



Learning from Cyclone Nargis

Investing in the environment for
livelihoods and disaster risk reduction

A Case Study



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Cover photo: Tropical Cyclone Nargis makes landfall in Myanmar, 2 May 2008, Source: NASA

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Table of contents

Acronyms and abbreviations.....	2
Executive summary	3
Introduction	4
Extent of impact from Cyclone Nargis.....	6
Natural resource management and environmental degradation in the Ayeyarwady and Yangon Divisions prior to Cyclone Nargis	10
Post-Nargis recovery and long-term development.....	17
Lessons from Cyclone Nargis for the environment, sustainable livelihoods and disaster risk reduction ..	21
Conclusions	25
Annex – Endnotes	26

Acronyms and abbreviations

ASEAN	Association of Southeast Asian Nations
CBO	community-based organization
DFID	United Kingdom's Department for International Development
DRR	disaster risk reduction
FAO	Food and Agriculture Organization of the UN
FREDA	Forest Resource Environment Development and Conservation Association
ha	hectare(s)
JICA	Japan International Cooperation Agency
km	kilometre(s)
MAPDRR	Myanmar Action Plan for Disaster Risk Reduction
MIMU	Myanmar Information Management Unit
NAPA	National Action Plan for Adaptation
NCEA	National Commission for Environmental Affairs
NDPCC	Natural Disaster Preparedness Central Committee
NGO	non-governmental organization
PONJA	Post-Nargis Joint Assessment
PONREPP	Post-Nargis Recovery and Preparedness Plan
TCG	Tripartite Core Group
UN	United Nations
WASH	Water, sanitation and hygiene

Executive summary

Cyclone Nargis struck Myanmar on 2 and 3 May 2008, making landfall in Ayeyarwady Division, approximately 250 kilometres (km) southwest of Yangon. A category 3 cyclone, Nargis affected more than 50 townships, mainly in Yangon and Ayeyarwady Divisions, including Yangon, the country's largest city. Strong winds and heavy rain caused the greatest damage in the Ayeyarwady Delta, where a storm surge compounded the impact of the cyclone. Nargis was the worst natural disaster in the history of Myanmar. More than 140,000 people were killed, mainly by the storm surge.

Cyclone Nargis caused devastating damage to the environment of the Ayeyarwady and Yangon Divisions, an area where local livelihoods are heavily reliant on the natural resource base. Cyclone Nargis destroyed 38,000 hectares (ha) of natural and replanted mangroves, submerged over 63 percent of paddy fields and damaged 43 percent of freshwater ponds.

The cyclone's impacts were exacerbated by earlier damage to the environment, including deforestation and degradation of mangroves, over-exploitation of natural resources such as fisheries, and soil erosion. For example, the heavy loss of life as a result of the storm surge was primarily due to prior loss of about 75 percent of the original mangrove cover in the Delta, which could have served as a buffer against the storm surge. The deterioration of the natural resource base, in effect, reduced people's resilience against the

impacts of Nargis. The damage caused by the cyclone in the Ayeyarwady and Yangon Divisions poses a major challenge for recovery efforts that are striving to achieve sustainable development in the region.

Experiences from Cyclone Nargis clearly demonstrate the vicious circle in which pre-existing environmental degradation increased vulnerability, turning a natural hazard into a major disaster. The disaster resulted in further environmental damage, jeopardizing the sustainability of livelihoods and ecosystem functions. The root cause of environmental degradation in the Ayeyarwady Delta is poverty.

Unless remedial action is taken to restore livelihoods, the impacts of Cyclone Nargis will likely increase poverty as communities have little in reserve to cope with the disaster. One key lesson from Nargis is that developing more sustainable livelihoods can not be achieved by focusing solely on natural resource management interventions. Ensuring sustainability will require a coherent and integrated approach across a number of sectors, including livelihoods and food security; shelter; education and training; water, sanitation and hygiene; disaster risk reduction (DRR); and protection of vulnerable groups. At the same time, these sectoral approaches will need to be augmented by capacity-building and institutional strengthening for national and local governments as well as civil society, an enabling framework at the national level to provide laws and policies that support sustainable development, and a reliable information base on the environment.

1 Introduction

Myanmar is the largest country in mainland Southeast Asia with a total land area of 676,578 square km (261,228 square miles) and a population of 51.5 million. Its long coastline of about 2,000 km covers almost the entire east coast of the Bay of Bengal. As a country prone to heavy rainfall, floods occur regularly during the mid-monsoon period (June to August) in areas traversed by rivers or large streams. The country is also prone to cyclones, landslides, earthquakes, tsunami, fire and drought.

Nargis, a category 3 cyclone, struck Myanmar on 2 and 3 May 2008, making landfall in the Ayeyarwady Division, approximately 250 km (155 miles) southwest of Yangon. The cyclone affected more than 50 townships, mainly in Yangon and Ayeyarwady Divisions, including Yangon, the country's largest city and most important commercial centre. With wind speeds of up to 200 km per hour (124 miles/hour) and accompanied by heavy rain, the cyclone caused the greatest damage in the Ayeyarwady Delta region. The effects of extreme winds in this area were compounded by a 3.6 m (12 foot) storm surge. Nargis was the worst natural disaster in the history of Myanmar, and the most devastating cyclone to strike Asia since 1991. More than 140,000 people were killed, mainly by the storm surge.

Nargis also had a devastating impact on the environment of the Ayeyarwady and Yangon Divisions, an area where the livelihoods of the majority of the population remain heavily dependent on natural resources. It destroyed 38,000 ha (93,900 acres) of natural and replanted mangroves, submerging over 63 percent of paddy fields and damaging 43 percent of freshwater ponds.

The impact of the cyclone was exacerbated by pre-existing environmental degradation in this

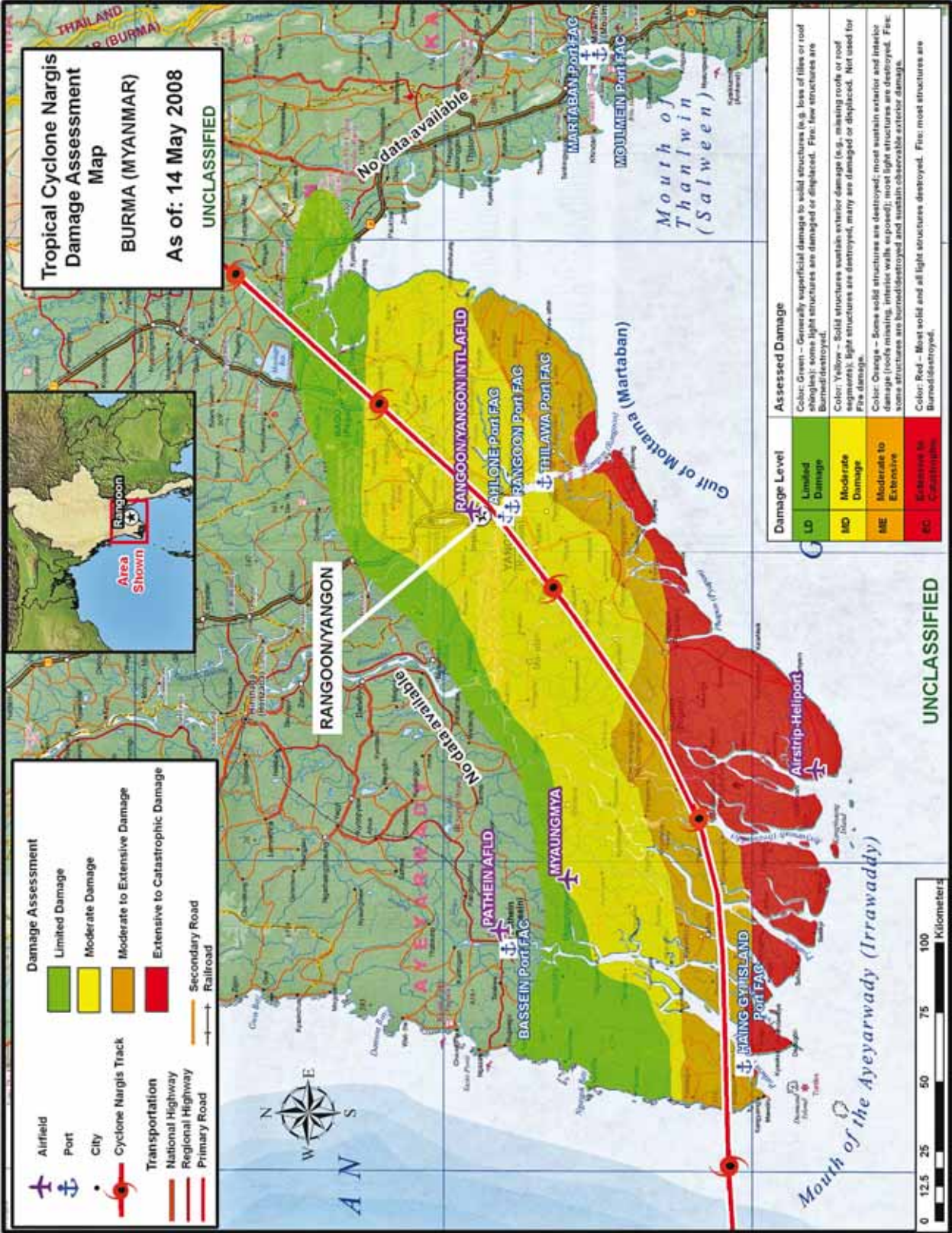
region, including deforestation particularly of mangroves, over-exploitation of natural resources and soil erosion. The extent of damage in the Ayeyarwady and Yangon Divisions has posed a major challenge to recovery efforts that strive to achieve sustainable development for the region.

In the aftermath of the cyclone, a Tripartite Core Group (TCG), consisting of the Government of the Union of Myanmar, the Association of Southeast Asian Nations (ASEAN) and the United Nations (UN), was set up to coordinate relief efforts. One of its first tasks was to conduct a Post-Nargis Joint Assessment (PONJA) to determine the full scale of the impact of the cyclone and requirements for both immediate humanitarian assistance and medium- to long-term recovery. The PONJA report recognized the key role of the environment in sustaining livelihoods in the Delta and concluded that recovery and long-term development efforts must be founded on sustainable management of the natural resource base.

The catastrophic impact of Cyclone Nargis clearly demonstrated that underlying risk factors, in this case pre-existing resource degradation that is closely linked to poverty, increase people's vulnerability to natural hazards – turning hazards into a major disaster. Nargis has contributed to the additional deterioration of the environment, which in turn jeopardizes the viability of local ecosystems and livelihoods.

This case study analyses the root causes of environmental degradation in the Ayeyarwady Delta and illustrates the inter-relationship between environmental management, livelihoods and disasters. Key lessons from Cyclone Nargis are drawn out, highlighting the importance of addressing disaster risks over the long term, through improved environmental governance and resource management and the development of more sustainable livelihoods.

Map: Cyclone Nargis caused major destruction as it passed through the Ayeyarwady Delta and Yangon Division



Source: Myanmar Information Management Unit (MIMU), Office of the UN Resident Coordinator, Myanmar

2 Extent of impact from Cyclone Nargis

Nargis had a devastating impact in the Ayeyarwady Delta due to the heavy dependence of households on the natural environment as a source of livelihood and food security. Environment-related issues emerging from the consequences of Nargis can be summarised into three broad areas: (i) impact on natural resources and biodiversity, (ii) impact on livelihoods and basic needs, and (iii) increased vulnerability to natural hazards.

2.1 Impact on natural resources and biodiversity

The loss and damage of mangrove forests as a result of Nargis is particularly critical, which affected about 16,800 ha (41,514 acres) of natural forest and 21,000 ha (51,892 acres) of forest plantations.¹ Surveys by Maung Maung Than² indicated significant destruction of mangroves in the direct path of the cyclone and in adjacent areas. Defoliation and damage to branches ranged from 38.9 to 55.6 percent and damage to crowns was between 12.8 and 19.8 percent. Uprooting of trees was notably higher in the direct path of the storm (56.7 percent) than elsewhere (4.2 percent).³

In addition, the author carried out surveys of mangrove plantations consisting of six to nine year old trees to examine how different mangrove species were affected by the cyclone. His conclusion was that three mangrove species – *Rhizophora apiculata*, *Sonneratia apetala* and *Avicennia officinalis* – were more susceptible to storm damage than three others – *Bruguiera sexangula*, *Avicennia marina* and *Heritiera fomes*.

The loss of both natural and plantation trees has significant implications for the environment and livelihoods in the Ayeyarwady Delta. Mangroves are an important source of subsistence and income for local communities, particularly for landless labourers, through the collection of firewood, production of charcoal, and the harvesting of fisheries as well as material for shelter (Box 1). They also serve as natural barriers to surges and floods and as fish breeding grounds. The maintenance of these different values (economic, social, biodiversity conservation) is therefore critical to supporting livelihoods, reducing disaster risks and increasing resilience through an improved ability for post-disaster recovery.

High winds associated with Cyclone Nargis as well as the storm surge also resulted in damage to trees other than mangroves, such as nipa palm (*Nypa fruticans*), toddy palm (*Borassus flabellifer*) and



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