



Adaptation and Adaptive Capacity

Adaptation is defined by the IPCC as the adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects that moderates harm or exploits beneficial opportunities.

Adapting to the adverse effects of climate change is, along with mitigation, a major area of action for Parties under the UN Framework Convention on Climate Change. The world is already experiencing changes in mean temperature, shifts in the seasons, and an increasing frequency of extreme weather events. These are set to continue, for the global climate system has great inertia. Adaptation is therefore essential.

The new climate deal to be agreed at Copenhagen should aim to stabilize and reduce greenhouse gas concentration in the atmosphere at a level should allow communities and ecosystems to adapt naturally climate change and enable economic development to continue in a sustainable manner.

Climate change is also a matter of development, as the poorest are those with the lowest adaptive capacity and stand to suffer the most. Climate change impacts livelihood, food security and could in the long run stunt the economic development of entire communities.

In general, most small islands are vulnerable and its people have a low adaptive capacity due to lack of resources. The most pressuring constraint is the very limited water supplies that support domestic, agriculture and the tourism industry.

Climate related disasters hitting inland and disrupting the coastal areas is affecting the majority of these islands more often. Lack of land to supply their basic need makes these islands very dependable on imported goods from other larger island or neighboring countries. Hence, sea level rise and extreme weather events resulting from climate change increases their vulnerability.



Pioneering The Work

The Lombok island was selected as a case study because it has all the characteristics that many Indonesian islands share: it is relatively small; it has important agricultural and fishery sectors as well as an expanding tourism sector. Moreover, the government is open and has high initiatives

to manage the climate change impacts of this island. WWF Indonesia's efforts to advocate and facilitate a Vulnerability Assessment have allowed the government to formulate and implement adaptation strategies more effectively.



Unless efforts are made today to stabilize and subsequently reduce global greenhouse gas emission--action including achieving an ambitious global climate agreement at Copenhagen--the impacts of climate change will become increasingly severe and irreversible. Islands like Lombok stand to suffer the most from the devastating impacts of climate change. Reducing vulnerability and adapting to the impacts is key to the survival of these communities.

Adapting to the impacts of climate change, in particular, is an uphill challenge, yet actions taken at the local level such as what has been initiated on Lombok Island is highly encouraging and should be supported by actions taken on the national and regional level under the new climate deal to be sealed in Copenhagen.

The pioneering work on Lombok needs to be supported by capacity building to equip local authorities with the necessary skills and expertise needed to carry out the implementation of adaptation strategies already incorporated in the development plan. Making the necessary funds available to finance the work is therefore key to promote adaptation.



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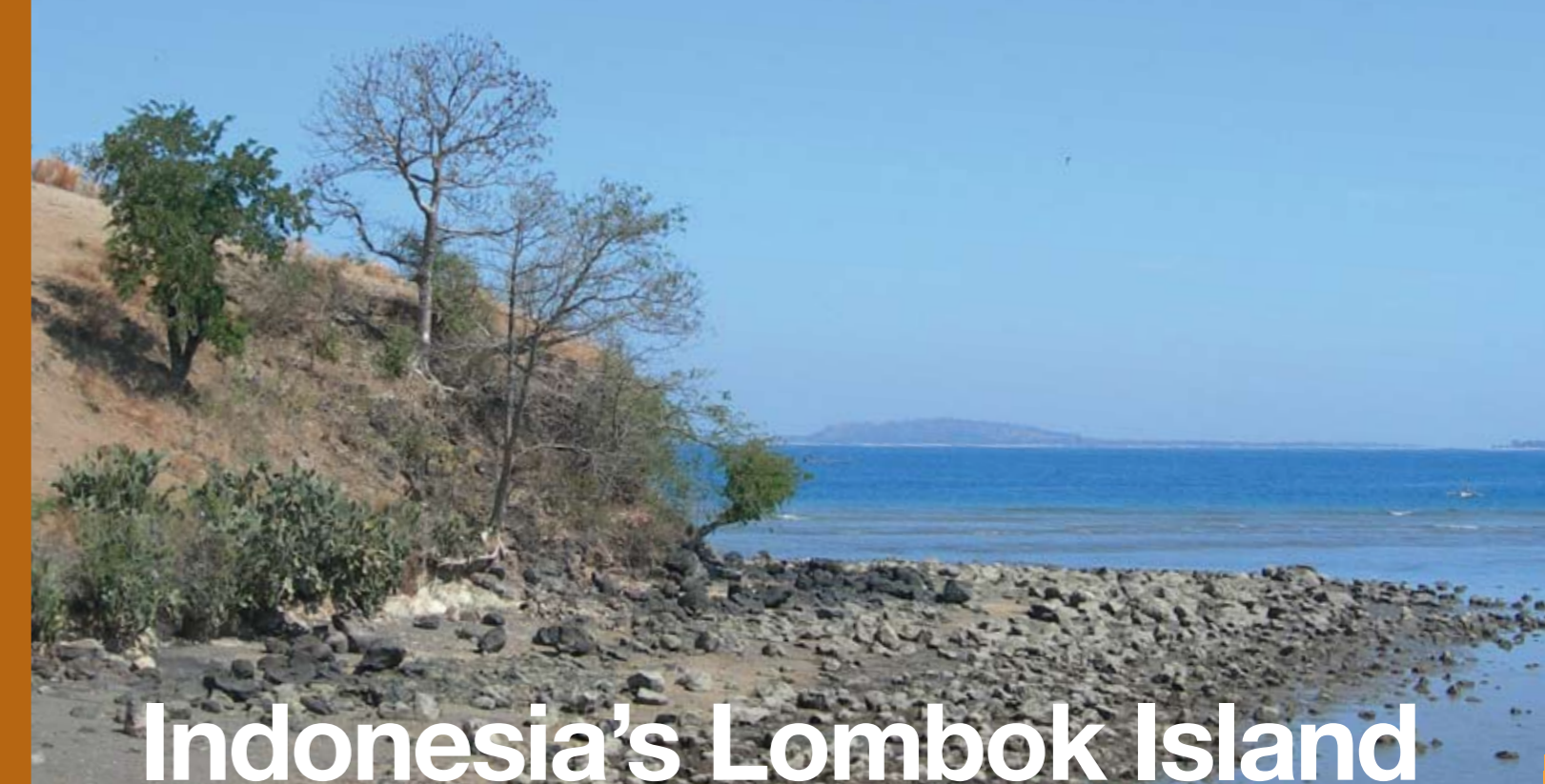
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Indonesia's Lombok Island and its first steps to adapt to the impacts of Climate Change



The climate is changing rapidly and increasingly presents itself as a grave threat to communities, businesses and nature. Already, its effects are being felt and the need to reduce

our vulnerability and to adapt to the dangerous impacts of climate change becomes more pressing than ever.

As world leaders gather in Copenhagen in December 2009 to negotiate a new climate treaty that will keep the fight against climate change on track, a number of local governments have made adaptation to the dangerous impacts of climate change a priority.

Lombok Island, one of Indonesia's 17,000 islands, has taken the courageous first steps to mainstreaming adaptation into its development plan. The local authorities are the first to take stock of its vulnerabilities to climate change impact, should scenarios outlined by the Intergovernmental Panel on Climate Change (IPCC) fully manifest in 2030 and 2080.

WWF Indonesia collaborated with the Ministry of Environment and the German international cooperation enterprise for sustainable development (GTZ) to support the provincial government in its vulnerability assessment and efforts to incorporate adaptation strategies into the local development plan.



Farming communities are often most vulnerable to the impacts of climate change as longer dry season threatens their harvest.



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Climate Change Impacts in Indonesia

Overall in Indonesia, the observed and projected impacts of climate change include an increase in the severity of droughts, flooding, fires, coral bleaching, the gradual rise of sea levels, and the increase in frequency of extreme weather conditions including storms, which will be destroying natural and human-made systems in the area.

Increased rainfall during the wet seasons may lead to high floods, which could displace populations and result in damages to homes, buildings and infrastructure. Climate change will profoundly affect biodiversity, water resources and the economy in the country, all of which in turn will impact its people as hundreds of million depend on resources, goods and services for their livelihood.

The impacts of climate change will also increase the pressure on Indonesia forest, coastal and marine ecosystems caused by illegal and destructive logging, overfishing and overexploitation of natural resource.

Making a Case for Lombok Island

Already, effects of the changing climate are being felt in Lombok Island. The island, which lies on the slightly eastern part of the Indonesian archipelago, shapes up at about 80km from east to west and about the same from north to south, with lush evergreen landscapes and parts, which are chronically dry.

Droughts, particularly in the south and east, can last for months, causing crop failure and famine. Changes in the climate exacerbate

this condition as it influences the island's average temperature and precipitation pattern. The average temperature rose from the range of 26,5°C – 27°C in 1948 to the range of 28°C– 28,5°C in 2007. Together with the destruction of forest protecting most of island's watershed area, this has lead to the diminishing of water springs and a significant reduction of surface water as evaporation levels increased.

The rise in temperature may have also played a role in changing rain

Climate change will profoundly affect biodiversity, water resources and the economy in the country, all of which in turn will impact its people as hundreds of million depend on resources, goods and services for their livelihood.



ABOUT LOMBOK ISLAND

Size : 4,738.70 Km2

Population : 3,039,000 (2007)

Livelihood : Agriculture, Fisheries, Tourism

The island's highest peak is the Mount Rinjani, at 3,726 m

Source Official Site West Nusa Tenggara Provincial Government



Assessing Impacts and Vulnerabilities

Under the auspices of the local government, WWF Indonesia teamed up with The Ministry of Environment and GTZ to develop a Vulnerability Assessment of the Lombok Island as part of mainstreaming adaptation strategies into the province's mid-term development plan. The

document produced detailed projections of how climate change impacts different economic sectors and areas. This information is needed to form strategies to address the island's adaptive capacity.

The vulnerability assessment focused on three sectors, namely Water, Coastal and Marine, as well as Agriculture. To produce the projections for 2030 and 2080 for each sector, different areas in the island were selected, against which three different IPCC climate scenarios were

run against. The baseline used in this study is that of 1961-1990. Overall, the study projected a rise in average temperature by 2-3° C by 2070-2100.

Coastal & Marine

In the sector of Coastal and Marine, based on conservative estimates, the study found that Lombok would lose up to 1,500 m2 of its coastal area by 2030 due to sea level rise. This would lead to a wave of population displacement and significantly alter coastal ecosystems. In another scenario that incorporated the hazards of extreme weather events spurred by increased sea surface temperature and higher frequencies of El Nino and La Nina, it is projected that up to 43 thousand people are at risk of losing their homes by 2030. Higher sea temperature also puts coral reefs adjacent to the island at risk to bleaching.



Climate change workshop for local government stakeholders particularly on adapting to the impacts on climate change in Lombok Island and West Nusa Tenggara province.

Engaging Stakeholders

In April 2007, WWF Climate and Energy Program initiated activities to mainstream climate change mitigation and adaptation in West Nusa Tenggara. A series of workshop were carried out afterwards to deepen the knowledge of local stakeholders particularly on adapting to the impacts on climate change for small islands.

As an outcome, the provincial government issued a Gubernatorial Decree No. 219/2007 to form a task force that comprises the government, NGO and academia, to "Mainstream Climate Change Mitigation and Adaptation in West Nusa Tenggara" and promptly began work integrating climate change mitigation and adaptation in the work plan of its various sectors.

Mid 2008, WWF expanded its collaboration to include the Ministry of Environment and GTZ. The Ministry gave directions on the central government policy, such as understanding climate change impacts and how to address them, including making available high quality information to stakeholders, and integrating and mainstreaming climate change into development planning.

Water

Based on a study at four key river basins, the island is projected to experience a massive decline in ground- and surface water reserves by 2030. The study found that water reserves could fall by up to 5 billion cubic meters, which is equivalent to more than three times the amount needed to meet the current demand. With population rise and an increase in water-intensive agriculture and tourism, and given the current state of water pollution, access to clean water for industry, agriculture and household consumption could become critical before 2030. Generally, falling precipitation levels and higher evaporation levels add more pressure to fast diminishing water resources.



Agriculture

The province is one of the country's main crop producers, particularly rice. Annually, West Nusa Tenggara produces more than 40 thousand tons of rice, with most of the yield produced on Lombok Island. Yet around 16 percent of all paddy fields on the island are rainfed and would be greatly affected in times of longer droughts and diminishing precipitation. The rest are naturally affected by water scarcity as a direct result of rising temperatures and the destruction of forests protecting the watershed areas. Conservative estimates reveal that the risk of crop failure in its planting and ripening phase due to shifting climate patterns and fluctuating rainfall intensity doubles after 2040. Extreme weather events such as storms and long droughts exacerbated by the changing climate also remain a significant threat to the harvest.



The provincial government is the first in Indonesia to mainstream adaptation into their mid-term development plan.

GTZ supported expertise and facilitated workshops and discussions to develop the projection of impacts, sea level rise, impacts on coastal, marine and fisheries, water resources, and agriculture. Strategies formulated based on the result of the assessment were mainstreamed in the Provincial Mid Term Development Plan (2008-2014).