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Thematic Focus: Ecosystem Management, Disaster and Conflicts, and Climate Change

Global Mangrove Extent Much Smaller than Previously Estimated

Why is this issue important?

As confirmed by the impacts of the December 2004 Asian tsunami and Hurricane Katrina in 2005, intact mangroves help stabilize shorelines and thus protect lives and property from such natural disasters. They also provide other ecosystem services, such as breeding and nursing grounds for marine species and sources of food, medicine, fuel, and building materials for local communities. In addition, living mangroves store carbon, keeping it out of the atmosphere. It is possible that mangroves and the soils they grow in could sequester about 22.8 million metric tonnes of carbon each year. Mangrove forests occur between the sea and land and are thought to cover about a quarter of the world's tropical and subtropical intertidal zones, mostly between 5˚ N and 5˚ S latitude. Research reveals that the forests have been declining at an alarming rate, however—perhaps even faster than inland tropical forests—and much of what is left is degraded. From 1980 to 2000, mangroves around the world declined by an estimated 35 per cent. Remaining mangrove forests are under immense pressure from clear cutting, especially for farming and aquaculture; encroachment; hydrological alterations; chemical spills; storms; and climate change. Until

recently, however, little was known about their current distribution, rate and causes of deforestation, and potential rehabilitation sites (Giri and others 2010).

What are the findings and implications?

In 2010, the most comprehensive and globally consistent worldwide mangrove database to date was created using thousands of satellite images with the highest resolution (30 m) possible (Giri and others 2010). Analysis found that the total area of mangroves in the year 2000 was 137 760 km^2 in 118 countries and territories in the world's tropical and subtropical regions. The largest mangrove extent is found in Asia (42 per cent) followed by Africa (20 per cent), North and Central America (15 per cent), Oceania (12 per cent) and South America (11 per cent). Approximately 75 per cent of mangroves are concentrated in just 15 countries. Only 6.9 per cent fall within existing protected areas networks (under IUCN's I-IV categories). Analysis of the satellite imagery found that mangroves have declined significantly more than previously estimated—they cover an area that is 12.3 per cent smaller than the most recent estimate by the Food and Agriculture Organization (FAO) of the United Nations.

A previous study of satellite images of coastal areas affected by the 2004 tsunami (Giri and others 2007a) shows that from 1975 to 2005, the region lost 12 per cent of its mangrove forests. Agricultural expansion was the major cause, accounting for 81 per cent of losses. Although aquaculture was responsible for only 12 per cent, the industry is growing rapidly. In Thailand, agricultural expansion accounts for half the mangrove losses, but aquaculture is now responsible for 41 per cent. As aquaculture develops, there is a clear need to consider the mangrove forest's value in protecting coastlines and other ecosystem services, which in some areas may be higher in the long term than the economic value of shrimp farming (Ranganathan and others 2008). Giri and others (2007b) shows that mangrove conservation and development need not be mutually exclusive. Population density around the Sundarbans mangrove forests in Bangladesh and West Bengal is the highest in the world. The area covered by mangroves, however, has changed little over the past 25 years, due to the presence of reserves and other conservation areas, although human activities are degrading the forest's condition.

The information generated by these studies can be used to better understand the role of mangrove forests in saving lives and property from natural disasters such as tsunamis; identify possible areas for conservation, restoration and rehabilitation; and improve estimates of the amount of carbon stored in mangrove vegetation and the associated marine environment (blue carbon).

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