What role do forests play in reducing human vulnerability to natural disasters? And what are the wider implications of forest degradation for human security? Anne Hammill, Oli Brown and Alec Crawford of the International Institute for Sustainable Development (IISD) look at these questions.

The uniquely tragic events of the morning of 26th December 2004 need little introduction. With a death toll now approaching 300,000 and untold human suffering, the impacts of the Indian Ocean tsunami will be felt for decades. Governments and communities found themselves unprepared and overwhelmed by the effects of the disaster. Questions over where responsibility lies for the extent of the devastation have reignited debates about the role of poverty and environmental degradation in amplifying the destructive power of natural events. Early reports have provided evidence linking the clearing of mangrove forests to the increased exposure of coastal communities to the disaster. Some have called for a greater investigation of the economic factors that drive such degradation, in particular the expansion of shrimp farming and the tourism industry.

Forests and disaster vulnerability: Evidence from around the world

Research and experience have shown that forest ecosystems play an important role in reducing the vulnerability of communities to disasters, both in terms of reducing their physical exposure to natural hazards and providing them with the livelihood resources to withstand and recover from crises. The degradation of these ecosystems is exacerbating vulnerabilities around the world, as the following examples illustrate.

Before the Indian Ocean tsunami, 2004 had already seen the deforestation-disaster vulnerability link given high profile following a series of natural disasters. In Haiti, severe floods in May and Tropical Storm Jeanne in September 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 that has cleared 98% of its forests. In the Philippines, flash floods and landslides in November and December left more than 1,600 people dead or missing. President Gloria Arroyo publicly blamed the disaster on the indiscriminate logging that has left the country with less than 6% of its original forests.

Previously, the link between forest degradation and disaster vulnerability probably received the greatest attention in 1998 following Hurricane Mitch that killed over 18,000 people and caused an estimated US$4 billion in damages. In less than one week, almost a year’s worth of rain fell on the deforested hillsides of Central America, causing rivers to overflow and resulting in flash floods, mudslides and landslides. Decades of agricultural expansion and growth in human settlements had cleared the vegetation needed to absorb water and anchor soils during times of heavy precipitation. In the aftermath of Mitch, studies in Honduras, Nicaragua and Guatemala revealed that farms using agroecological practices – including agroforestry – withstood the storm’s impacts better than those using conventional farming methods. The sustainably-managed plots retained more topsoil and soil moisture, experienced less erosion and fewer economic losses than neighbouring plots (see: http://www.wn.org/Mitch.pdf).

The powerful cyclone that hit India’s Orissa coast in October 1999 provided another powerful example of deforestation and disaster vulnerability. Much of the damage caused by the cyclone occurred in the extensively-deforested new settlement areas along Orissa’s coast as the storm surge ripped through a 100-km long denuded stretch, the Ersama block, killing thousands of people within minutes. According 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 as well as mangrove and casuarina forests, essentially stripping away the traditional barriers to storm surges and high winds (see: http://www.futureharvest.org/pdf/Weathering_Nat_Disas1.pdf).

Conversely, cyclone-prone coastal communities in Vietnam have been experiencing 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. They have planted nearly 12,000 hectares and the benefits have been 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 unharmed while neighbouring provinces suffered huge losses of lives, property and livelihoods (see: http://www.ifrc.org/publicat/wdr2001/).

Much of the destruction associated with these disasters was inevitable. At one stage Mitch was a category V hurricane (one of four such hurricanes in the 20th century), while the Indian Ocean tsunami resulted from an earthquake with a magnitude of 9.0 on the Richter scale – the second largest earthquake ever recorded instrumentally. Even if all of the coasts and hillsides were densely forested, communities and ecosystems would have suffered significant losses. But the fact remains that healthy forests could have helped to minimize the impacts, at least in some places.

**Forests and human security: The bigger picture**

Environmental degradation that makes communities more vulnerable to natural disasters is central to the concept of human security – yet somehow these areas are often treated in isolation. Increasingly, the concept of human security is being co-opted into an understanding of security in terms of terrorism or violent crime. But human security is about more than freedom from violence or the threat of violence. It refers to, among other things, peoples’ health, economic opportunities, political rights, community identity, and resilience to shocks such as natural hazards.

Forest resources and services play an important role in the achievement of human security. Whether it is through the provision of livelihood resources (e.g. food, medicine, cooking fuel, construction materials, etc.) or ecosystem services such as water purification, climate regulation and erosion control, forests are undeniably linked to the well-being and prosperity of people. When the availability of these resources and services is undermined, the resulting insecurity can range from hunger and susceptibility to disease, to loss of income and livelihoods, to social tensions and open conflict, and as seen in the examples above – to acute vulnerability to natural hazards.

Exacerbating this increased exposure to hazards is a reduced forest resource base from which to draw on during times of crisis. Oftentimes, these resources are central to the local safety nets that sustain rural communities as they recover from disasters.

The relationship between forest ecosystems and human security is reciprocal. While forest degradation contributes to human insecurity, the reverse is also true. Insecurity in the form of chronic poverty, civil war, or the mass movements of internally-displaced people can destroy ecosystems and as resource-rich, multi-functional systems, forests in particular often bear the brunt of insecurity. Decades of experience has shown that when impoverished communities are left without livelihood options and support services, they turn to the environment for immediate solutions. During times of conflict, armed groups have turned to legal or illegal sales of timber to finance their operations, and often use forests as bases or targets during military operations, degrading the resource base in the process. Ironically, post-conflict situations can be even more damaging for forests. Governments struggling to maintain peace and regain an economic footing often promote timber extraction and the conversion of forested land to farmland as a way of compensating former combatants, resettling refugees and generating much-needed foreign exchange. Over the long term, forest conservation will only succeed in conditions of security for the communities living in and around them. Forests need human security as much as human security needs forests.

Including the environmental dimensions of vulnerability in our understanding of human security would help to focus public attention, policy-makers and funds on the long-term value of forest conservation and sustainable forest management. All too often forests are valued only over the short-term and primarily as sources of timber. This undervaluation means that the real costs of deforestation and mangrove destruction are not taken into account in policy decisions that authorize upland logging, shrimp farm expansion or coastal tourism development in disaster-prone areas. It is these long-term and hard-to-value costs that become apparent after natural disasters and it is the local affected people that are left to bear them.

The calamity of the Indian Ocean tsunami offers an opportunity to reassess the role of forests in natural disaster prevention and mitigation. It also presents a policy space to make significant progress in the global commitment to forest conservation. Rather than waiting for the next disaster to remind the world of the true value of forests, forest conservation must become a central part of disaster resilience and human security strategies.

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