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Natural Disasters and Resource Rights

Building resilience, rebuilding lives

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Overview[1]

Natural disasters such as hurricanes, tsunamis and earthquakes damage and destroy the land, sea, forest and other resources vital to peoples' livelihoods. They kill titleholders, destroy documentation and erase demarcations. Compensation after such disasters is often inadequate, and movements of refugees can increase competition over scarce resources.

Where resource rights are clearly defined, equitable and verifiable, poor and marginalized communities are better equipped to survive disasters and recover after them. Resource rights govern how individuals or communities use certain resources and shape the livelihood options available to many people. These resource rights may take the form of open, common, state or private property; examples include land ownership, fishing rights, communal grazing rights and so on. For the poorest, access and control over resources are important determinants of their vulnerability and resilience to natural disasters.

Before a natural disaster strikes, the **resilience** of groups and individuals can be strengthened by their resource rights. Control and access to such resources influences spatial planning in areas vulnerable to natural disasters, encourages investment in resilience, and helps to reduce the environmental degradation which heightens vulnerability.

After a natural disaster, a number of issues arise around the **relocation** of communities, the **reconstruction** of infrastructure, the **restitution** of rights and the **rehabilitation** of livelihoods. First, the relocation of affected populations, whether as a result of destroyed resources or as a means to reduce exposure to future hazards, can provoke competition between displaced and established populations. Population movements may give rise to increased environmental degradation and can result in opportunistic land and resource grabs in areas cleared of people.

Restitution of lost resources is complicated by the death of titleholders and the loss of ownership information. The destruction of documentation and demarcations adds to this confusion, as does ethnic and gender discrimination and the informal nature of many holdings in the affected communities of the developing world.

Clarity over private and communal resource ownership is a precondition for the effective reconstruction of disaster-affected regions. Without such rights, formal land-use planning and enforced building standards are often absent, thus delaying reconstruction, perpetuating vulnerability and raising tensions amongst those competing for scarce resources.

Greater focus on resource rights is central to the rehabilitation of communities affected by natural disasters. Access to, and control over, resources enables the rebuilding of livelihoods, as agriculture, aquaculture and other income strategies are revived and the borrowing capabilities of survivors are restored.

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This paper discusses the role of resource rights in pre-disaster resilience and post-disaster reconstruction. It also raises a number of important questions: Where is the balance between communally-held and privately-held resource rights? How can an understanding of resource rights be integrated into disaster risk reduction plans and disaster relief? And what are the roles and responsibilities of government, the international community and civil society?

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1. Introduction

For many, the threat of natural disaster is a part of everyday life. Millions are faced with drought, flooding, windstorms and earthquakes. For those struggling to rebuild their livelihoods after such disasters, the destruction can seem insurmountable.

After the Tsunami, Sri Lanka, January 2005

Resource owners die, documentation is destroyed and land demarcations vanish. Pollution, salinization, flooding and the destruction of irrigation systems reduce usable resources, with survivors forced to compete for increasingly scarce resources in and around the affected regions. Refugees put pressure on existing resources, while regulations prohibiting reconstruction within a certain area can displace entire communities. Compensation can be confused, discriminating and often insufficient.

This paper analyzes the role of resource rights in helping poor and marginalized communities survive natural disasters and recover after them. "Resource rights" refers to an enforceable authority to undertake particular actions with regards to resources. This can include the right to access the resources, to extract or harvest the resource, to manage the resources' use, to exclude access to external parties and to transfer ownership. All of these rights may be held by single individuals or on a collective basis.[2]

In economic terms, 2004 was the most expensive natural catastrophe year on record, with losses totalling US$145 billion.[3] While the number of natural disasters has remained fairly stable over the past 10 years at 650 events per annum, the cost associated with them has been steadily increasing.[4]

The majority of the 2004 monetary losses were concentrated in the developed world and resulted primarily from property destroyed in the southern United States following the summer hurricane season and for the typhoons and earthquake that struck Japan. The figure does not reflect the true scale of human loss for 2004, excluding, for instance, the enormous loss sustained by the developing countries affected by the Asian tsunami of December 26, 2004.

[2] Ostrom, Elinor. "Private and Common Property Rights," 1999, p.332.
[3] Munich Re Group, "Annual Review: Natural Catastrophes 2004," p.2.
[4] ibid.

According to the United Nations Development Programme (UNDP), 85 per cent of those exposed to disaster-risk live in countries having either medium or low human development.[5] While a certain amount of this risk can be attributed to geography, much of it has to do with poverty and under-development. Vulnerability to natural disasters is derived from population growth and density, unplanned human settlements, poor construction, lack of adequate infrastructure, social inequality, poverty and poor environmental management.[6]

Poverty remains the real threat, for while only 11 per cent of the people exposed to natural hazards live in countries classified as low human development, they account for more than 53 per cent of the total number of recorded deaths.[7] The true scale of this figure becomes apparent when considering that in the two decades leading up to the year 2000, 1.5 million people were killed by natural disasters. For each person killed, 3,000 were affected by disaster.[8]

This paper will examine the relationship between resource rights and disasters. It will do so looking at the pre- and post-disaster settings; namely, what resource rights issues affect pre-disaster resilience, and what issues arise in post-disaster reconstruction and rehabilitation. It will examine how resource rights interact with natural disasters to magnify or lessen their impact, and will seek to explain why clearly-defined, provable private and communal resource rights are crucial to reducing disaster vulnerability. Following this, the paper will conclude with questions for discussion raised by the research.

[5] UNDP, "Reducing Disaster Risk," 2004, foreword.
[6] "Reducing Vulnerability to Natural Disasters," Inter-American Development Bank, May 1999.
[7] UNDP, "Reducing Disaster Risk," 2004, p.1.
[8] ibid., p.3.

2. Disasters, Vulnerability, Resilience and Resource Rights

2.1 Disaster Vulnerability and Resilience: Some definitions

A **hazard** can be defined as a potentially damaging physical event, phenomenon or human activity that may cause the loss of life or injury, property damage, social and economic disruption or environmental degradation.[9] Their origins can be social (conflict and terrorism), technological (industrial and transport accidents) or natural (floods, windstorms, earthquakes and droughts). A **disaster** is defined as a "serious disruption of the functioning of a community or a society causing widespread human, material, economic or environmental losses which exceed the ability of the affected community/society to cope using its own resources."[10] Whether a **hazard** become a **disaster** depends on the **vulnerability** of a system.[11]

Vulnerability is the propensity to suffer some degree of loss from a hazardous event.[12] It is comprised of a system's exposure to a hazardous event and its ability to cope with or adapt to the impacts. Exposure and coping capacity are, in turn, shaped by a range of social conditions or processes such as poverty, political marginalization, conflict, population growth, rapid urbanization, settlement patterns and environmental degradation. As Hewitt notes,

> "Vulnerability is maintained by economic and other conditions. It is reproduced by the activities that sustain unsafe living conditions for some, or disempower them, and changes only if these conditions are transformed."[13]

For the poor, vulnerability is therefore both a condition and determinant of poverty.

While minimizing exposure is important for reducing vulnerability, recent academic analysis and debate has focused on the ability to cope with and adapt to hazard impacts – in many cases rendered synonymous with the concept of **resilience**. The word "resilience" is intuitively associated with the capacity to withstand and "bounce back" from a disturbance. More specifically, "ecosystem resilience" is concerned with a system's ability to maintain structure/function in the face of disturbance and move into a different state following disturbance-driven change.[14] It focuses on attributes such as persistence, adaptability, variability and unpredictability – all of which are at the heart of evolution and development.

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[9] UN/International Strategy for Disaster Reduction, Geneva, 2004. Online at http://www.unisdr.org/eng/library/lib-terminology-eng%20home.htm .

[10] UNISDR. *Living with Risk: A global review of disaster reduction initiatives.* Geneva: United Nations, 2002, p.338.

[11] It must be remembered that while large-scale events as those discussed in this paper cause massive amounts of damage and suffering, they also overshadow the countless small and medium-scale disasters that cumulatively cause greater damage. In "Reducing Vulnerability to Natural Disasters," Inter-American Development Bank, May 1999.

[12] Etkin, D., Haque, E., Bellisoria, L., & Burton, I. *An assessment of natural hazards and disasters in Canada.* Ottawa: Environment Canada, 2004, p.xi.

[13] Hewitt, Kenneth. 1997. *Regions of Risk: A Geographical Introduction to Disasters.* London: Longman, p.153.

[14] Holling, C.S. and B. Walker. 2003. Resilience Defined. Internet Encyclopedia of Ecological Economics. http://www.ecoeco.org/publica/encyc.htm .

Resilience as applied to ecosystems or socio-ecological systems has three defining characteristics: (1) the amount of change the system can undergo and still retain the same controls on function and structure; (2) the degree to which the system is capable of self-organization (recovery); and (3) the ability to build and increase the capacity for learning and adaptation.[15] The last point emphasizes the primary difference between resilience in ecosystems and social systems – the capacity for forward planning. This **adaptive capacity,** which, simply stated, refers to the ability of the actors in a system to influence or manage their resilience, is dependent on institutions and systems that learn and store knowledge.[16, 17]

2.2 Natural Resources and Property Rights

Natural resources can play an important role in shaping disaster vulnerability in two ways: (1) by reducing exposure to or impact of hazards through natural buffering capacities (exposure), for example, mangrove forests that protect coastal lands from storm surges and hillside forests that stabilize soils to reduce the likelihood or impact of landslides; and (2) by supporting people's livelihoods and well-being, particularly in times of crisis by providing them with the resources (e.g., food, fuel, makeshift shelter) to cope with and recover from shocks (resilience).

The Millennium Ecosystem Assessment documented examples of how ecosystems sustain livelihoods and human well-being. More than two billion people, for instance, depend on biomass (mostly fuel wood) for cooking and heating,[18] and 75–90 per cent of people in developing countries rely on natural products for medicine. For communities more directly dependent on natural resources, a degraded or depleted resource can undermine people's health, economic security and social relations, ultimately diminishing the communities' ability to deal with disturbances. Blaikie *et al.* note that "a 'safe environment' is the goal […] but is also the means. Reducing vulnerability to disasters will be shown to be tied up with increased resource access and empowerment of marginal groups."[19] In fact it can be argued that the greater the level of resource dependency, the stronger the links between ecological and social resilience.[20]

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[15] Resilience Alliance. 2001. http://www.resalliance.org .

[16] Walker, B. and J. A. Meyers. "Thresholds in ecological and social–ecological systems: a developing database," Ecology and Society 9(2), 2004, p.3.

[17] The term "adaptive capacity" is also used in climate change literature, albeit with a slightly different meaning. As summarized above, socio-ecological approaches identify a conceptual hierarchy whereby adaptive capacity is a component of resilience, which is, in turn, a determinant of vulnerability (Klein *et al.*, 2003). In climate change literature, the relationship between adaptive capacity and resilience is reversed – i.e., resilience contributes to adaptive capacity, which is a determinant of vulnerability to climate change impacts. Climate change researchers define adaptive capacity as, "the equivalent of coping ability, and includes the capacity to prepare for, avoid or moderate, and to recover from exposure effects" (Smit and Pilifosova, p. 20). Thus, the ability of a system to buffer, recover from and plan for disturbances appears in both the socio-ecological interpretation of resilience, and the climate change definition of adaptive capacity. This paper subscribes to the socio-ecological understanding of the relationships between vulnerability, resilience and adaptive capacity.

[18] UNDP, UNDESA and World Energy Council. 2000. World Energy Assessment, UNDP, New York.

[19] Blaikie, P., T. Cannon, I. Davis and B. Wisner. 1997. At Risk: Natural Hazards, People's Vulnerability and Disasters. London: Routledge, 1997, p.34.

[20] Adger, W. N. "Social and ecological resilience: are they related?" Progress in Human Geography, 24(3), 2000, pp. 347-364.

Central to the linking of ecological and social resilience are the institutional arrangements, such as **resource or property rights**, that influence the use of natural resources.[21] Simply stated, property rights govern what individuals or groups can do with certain resources. More specifically, they "specify the claims and related obligations of different actors – individuals or groups – to the benefits of a resource."[22] If a person holds a right, then others have an obligation to observe that right. Conversely, for resource users who do not possess prescriptive rights, no one holds a corresponding duty to protect their continued use of a resource. As a result, systems of property rights shape the authority and incentives structure of the rights holder, leading to particular patterns of environmental use.[23] Clearly defined property rights minimize the risk of appropriation, thereby encouraging investment in and sustainable use of resources.

Conventional research and analysis identify four types of property rights regime:[24]

1. **Open access**, characterized by the absence of well-defined property rights, where access to resources is free and open to all;
2. **State property**, where governments regulate and control access to resources which are owned by citizens of the state;
3. **Common property**, where a specified group of people own the resource and can regulate use and exclude non-owners; and
4. **Private property**, where resources are owned by individuals or corporations and their rights are defined by terms of exclusivity and transferability.

These four types of regime differ in the nature of ownership, the rights and duties of owners, the rules of use and the locus of control.[25] Moreover, no single regime can be deemed more effective in reducing environmental degradation or, conversely, supporting ecosystem resilience – different contexts call for different institutions. In fact, as institutional arrangements, property rights are reflective of a community or society's values, interests and priorities. As Hanna *et al.* note, "in addressing environmental problems, policy must focus on establishing property rights regimes that are designed to fit the cultural, economic, geographic and ecological context in which they are to function."[26] While many economists have argued that private ownership of resources is more likely to remedy environmental problems, evidence has also revealed resource overuse under private ownership and sustainable management under collective, decentralized property regimes.

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[21] ibid.

[22] Meinzen-Dick, R. R. Pradhan, and M. Di Gregorio. Collective Action and Property Rights for Sustainable Development: Understanding Property Rights. Focus 11, Brief 3, 2004. http://www.ifpri.org/2020/focus/focus11/focus11.pdf

[23] Hanna, S., C. Folke and K-G Maler. Property Rights and the Natural Environment in Rights to Nature: Ecological, Economic, Cultural, and Political Principles of Institutions for the Environment, edited by S. S. Hanna, C. Folke and K-G Maler. Washington, D.C.: Island Press, 1996, pp. 1-10.

[24] Berkes, F. "Social Systems, Ecological Systems, and Property Rights," in Rights to Nature: Ecological, Economic, Cultural, and Political Principles of Institutions for the Environment, edited by S. S. Hanna, C. Folke and K-G Maler. Washington, D.C.: Island Press, 1996, pp. 87-107.

[25] Hanna, S. and M. Munasinghe. "Property Rights and the Environment," The Beijer International Institute of Ecological Economics/The World Bank, 1995.

[26] Hanna, S., C. Folke, and K.-G. Maler. Rights to Nature: Ecological, Economic, Cultural and Political Principles of Institutions for the Environment, Washington, D.C.: Island Press, 1996, p.4.

It is important to note that the four regimes described above are neither mutually exclusive nor always representative of reality. In practice, there is overlap between and variation within the identified regimes, and rights are far more complex. Ostrom notes that the regime typologies, "better reflect the status and organization of the holder of a particular right than the bundle of property rights held."[27] In fact, each of these regimes can be understood to delineate the rules for a range of specific types of rights, which can be bundled into use rights (i.e., rights to access, withdraw or exploit) or decision-making rights (i.e., rights to management, exclusion and alienation). The former is about exercising a right, while the latter is about participating in the definition of future rights.[28] Different rights and rights-holders may exist for the same resource. For example, the state may be the owner of a forest, but individuals may have rights to collect firewood (withdrawal), while certain communities may have the right to plant trees (management) or guard the resources (exclusion).

The regimes and specific types of property rights and holders do not always originate from "the state." While statutory laws are important in establishing, monitoring and enforcing property rights, there are other sources of property rights including:

- International treaties and law (e.g., international fisheries treaties);
- Religious law (e.g., Sharia);
- Customary law (e.g., property inheritance through males, and traditional dispute resolution);
- Project (or donor) law, including project or program regulations; and
- Organizational law, such as rules made by user groups.[29]

These different legal frameworks (or "legal pluralism") do not exist in isolation but can overlap or influence each other. For example, international treaties may influence state law, which may influence local customs or, conversely, religious law may find its way into state law. And not all legal frameworks are equally powerful – "each is only as strong as the institution that stands behind it."[30] In some cases, statutory law is more powerful and is used by government officials or outsiders, while in other cases local communities will depend on customary laws to dictate everyday decisions. Meinzen-Dick *et al.* note that "state titling programs do not always provide stronger security than customary rights and may even be a source of insecurity for women and households with less information or fewer connections to obtain government land registration."[31] And while legal pluralism may translate into confusing and sometimes conflicting claims to a resource, they also provide a certain amount of flexibility in managing natural resources – particularly during times of stress or crisis. While statutory frameworks may provide a basis for managing water resources or rangelands

[27] Ostrom, E. 1998. "Efficiency, Sustainability, and Access Under Alternative Property-Rights Regimes." Paper presented at the UNU/WIDER project "Land Reform Revisited: Access to Land, Rural Poverty, and Public Action," Santiago, Chile, April 27–29, 1998. Available at: http://www.rlc.fao.org/eventos/1998/abril/tierra/regimes.pdf

[28] Ostrom, E. and E. Schlager. "The Formation of Property Rights," in Rights to Nature: Ecological, Economic, Cultural, and Political Principles of Institutions for the Environment, edited by S. S. Hanna, C. Folke and K-G Maler. Washington, D.C.: Island Press, 1996.

[29] Meinzen-Dick, R. R. Pradhan, and M. Di Gregorio. 2004.

[30] ibid., p.1.

[31] ibid., p.2.

in some countries, communities may turn to customary frameworks during droughts or other disasters, as they may provide safety nets based on reciprocal exchange between social groups.

Finally, the mere existence of clearly defined property rights – whether through official documentation or collective memory – is not enough. If people are not aware of the existence of their rights due to lack of knowledge, communication or access to information, the rights cannot be exercised. Even if communities are aware of their rights, they can be undermined by the absence of equitable monitoring and enforcement systems, as well as inadequate dispute-resolution mechanisms. Moreover, if exercising property rights involves paying a fee – to obtain a fishing permit or lease, for instance – the cost may be too prohibitive for some communities, particularly poorer, resource-dependent communities whose livelihoods and well-being are directly affected by resource access.

2.3 Resource Rights and Resilience: What are the links?

Clearly defined, equitably enforced property rights are central to shaping access to and sustainable management of natural resources, which in turn are an important component of socio-ecological resilience. The link between property rights and resilience is clear, but what are some examples? In his study of early indigenous societies in the Pacific Northwest U.S., Trosper (2003) notes that "contingent land proprietorship," helped to buffer and recover from disturbances from both the ecosystem and human activity.[32] He describes those who controlled the land as proprietors rather than owners, since land could not be sold but was transferred only through inheritance. Holding titles was "contingent on proper management, as judged both by productivity of the land and by stewardship of that productivity."[33] This ensured social stability during times of both plenty and stress. Thus the property rights system contributed to ecological and social resilience.

Adger (2000) describes how mangrove conversion and agricultural privatization have undermined common property institutions in Vietnam, negatively impacting the resilience of local social and ecological systems.[34] The loss of mangrove resources has reduced household livelihood security and enhanced conflict between households, leading to less cooperation and further exploitation of the remaining resources, along with increased income inequality. The resilience offered by the mangrove ecosystem has also been reduced by aquaculture practices which convert mangroves to ponds, thus increasing the risk of coastal flooding. This negative ecosystem change feeds back to the social structures and arrangements that depend upon its productivity, further undermining social resilience and increasing community vulnerability to coastal hazards.

The 2004 World Disasters Report notes that clearly defined and equitably enforced property rights are central to disaster resilience. In examining community resilience in the Philippines, the authors note that farmers are discouraged from investing in disaster-resilient crops due to insecure land tenure. A tenant farmer is quoted as saying:

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[32] Trosper, R. L. "Resilience in Pre-contact Pacific Northwest Social Ecological Systems." Conservation Ecology, 7(3): 6, 2003. [online] URL: http://www.consecol.org/vol7/iss3/art6

[33] ibid.

[34] Adger, W. N. "Social and ecological resilience: are they related?" *Progress in Human Geography*, 24(3), 2000.

> "The rice field we farm is low-lying and flooded on a more-or-less annual basis… Flooding greatly reduces our harvest… This land would be better suited to growing plantation trees. However, as tenant farmers, we cannot plant trees. Even if we got permission, as tenants, we would have no guarantee that the landowner would not reclaim the land (and trees)… We have no tenancy contract – landowners do not need to give notice or compensation to their tenants if they wish to reclaim their land."[35]

For the poorest, access and control over natural resources are an important determinant of vulnerability and resilience. A central argument of this paper is that **clear, predictable and equitably allocated resource rights help poor and marginalized communities increase their resilience to natural disasters**. Efforts to rebuild and rehabilitate after natural disasters are often complicated by unclear and un-provable private and communal resource rights, which can delay reconstruction and increasing the suffering of those already affected. As such, the second main argument of this paper is that the **equitable re-allocation of resource rights is crucial to the post-disaster restoration of sustainable livelihoods**.

[35] International Federation of Red Cross and Red Crescent Societies. World Disasters Report, 2004.

3. Natural Disasters and Resource Rights

"[Hurricane] Mitch was not a natural disaster. The disasters have been happening over the years while we have been devastating the forests, burning the soils, and leaving the watersheds unprotected. Mitch was just a response to all those disasters."

Raúl Zelaya
World Neighbours Area Representative, Central America[36]

3.1 The Pre-Disaster Setting: Resilience

Vulnerability to natural disasters is derived from many factors: population growth and density, unplanned human settlements, poor construction, lack of adequate infrastructure, social inequality, poverty and poor environmental management.[37] Resource rights issues permeate many of these issues. The poor are particularly vulnerable; due to the type of housing upon which they rely, the marginal lands they inhabit, the liquidity constraints they face, their inability to escape disaster zones, as well as their limited education and awareness of the dangers.[38]

Resource rights represent one potential source of vulnerability, but as discussed are also key factors in building resilience. Clearly defined and equitable resource rights may help to improve planning in areas vulnerable to natural disasters. They can encourage land and homeowners to invest in windbreaks, better home construction and flood barriers, and provide the necessary collateral to make such investments. Finally, personal or collective ownership may help to reduce the environmental degradation that increases vulnerability to natural disaster. This resilience will prove increasingly important and challenged in the years to come, as trends indicate that climate change will lead to an increase in the frequency and intensity of exceptional weather events.[39]

Central to the relationship between resilience and resource rights is the establishment of property rights and mechanisms to regulate land tenure, in order to clarify land ownership, access and boundaries. Such clarity of ownership allows the settlement of individuals and communities away from areas physically exposed to natural hazards (i.e., fault lines and eroded hillsides).

Conversely, the establishment of land tenure without an appreciation for vulnerability and environmental planning can encourage the establishment of settlements in hazard-prone areas.[40] Such settlements are commonly built on marginal lands without the infrastructure required to withstand the natural threats dictated by geography and climate. Much of the damage caused by the cyclone that hit India's Orissa coast in 1999 occurred in the extensively-deforested new settlement areas along the region's shoreline, as the storm surge ripped through a 100-km long denuded stretch, killing thousands within minutes. According

[36] World Neighbors. "Lessons from the Field – Reasons for Resilience: Toward a Sustainable Recovery after Hurricane Mitch," 2000, p.9.
[37] "Reducing Vulnerability to Natural Disasters," Inter-American Development Bank, May 1999.
[38] Dayton-Johnson, Jeff. "Natural Disasters and Adaptive Capacity," OECD Working Paper 237, 2004, p.18.
[39] Munich Re Group, "Annual Review: Natural Catastrophes 2004," 2004, p.17.
[40] "Reducing Vulnerability to Natural Disasters," Inter-American Development Bank, May 1999.

to local reports, illegal Bangladeshi immigrants had been allegedly encouraged to settle in the affected area by vote-seeking politicians. During the construction of their homes, they destroyed the sand dunes, mangrove and *casuarina* forests, stripping away the traditional barriers to storm surges and high winds.[41]

The legalization of land tenure may encourage occupants to invest in their resources – namely their houses and land – for the long-term. After all, people are much more likely to invest in their land if they are confident those investments will remain with them and that they can pass them on to their children. Effective resource rights systems may also promote investment in resilience-building resource management.

In Central America, decades of agricultural expansion and growth in human settlements have cleared much needed vegetation that absorbed water and anchored soils during times of heavy rain. In the aftermath of Hurricane Mitch, studies in Honduras, Nicaragua and Guatemala indicated that farms using agro-ecological practices – including agro-forestry – withstood the storm's impacts better than those using conventional farming methods. The sustainably-managed plots retained more topsoil and experienced less erosion than neighbouring plots.[42] However, with a lack of reliable credit or technical assistance, rural families had little incentive (or means) to increase their resilience, whether through sustainable land management, soil and water conservation, forest protection or erosion and landslide prevention. Central America's widespread rural poverty, unequal land tenure, and unsustainable farming and land use, thus all contributed to the destruction left in the wake of Hurricane Mitch.[43]

Cyclone-prone coastal communities in Vietnam have seen the risk reduction benefits of mangrove forests firsthand. Since 1994 the Vietnam National Chapter of the Red Cross has been working with local communities to plant and protect mangrove forests in northern parts of the country. Some 12,000 hectares have been planted and the benefits are clear. An initial investment of US$1.1 million saved an estimated $7.3 million a year in sea dyke maintenance. During the devastating typhoon Wukong in 2000, project areas remained relatively unharmed while neighbouring provinces suffered significant losses of life and property.[44]

Without proper collective or private tenure systems in place, the over-exploitation of resources and environmental degradation increase a community's vulnerability to disaster. In Haiti, severe floods in May 2004 and Tropical Storm Jeanne in September of that year together killed over 5,000 people. Scientists and the media were quick to highlight the link between these events and the country's high level of deforestation, noting that the country had already cleared 98 per cent of its forests. In the Philippines, flash floods and landslides in November and December 2004 left more than 1,600 people dead or missing. President

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[41] Delaney *et al*., "Weathering Natural Disasters – Refocusing Relief and Development through Improved Agriculture and Environmental Practices," June 2004, p.26.
[42] World Neighbors. "Lessons from the Field – Reasons for Resilience: Toward a Sustainable Recovery after Hurricane Mitch," 2000, p.9.
[43] ibid., p.8.
[44] International Federation of Red Cross and Red Crescent Societies, World Disasters Report, 2001.

Gloria Arroyo publicly blamed the disaster on the indiscriminate logging that has left the country with less than six per cent of its original forests.[45]

Conversely, village-level management of local forests in Nepal is successfully regenerating forest cover and supporting local livelihoods whilst reducing erosion, flooding and landslides.[46] By 2002 local communities were managing 16 per cent of Nepal's forests. This community forestry practised in Nepal offers a prime example of how communally held resource rights can support the sustainable use of natural resources and increase a community's resilience to natural disasters.

Box 3.1 Divi Seema Cyclone, India, 1977[47]

In 1977 the island of Divi Seema in the Krishna River delta of India was hit by a strong cyclone which left 10,000 dead. The exposure and vulnerability of the victims can largely be attributed to the patterns of resource access and rights of the island's inhabitants.

In the years leading up to the cyclone, the majority of the island was controlled by rich landowners who, following the irrigation of the island's arable inland, bought up the land as absentee landlords. This pushed the marginalized and poor inhabitants from the interior to the coast. In turn the influx of inhabitants to the coast led to increased fishing activities and the destruction of important mangrove buffer areas.

Recognizing the problem, the government drew up a plan to transfer large amounts of land to these poor communities. However, the plan was never realized as funding fell short when the beneficiaries could not obtain credit from the banks for land development due to a lack of collateral resources. With banks continuing to lend only to those with collateral, the poor were forced to use moneylenders, which further indebted them through their exorbitant interest rates. Economically and physically vulnerable, these poor communities had few defences against the cyclone when it struck.

[45] Hammill, Brown and Crawford. 'Forests, natural disasters and human security' *Arborvitae*, March 2005, IUCN, p.8.
[46] Interview with Praveen Pardeshi, ISDR, 2005.
[47] Drawn from Winchester, P. "Cyclone Mitigation, Resource Allocation and Post-Disaster Reconstruction in South India: Lessons from Two Decades of Research," ODI, 2000.

3.2 The Post-Disaster Setting

"The first step is to ensure people are able to recover their basic documentation, such as identity cards, and get death certificates issued for the purposes of inheritance."

Rory Mungoven
Senior Human Rights advisor to the UN Country Team in Sri Lanka[48]

There remains a pressing need to address the links between resource rights, disaster risk reduction and reconstruction. Often, in regions such as the tsunami-affected Andaman and Nicobar islands, this involves recognition of non-traditional forms of ownership as well, particularly community ownership in secluded communities.[49] Unfortunately, the importance of private and communal resource rights to reconstruction efforts and disaster risk reductions strategies does not appear explicitly within the agenda of the Hyogo Action Plan, the working document to come out of the 2005 World Conference on Disaster Reduction, held shortly after the Asian tsunami in Kobe, Japan.

We do not suggest that the privatization of resource rights is necessarily the best way to promote resilience and effective reconstruction, nor that vulnerability to disasters should be used as a rationale for individualizing land tenure. We would rather propose that clearly defined, provable private *and* communal resource rights are both equally important, and they should be considered central to effective disaster risk reduction.

Recovering and protecting communal and private property rights may lay solid foundations for reconstruction, spatial planning, compensation and long-term economic regeneration. They also serve to maintain social justice, ensure long-term social stability, and eliminate any spurious claims made on the land that remains, attempting to exploit the confusion of vulnerable and disadvantaged groups.[50]

Ruined homes in Mt Lavinia, Sri Lanka, January 2005

The following section examines issues surrounding resource rights in the post-disaster setting. Drawing largely on the Asian tsunami, this section will first look at the issues surrounding the **relocation** of affected populations and infrastructure, followed by complications to the **reconstruction** efforts. It will then look at the issues surrounding the **restitution and compensation** of individuals relating to their losses, before closing with the longer-term concern of **rehabilitation** of livelihoods.

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[48] Ahamed, Farah Mihlar, "Human Rights Concerns Come to the Fore in Post-Tsunami Relief Agenda," Respect, OHCHR, 2005, p.4.
[49] "After the Deluge: India's Reconstruction Following the 2004 Tsunami." Human Rights Watch, 17:3; May 2005, p.46.
[50] World Bank, "Rebuilding a Better Aceh and Nias," 2005, p.40.

Box 3.2a The Asian Tsunami

The Asian tsunami of December 26, 2004, inflicted great damage and suffering to the affected region. With a death toll of nearly 300,000, its impacts on families, communities and nations are likely to last generations.

The damage to the natural environment, upon which many depend, was extensive. According to the United Nations Environment Programme's Rapid Environmental Assessment (REA), coastal ecosystems were destroyed throughout the region; debris was dragged from the land into the ocean, standing crops were ruined just before harvest, and soils became brackish due to salinization. Wells were contaminated, irrigation systems damaged and septic tanks spilled toxic materials into fields.[51] This had the cumulative effect of temporarily halting agricultural in the coastal regions and increasing the scarcity of valuable resources in a way that will continue to have profound implications for local livelihoods in the future.

Regional examples provide a glimpse into the scale of the disaster for local livelihoods. In India, primarily in the state of Tamil Nadu, coastal communities, primarily fishing villages, bore the brunt of the damage; 230,000 homes in 1,089 villages were damaged or destroyed. 35,000 livestock were killed, 22,000 hectares of cropland damaged, and 83,000 fishing boats damaged or lost.[52] The region also suffered from extensive infrastructure damage.

Damage to the documentation infrastructure was similarly widespread. In the affected regions of Indonesia (namely Aceh and North Sumatra), the National Land Agency lost 40 staff and six of its offices in the area were demolished. Ten per cent of land books were lost, while most of the remaining records required urgent conservation and restoration to save the data. Almost all taxation maps were lost. The Land Agency's offices were constrained by insufficient supplies necessary to meet the demand for record recovery support.

All told, 300,000 land parcels were affected in Aceh and North Sumatra – 170,000 urban and 130,000 rural. It is estimated that only 60,000 of these were titled.[53] This problem is also evident in Sri Lanka as well, where it is estimated that 90 per cent of the people whose houses were destroyed lost all of their legal and property documentation.[54] This significantly complicates reconstruction and rehabilitation efforts, as is it difficult to identify rightful land owners and users with no documentary proof available.

These issues are likely to delay the reconstruction effort and could create tensions among those competing for the markedly reduced resources available. The destruction has led to unemployment and has required significant food imports, while the land administration sector has lost many of its workers, and thus much of the long-term capacity to manage future agricultural reconstruction.[55]

[51] UNEP, "After the Tsunami: Rapid Environmental Assessment," 2005, p.11.
[52] "After the Deluge: India's Reconstruction Following the 2004 Tsunami." Human Rights Watch, 17:3; May 2005, p.6.
[53] World Bank, "Rebuilding a Better Aceh and Nias," 2005, p.xvi.
[54] Ahamed, Farah Mihlar, "Human Rights Concerns Come to the Fore in Post-Tsunami Relief Agenda," Respect, OHCHR, 2005, p.4.
[55] IFAD "Proposed IFAD Response in Asia," February 2005, p.8.

3.2.1 Relocation

For many families and communities in India, Indonesia, Sri Lanka and Thailand, the Asian tsunami left them few alternatives but to move. Land was often rendered useless due to salinization or flooding, while some coastal and riverside land simply disappeared – either washed away or shifted due to tectonic activity.[56] A similar situation faced many Central Americans following the landslides and flooding of Hurricane Mitch. A prime concern for affected communities is to regain their livelihood. To do so requires seeking out alternative resources and lands upon which houses can be built and crops can be planted.

In addition, some governments in South and Southeast Asia have decided to create coastal buffer zones in which no reconstruction is permitted. The idea is to move coastal communities permanently away from disaster-risk areas to reduce casualties in the event of future floods or tsunamis. The Sri Lankan government, for example, is trying to establish such restricted areas from between 100-300 m off the coastline, depending on local risk exposures.[57] This effort would require moving over 118,000 houses .[58]

However, by moving communities away from the coastline, the government runs the risk of generating competition and potential conflict between those currently occupying the land and the resettled communities. The influx of relocated families will increase the demand for area resources without a corresponding increase in resource supply, or reignite discriminations through proximate resource holdings. In India, there is real fear of an outbreak of violence between fisherman and *Dalits* (untouchable caste). Should the fishermen be relocated further inland for reconstruction purposes, the two communities would become close neighbours and could lead to conflict. The Dalits fear that these resettled fishing communities will not want to live close to them and will use their greater political clout to push them out of the region.[59]

Ultimately these attempts at deflecting risk could instead translate into new disaster vulnerability. Increased population density in resettled areas may accelerate environmental degradation. Should deforestation and soil erosion result from this increased resource-use, the risk associated with flooding and landslides could increase, thus negating the initial disaster-risk reduction benefits of the tsunami-related relocation.[60]

Imposed buffer zones may also impede the economic revival of affected areas. The establishment of coastal management zones separates much of the population from the resources upon which they depend for their livelihoods. In the cases mentioned above, placing the fishermen's homes hundreds of metres from the shoreline ostensibly removes them from their place of work (the sea) making it more difficult to make their livelihoods and also complicates support activities such as fish cleaning, transport and marketing.

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[56] ibid., p.11.
[57] Atapattu, Sithara. "Tsunami Impacts on Coastal Ecosystems of Southern Sri Lanka," 2005, p.9.
[58] TAFREN, "Rebuilding Sri Lanka Action Plan," 2005, p.106.
[59] "After the Deluge: India's Reconstruction Following the 2004 Tsunami." Human Rights Watch, 17:3; May 2005, p.29.
[60] World Bank Operation Evaluation Department, "Lessons from Natural Disasters and Emergency Reconstruction," 2005.

Similarly, moving communities away from seismic threats could restrict community and individual access to arable lands.

Tourism could also suffer from the creation of coastal buffer zones. A significant part of the tourist industry in the affected areas revolves around easy access to beach and sea. The concern is that coastal buffer zones might lead to a contraction of the tourist industry and consequently reduced investment and local employment.

In some cases, buffer zones have purposefully been established in a discriminatory manner. As the Brookings Institute reports, "in some areas it was reported that local residents would not be allowed to return and reconstruct their homes and that local fishermen would not be allowed to regain their livelihoods, but that corporations would be permitted to construct tourism facilities in the same areas. Indeed, there have been news reports of rampant opportunism in the wake of the tsunami, with particular risk to marginalized and vulnerable groups."[61]

Many local residents are concerned that the tsunami and the subsequent relocation have created an opportunity for the government and private interests to gain control of valuable coastal land and resources. Ossie Fernandes, of the Chennai-based Human Rights Advocacy and Research Foundation, reports that, "there is a very real threat that people are trying to take over land re-zoned as buffer zones. They fear that the Tamil Nadu government, in collaboration with multilateral agencies, is using the disaster to plan to redevelop the area in favour of tourism."[62]

On the other hand, the relocation of populations may also be beneficial, for instance in promoting the re-growth of natural breakwaters. According to UNEP, satellite photography before and after the tsunami corroborates anecdotal claims that coral reefs, mangrove forests and other coastal vegetation, provided protection from the impacts of the tsunami.[63] While some of these natural buffers controlled storm surges, in many areas they were too badly degraded due to coastal settlement and aquaculture to have much buffering effect.

Relocations could also promote the establishment of common resource regimes between the resettled population and existing residents. Policy space exists in the aftermath of a disaster for the creation of such resource management systems by communities and local or national governing bodies. Through collective ownership, such new communities could improve their resource use in ways unavailable through private or open access. Tension and conflict are by no means inevitable results of such relocations.

[61] Brookings Institute, "Warning Systems, Reconstruction and Stability: Durable Solutions in the Aftermath of the Tsunami Tragedy," 2005.
[62] "After the Deluge: India's Reconstruction Following the 2004 Tsunami." Human Rights Watch, 17:3; May 2005. p.40.
[63] UNEP, "After the Tsunami: Rapid Environmental Assessment," 2005, p.11.

Box 3.2b Post-Tsunami Land Tenure in Thailand: The Mokan

For the *Mokan,* or "Sea Gypsy" community of Thailand, the Indian Ocean tsunami exposed their country's fragile land tenure system. For decades, this community lived on state-owned or private coastal lands. While vague squatter laws gave the *Mokan* some legal claim over the area they inhabited,[64] some land developers, hoping to capitalize on Thailand's tourism boom, have been trying to remove *Mokan* villages to clear land for tourist resorts. The tsunami accelerated this process.

Initially displaced by the catastrophe, many *Mokan* returned to the lands upon which their villages once stood, hoping to rebuild their lives.[65] While some communities succeeded, others encountered private interests intent on developing the now-empty land in the absence of legal property holders.[66] Such eviction and land grab situations occurred in several places along the Thai coast.

Where competition for resources exists, the reclamation of land has taken several forms. The Phang Nga province's negotiation has become a model example.[67] In Phang Nga the people of Ba Tung Wah village simply moved back to where their houses once stood and began rebuilding without waiting for government approval. Instead, they were told that the land that had once been theirs was now to be used for a hospital funded by the German Embassy in Bangkok. Ultimately, an agreement was made to share the land, allocating the villagers two-thirds of their original land on a long-term collective lease, while still allowing for the building of the hospital.[68] This land-sharing method was repeated in several other villages in post-tsunami Thailand.

3.2.2 Reconstruction

Clarity over private and communal resource ownership, particularly of land, is a precondition for the effective reconstruction of disaster-affected regions.[69] Yet without formal land-use planning and enforced building standards effective application of resource rights becomes difficult. This often delays the reconstruction effort, and can perpetuate vulnerabilities and create tensions between those competing for scarce resources.

The difficulties arise from a number of sources. For those holding formal titles, the destruction of records (e.g., land titles, identity cards, insurance claims, civil status records and business records) can lead to conflicting claims. The destruction of boundaries and reference marks (i.e., trees and houses) further complicates property identification. Both hamper the ability of authorities to address resource rights issues in a timely manner. And in a post-disaster setting, there is an urgent need to address these issues as clean-up operations can destroy what few pieces of physical evidence associated with land ownership remain.

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[64] ACHR Survivors' Dialogue. ACHR report
[65] ibid.
[66] Charoenpo, Anucha. *The Bangkok Post.* 5 May 2005. See online: Bangkok Post Article
[67] ACHR Survivors' Dialogue. ACHR report
[68] ibid.
[69] World Bank, "Rebuilding a Better Aceh and Nias," 2005, p.38.

In Indonesia, three to five times as many landholders hold no registered title as those who do. For these former, possessory rights are only held through long and established occupation.[70] With proof of occupancy largely washed away by the tsunami's waves, these customary resource rights holders are left without tangible proof of their informal ownership. Communities need to resolve such issues in order to begin reconstruction. In Aceh, non-government organizations (NGOs) frustrated by the slow pace of government-led reconstruction and resource re-allocation organized community-mapping exercises to prepare inventories of resources and demarcate land boundaries.

Box 3.2c Addressing Land Tenure in Post-Tsunami Indonesia[71]

The confusion surrounding land tenure and resource rights in the Aceh and Northern Sumatra provinces of Indonesia led to the recognition that community-driven solutions were required to allocate land equitably. With the help of NGOs, community-mapping exercises can help produce a basic understanding of land ownership in the area. These basic reference sketches can be digitized using GPS equipment and reviewed for community acceptance (albeit not titles – only the National Land Agency (BPN) can issue those). This community-driven adjudication (CDA) of land rights is crucial. Once the community has reached agreement on the land ownership and the position of the land parcels, BPN is called in to survey the area, finalize ownership (and allow for complaints), and then issue titles. Up to 60 villages have commenced or completed this process to date.

Housing is a pressing post-disaster reconstruction issue, with many survivors having to live in temporary settlements for extended periods of time. The Bam earthquake of December 2003 destroyed 85 per cent of the Iranian city's buildings. However, despite the widespread destruction, only 11 per cent of the total surviving population moved into temporary camps. According to UN OCHA, "from the start Bamis were reluctant to leave their land: at first feeling a strong emotional bond to the place where their loved ones had been buried alive, and later fearing they would lose their small patch of land, all that most of the survivors had left."[72] Poor and marginalized communities are most in need, as their settlements are least likely to withstand disaster and may not lie on lands to which they have legal claim.

Tenure-related conflict remains a threat throughout the reconstruction phase. According to the World Bank, "there is a high likelihood that at least some conflicts will occur. This could include conflict over boundaries, ownership, inheritance, and between individuals and government. Ultimately, if disputes cannot be resolved through mediation at the community level, the processes of the courts will be necessary."[73]

Delays deriving from such resource rights issues and any fraudulent claims on un-owned assets in the disaster's aftermath serve not only to increase the cost of the reconstruction, but also increase the hazard's "disaster" potential. With survivors made to wait for reconstruction to begin, their means of livelihoods are placed on hold. Their income forfeit, they grow increasingly vulnerable.

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[70] ibid.
[71] ibid., pp.40-41.
[72] UN OCHA, "Special on Bam Six Months On," July 7, 2004.
[73] ibid., p.40.

3.2.3 Restitution and Compensation


Damaged fishing communities in Bentota, Sri Lanka, January 2005

To begin the rehabilitation of livelihoods many survivors first require compensation for their losses. Homes must be rebuilt, fields cleared and boats repaired. In many developing countries however, only a tiny fraction of the assets damaged by natural disasters are insured.

To begin with, disasters can take the lives of thousands of titleholders; and with them the human archive of information detailing who owned and had access to which resources. Formal documentation might also be lost or destroyed; washed away by landslides or flooding or lost to fires. Additionally, many of the demarcations used to identify communal and private lands can vanish. These effects can complicate subsequent efforts at equitable compensation.

For those with informal holdings, the question is even more difficult. In the affected areas of Indonesia, less than 10 per cent of the population of the province was reported to hold legal title to their land prior to the tsunami.[74] In the post-disaster setting there is confusion over who has rights over which resources, and where those resources are. Further complicating claims are the different types of law under which they may fall – be it formal, customary or religious. An inability to resolve these compensation issues cannot only generate tension among survivors, but can also delay reconstruction.

Nevertheless, such restitution issues are not necessarily an insurmountable challenge. In the case of the Asian tsunami, aerial photography and satellite images are being used to show where the houses once stood.[75] Community mapping exercises are underway (see Box 3.2c), and data triangulation techniques are being used to identify resource owners. To achieve this, authorities cross-reference existing pieces of identification (such as birth certificates and voting records) to identify claimants and re-establish land titling.[76]

[74] IFAD "Proposed IFAD Response in Asia," February 2005, p.3.
[75] World Bank, "Rebuilding Aceh," May 10, 2005.
[76] Personal interview, Praveen Pardeshi.

Box 3.2d Resources and Livelihoods after the 1991 eruption of Mt. Pinatubo[77]

When Mt. Pinatubo erupted in June 1991 after more than five centuries of inactivity, the damage done to the Philippine region of Central Luzon was devastating. After the eruption, a blanket of ash rendered 96,200 hectares of agricultural land unusable.

With heavily damaged land it was nearly impossible for the residents of Luzon to return to their fields. Both immediately and in the years that followed the eruption, many crops – particularly rice paddies – were covered by either ash (up to two meters in some areas), the thick layer of mud left behind by lahars, or flooded by clogged waterways. All told, the eruption undermined the livelihoods of an estimated 329,141 families.

The farmers most affected by the blast were land reform beneficiaries. Some were leaseholders, others were acquiring land through mortgage payment plans, and others were new owners who painstakingly met the government's requirements for full land transfer. Those with full ownership and residents who had already paid much of their mortgage were most devastated by the eruption, as they had no means to recover the land that belonged to them. Leaseholders fared slightly better, as they had not invested as much. Ultimately, the government did not provide any direct, individual compensation to resource title-holders, leaving the farmers to fend for themselves.

Barriers to compensation can further complicate reconstruction. Women and ethnic minorities lose out if they are unable to hold legal title to land or other resources. Additionally, even where women have access to compensation following a disaster, other barriers may still exist. In post-tsunami Tamil Nadu, for example, illiteracy and ignorance of the bank system hindered many women's attempts to access compensation payments.[78]

Compensation only to resource owners, excluding resource users, will prove similarly problematic in instances where landowners are compensated for the damages sustained by their lands, but the needs of the landless agricultural labourers whose livelihoods depend on the health of the land are ignored. Similarly, reports have surfaced in tsunami-affected countries in which landlords of damaged homes are claiming (and receiving) compensation for their destroyed property, but refusing to return deposits and rent advances to the tenants who inhabited them.[79]

[77] Drawn from De Guzman, Emmanuel. Asian Disaster Reduction Center. "Eruption of Mount Pinatubo in the Philippines in June 1991." ADRC Report.
[78] "After the Deluge: India's Reconstruction Following the 2004 Tsunami." Human Rights Watch, 17:3; May 2005, pp.17-18.
[79] ibid., p.25.

Box 3.2e Gender and Caste in the Gujarat Earthquake of January 26, 2001[80]

On January 26, 2001, an earthquake measuring 6.9 on the Richter scale struck Gujarat in western India killing an estimated 20,000 people, damaging over a million homes, and disrupting the lives of over 20 million people. Social injustices in Indian society, particularly those targeting untouchables (*Dalits)* and women, has persisted in the post-earthquake reconstruction efforts.

Gujarat's poorest families were largely ignored as relief efforts focused on the region's upper castes. Dalits faced difficulties claiming compensation for their homes as most had no papers, and lower caste widows were unable to inherit their husbands' land. While the government eventually made provisions for widowed Dalits, in which all they had to do was fill out certain forms, little effort was made to disseminate this information and consequently most Dalit women never knew this process existed. In other cases the government promised to rebuild houses for the Dalits, but refused to tell them where. The Dalits reacted by refusing to move from the rubble where their houses once stood, as with no papers they were afraid of being left with nothing.

A lack of gender equality within Gujarati society added to reconstruction complications. While their work remains largely socially invisible, the income women generate through informal jobs and agriculture is crucial to the survival of low income families.[81] The earthquake damaged the resources upon which many such women's livelihoods depended, such as gum and salt farming. However, little compensation was available. Combined with the costs of rebuilding their homes and communities, this resource and livelihood loss increased short-term insecurity and long-term vulnerability.

3.2.4 Rehabilitation of Livelihoods

"I can think of nothing that will generate more income over the long run for average families in this region than actually having title to the land they own."

Bill Clinton
UN Special Envoy for Tsunami Recovery
Aceh, May 23, 2005[82]

The long-term rehabilitation of livelihoods in disaster-affected regions can depend upon the strengthening of both private and communal resource rights. Addressing such land issues, according to UN Habitat, "will have a profound effect on the ability of societies to recover from crises and develop systems that will reduce their vulnerability to conflict and disaster in the future."[83]

[80] Drawn from Humanitarian Initiatives, UK, *et al.* "Independent Evaluation of Expenditure of DEC India Earthquake Appeal Funds." Full evaluation report, Volume 2.
[81] Enarson, Elaine. "Promoting Social Justice in Disaster Reconstruction: Guidelines for Gender-Sensitive and Community-Based Planning." March 13, 2001. Guidelines.
[82] World Bank, "Rebuilding a Better Aceh and Nias," 2005, p.38.
[83] UN Habitat, "Land and Property Management," UN Habitat Risk and Disaster Management, 2003.

Secure and provable tenure rights will similarly impact the borrowing capabilities of those trying to rebuild their lives. Resource rights provide collateral, which in turn spurs investment. As Bill Clinton, UN Special Envoy for Tsunami Recovery points out, "I can think of nothing that will generate more income over the long run for average families in this region than actually having title to the land they own. Then, they will be able to borrow money and build a much more diversified, much more modern economy."[84]

Having title to land can accelerate the rehabilitation of livelihoods, provided it is not done in a discriminatory manner. In post-tsunami Tamil Nadu, the decision-making authority has been given to local village councils, or *panchayats*. At times, these councils have reportedly discriminated in favour of the castes represented on the council.[85] Women have faced similar challenges. In Java, only about one third of land title certificates reflect ownership by women, and land registration processes do not effectively advance female ownership rights under the nation's family laws.[86]

Similar discrimination was found elsewhere with regards to informal settlements. The government of Thailand announced that it would not accept international emergency aid, and yet did not move to help the thousands of unregistered Burmese migrants living in Thai coastal areas who were made homeless by the tsunami.[87] Without access to the resource rights enjoyed by their fellow community-members, such groups hold less chance of making a full recovery from the tsunami. Instead they stand to become further impoverished and marginalized.

[84] World Bank, "Rebuilding a Better Aceh and Nias," 2005, p.38.
[85] "After the Deluge: India's Reconstruction Following the 2004 Tsunami." Human Rights Watch, 17:3; May 2005, p.10.
[86] Brown, Jennifer. "Rural Women's Land Rights in Java, Indonesia: Strengthened by Family Law, but weakened by land registration," Pacific Rim Law and Policy Journal, May 2003.
[87] Brookings Institute, "Warning Systems, Reconstruction and Stability: Durable Solutions in the Aftermath of the Tsunami Tragedy," 2005.

Box 3.2f Delayed Bam Earthquake Rehabilitation

The earthquake that shook the oasis city of Bam, Iran on December 26, 2003, flattened the city's mud brick buildings and left an estimated 26,000 dead beneath the rubble, a further 30,000 injured and 75,600 homeless.[88] Rapid urban population growth, un-enforced building codes, and poorly constructed infrastructure increased Bam's vulnerability to the disaster.

The initial response to the earthquake was impressive with 1,600 aid workers from 44 countries arriving in Bam.[89] However, the effort failed to transition from relief to the reconstruction and rehabilitation of livelihoods. One year after the quake, only five per cent of buildings were rebuilt, many residents were still living in temporary housing, and shops remained makeshift. Some residents were still wary of leaving the rubble-strewn plots of land they own for fear of losing them.[90] Many have been left unemployed with no livelihood alternatives as the city's famous date trees, once the main source of income for Bam's residents, were destroyed in the tremor. Without permanent homes or access to agricultural resources, few opportunities for proper rehabilitation exist. Severe limitations are placed on the rehabilitation effort by a shortage of financial resources, as the Iranian government had only received US$17 million of the promised US$1 billion in international aid.[91]

Box 3.2g The Multi-Donor Trust Fund and Property Rights in Indonesia

The Multi-Donor Trust Fund (MDTF) was established to pool aid resources in support of the Indonesian government's efforts to rebuild and rehabilitate the areas affects by the tsunami. One area in which MDTF has recognized a pressing need is that of resource rights and the confusion surrounding land ownership in post-tsunami Indonesia. "These were poor communities. Most houses had no legal title, and those that did have been lost. There are no property maps. Many of the people who lived there have been lost. In such a situation where do you begin?," asks Andrew Steer, the World Bank's Country Director for Indonesia.[92]

In an attempt to address this issue, the MDTF has approved a US$28 million project to be undertaken by the National Land Agency (BPN) in Banda Aceh, which will work toward protecting land rights in the affected area and to rebuild the damaged land administration system.[93] This will involve the reconstitution of land records and the reconstruction of damaged land offices. Additionally, the project hopes to establish a transparent and effective process of dispute resolution for the settlement of land conflicts, while also issuing land titles in Aceh.

[88] World Bank. "Technical Annex for a Proposed Loan of US$220 million to the Islamic Republic of Iran for A Bam Earthquake Emergency Reconstruction Project," October 5, 2004.
[89] Navai, Ramita. "A Year After the Quake, Iran City Struggles to Rise Above the Rubble." The Christian Science Monitor. January 5, 2005.
[90] UN OCHA, "Special on Bam Six Months On," 07 July 2004.
[91] Navai, Ramita. "A Year After the Quake, Iran City Struggles to Rise Above the Rubble." The Christian Science Monitor. January 5, 2005.
[92] ibid
[93] The National Land Agency. "Proposal for Recovery of Property Rights and the Reconstruction of Land Administration System," 2005.

4. Discussion

In this paper we have explored how resource rights play a role in resilience and rebuilding throughout the "disaster cycle."

It is evident that clear, equitable and enforced resource rights can help strengthen resilience to natural disasters. Often, but not always, such resource rights can encourage the sustainable use of common resources and investment in protective barriers. In addition the documented proof of rights to resources, such as land tenure, facilitates reconstruction, compensation and the rehabilitation both of peoples' livelihoods.

On the other hand, the inequitable reallocation of resource rights can impede reconstruction, trigger conflict and increase the vulnerability of poor and marginalized communities to future natural hazards.

The relationship between resource rights and resilience to natural disaster has yet to be fully understood. In order to generate further discussion four questions come to mind:

Do natural disasters offer an opportunity to move from "Crisis to Sustainability"?
Inherently, natural disasters are a tremendous external shock. They disrupt the normal pattern of life and change the ways people make their living. However, they can also prompt a fundamental re-evaluation of how a community uses its resources.

Some argue that natural disasters present a "window of opportunity" for the introduction of new, more sustainable ways to manage those resources. As Moench and Dixit note, "The development of resilient livelihoods requires strategies that recognise and build upon the incentives for change created by disruptions such as droughts and floods rather than viewing such disruptions as aberrations to which the appropriate response is an attempt to rebuild the status quo." [94]

This concept is partly behind the Sri Lankan government's creation of a post-tsunami buffer zone in coastal areas. Despite having a positive effect on the environment, the creation of a buffer zone has introduced a series of more negative "knock-on" effects for communities that find themselves unable to rebuild where they were before.

Reconstruction and rehabilitation after disasters is difficult. It involves mediating competing interests and it is rare to get perfect "win-win" outcomes. In effect policy-makers have to make a series of delicate trade-offs; should there be a buffer-zone in case of future storm surges or should you retain easy access for fishing communities to the sea? Should you allow mangroves to re-grow or should you preserve your shrimp ponds as a valuable export market? The list goes on and on.

[94] Moench, M. and A. Dixit. 2004. Adaptive Capacity and Livelihood Resilience: Adaptive Strategies for Responding to Floods and Droughts in South Asia. Boulder, CO: The Institute for Social and Environmental Transition, International, p.18.

Resource rights are an important consideration in deciding these trade-offs. What role do resource rights play as communities, countries and regions move toward improved resilience and sustainability? In the post-disaster setting, is there a window of opportunity for the reform of resource rights systems? And, if so, how can it be taken advantage of?

Where is the balance between communally held and privately held resource rights?

Different countries have differing resource rights regimes. Open access to resources leads to the much publicized problem of the "tragedy of the commons" – where everyone has access to resources but no one has responsibility for them. The subsequent free-for-all leads to rapid environmental degradation. Across the world, the typical response to this, promoted by governments and external donors, has been to privatize resource rights

However, in the countries affected by the Asian tsunami this "privatization" of resource rights arguably led to greater environment degradation and increased vulnerability as acre after acre of mangrove forest was cut down for aquaculture and construction.[95] This reduced not only the protection mangroves offer to coastal communities from storm surges, but also the spawning grounds they provide for maintaining fish stocks.

Coastal wreckage, Mt Lavinia, Sri Lanka

On the other hand, communally held resource rights may build on existing, traditional patterns of social organization and resource allocation and so may contribute to resilience. There is a balance between communally held and privately held resource rights that is dependent on local context but requires more consideration than it currently receives.

How can resource rights be integrated into disaster risk reduction plans and disaster relief?

Issues of resource rights were largely absent from the January 2005 Hyogo Action Plan that came out of the World Conference on Disaster Reduction. Disaster risk reduction tends to be seen in terms of government investment in infrastructure (building storm shelters and early warning systems) whilst disaster relief focuses around the immediate humanitarian response (tents and blankets).

Experience shows that resource rights are a key element of both disaster risk reduction and humanitarian relief but there is a real need to understand how considerations of resource rights can be integrated in practical terms into donor and government risk reduction plans and humanitarian responses.

[95] UNEP, "After the Tsunami: Rapid Environmental Assessment," 2005, p.44.

What is the role of government? Of the international community? Of the private sector? Of civil society?

Traditionally, the allocation of rights over resources is a central part of what governments do and is jealously guarded. But natural disasters kill government officials like anybody else and disrupt already-stretched government services. In such circumstances redefining resource rights can be beyond the capacity of government systems focused on immediate humanitarian relief. After the Asian tsunami there were reports of NGOs helping to redistribute land in Aceh out of frustration at the Indonesian government's inertia and inaction.

If resource rights systems are to contribute to the increased disaster resilience and recovery of poor and marginalised communities then governments, humanitarian agencies, the private sector, the international community and civil society all have important roles to play. In the past these roles have often overlapped and undermined concerted action. What those roles should be and how they can be mutually supportive now requires careful consideration.

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