

## **Sustainability in Post-disaster Recovery: A Case Study of the Coastal Rehabilitation and Livelihood Program in Banda Aceh, Indonesia**

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On December 26, 2004 an earthquake in the Indian Ocean unleashed a tsunami that caused the deaths of approximately 280,000 people, leaving many survivors in absolute devastation (Iemura, Takahashi, Harris Pradono, Sukamdo, and Kurniawan, 2006). The earthquake's epicenter was 255 kilometers from the nearest city, Banda Aceh, Indonesia (Iemura et al., 2006). Three waves entered Banda Aceh, and with little time to recede, each wave topped the previous one, reaching a height of over thirty meters. Banda Aceh was leveled; a quarter of its population lost, its infrastructure in ruins (Banda Aceh Government, 2005). Tibang is a village in Banda Aceh, less than one kilometer away from the coast. Only 40% of its population survived the tsunami, leaving approximately 800 survivors (Farhan, personal communication, July 15, 2006). Many have returned to the village, but some survivors were carried away from Tibang by the waves and remain in barracks scattered throughout the city. Family structures collapsed with the deaths of parents, children, and siblings; livelihoods disappeared as the tsunami washed away Tibang's fish and shrimp ponds, the village's major source of revenue.

Despite the tremendous loss caused by the tsunami, there is opportunity to rebuild Tibang and other villages in Banda Aceh based on a sustainable foundation. The Coastal Rehabilitation and Livelihood Program in Banda Aceh incorporates each component of sustainability through mangrove rehabilitation and the development of a microenterprise, Tibang Products. Mangroves promote biodiversity by acting as a nursery for juvenile fish and aquatic invertebrate species (Adeel and Pomeroy, 2001). This gives mangroves environmental value, as well as economic value. The livelihood of the villagers and the women in particular, depend on the collection and sale of crab, shrimp, fish, and oysters; the latter attach and live on the roots of mangrove trees. Mangroves also are significant because they protect coastal communities from storm surges, coastal erosion, and flooding (Barbier, Acreman, and Knowler, 1997) (Ellison, 2000). The microenterprise is an initiative designed to rebuild livelihoods for women through skill training and potential job opportunities and to create a revenue stream to support the ongoing maintenance of the mangroves.

A brief review of other mangrove rehabilitation programs in Banda Aceh has revealed that the Coastal Rehabilitation and Livelihood Program is the only mangrove program in the area that incorporates economic development and long-term plans for the beneficiaries. Therefore, an evaluation of this program was performed to learn whether and to what extent this program might serve as a model for subsequent disaster recovery programs. Although the tsunami was not a result of climate change, it is expected that more intense precipitation events and tropical cyclones are likely to occur due to climate change and may result in the devastation of coastal areas similar to that caused by the tsunami (Schneider, Rosencranz, and Niles, 2002). Therefore, the results from the thesis on which this paper is based can contribute to discussions about the design of future disaster (natural or man-made) recovery programs.

Sources of evidence include a field survey of mangroves, surveys and group interviews with the program's beneficiaries, and interviews with staff of the organization incubating the microenterprise. The results of the evaluation suggest that that program has not yet successfully

enhanced the livelihoods of the beneficiaries, as a majority reported that they were not given long-term employment with Tibang Products and therefore, were not able to apply the skills learned at training workshops. In addition, the microenterprise has not yet generated enough revenue to support itself or the continuation of mangrove rehabilitation. However, the evaluation revealed that the program has enhanced the empowerment of the women involved by presenting them with career opportunities that were unknown or unavailable before the tsunami, increasing their skills, and creating a social network for them. Although a social network was not a goal of the program's developers it was valued by participants. From the results, it is reasonable to assume that the continued commitment of the women to the program may be connected to the empowerment achieved through the program.

The following are recommendations for future disaster recovery programs based on the findings of the evaluation: perform a needs assessment before designing a program, design a program that reflects the assets and needs of the population, supply sufficient training, require or provide long-term funding, and include empowerment as one of the primary goals when designing sustainable development programs. Strategic and long-term planning and the needs, assets, and involvement of the community should not be ignored in the post-disaster stage of recovery. Disasters give an opportunity for change, and the concept of sustainable development should be incorporated into the rebuilding of stronger communities, so that they are better protected from future disasters. Recovery is complex and requires patience, but by balancing the social, economic, and environmental aspects of a system, it can be accomplished.

<b>BUDGET</b>	<b>US\$</b>
Vaccinations	315
Transportation Costs	3500
Communication Costs	130
Mapping Work - Printing and Consultants	200
Survey Supplies	30
Translator Fee	85
Food and Misc.	735
<b>TOTAL</b>	<b>5000</b>

***Key resources:***

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