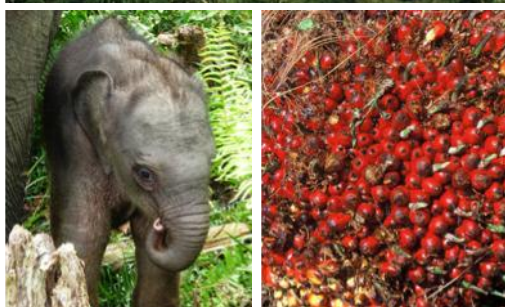


Central Sumatra, Indonesia

A Green Vision for Sumatra

Sumatra is one of Indonesia's largest islands and is home to roughly a quarter of the nation's population. The island is also a global hotspot for biodiversity, and is home to the world's last remaining Sumatran tigers, elephants, and rhinos. Its natural environment provides fertile land for agriculture and lush forests that sustain native species and local communities. Abundant natural resources support the production of palm oil, paper, and coffee, as well as provide clean water and sequester massive amounts of carbon in forests and peatlands.

In spite of its plentiful natural assets, Sumatra faces grave environmental challenges. The island has lost nearly half its forest cover in recent decades, causing a major reduction in carbon stock and other sources of Indonesia's natural capital. Though economic development has brought many benefits to the people of Sumatra, it has been accompanied by degraded water quality, massive greenhouse gas emissions, and increased erosion. Logging activities, deforestation, and land conversion to industrial plantations have depleted resources critical to wildlife and human well-being.



Results

■ **Developed framework for ecosystem-based spatial plan:** InVEST maps and associated analyses have informed spatial planning decisions in several provinces in Sumatra, such as Jambi, and a Strategic Environmental Assessment for the region.

■ **Identified alternatives for land management:** Our research offers practical options to safeguard natural capital. Analyses also provide planners with information they need to target districts for conservation and development activities.

■ **Provided clear-cut guidance for decision makers:** Our results suggest that implementing the Sumatra Vision will result in higher carbon stocks, reduced sedimentation, cleaner water, and greatly enhanced habitat quality. The Millennium Challenge Corporation (MCC) recently signed a Compact Agreement with the Indonesian government to fund \$600 million for projects for sustainable development and offsetting carbon emissions. The MCC recommend in their call for proposals that ecosystem service assessments, such as the one conducted with InVEST, be used to guide priorities for the first investments.

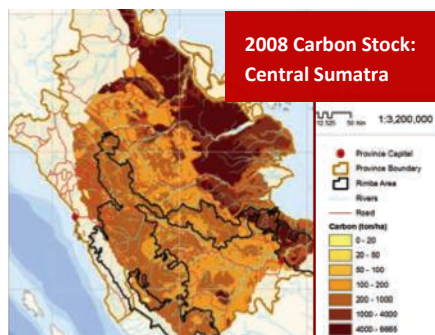
■ **Received public support for the Sumatra Ecosystem Vision,** which has been endorsed by the Indonesian Ministry of the Environment, Ministry of Public Works, Ministry of Forestry, and Ministry of Home Affairs.

Historic commitment to conservation on Sumatra

In Indonesia, district and provincial spatial plans specify where timber harvest, plantation expansion, infrastructure development, and conservation should take place. In 2010, the 10 governors of Sumatra made an island-wide commitment to conduct ecosystem-based spatial planning, which supports sustainable development and conservation. The plan addresses environmental, climate, and



livelihood concerns and also identifies critical areas for biodiversity and peatland conservation (pictured here). Six national government agencies and a forum of NGOs developed an ecosystem vision for Sumatra as an alternative to the existing government spatial plans. World Wildlife Fund used the Natural Capital Project's InVEST (Integrated Valuation of Environmental Services and Tradeoffs) software to inform the new plan by modeling climate storage and sequestration, water quality and quantity, and habitat quality for biodiversity in priority areas on the island of Sumatra. InVEST also identified tradeoffs and synergies among multiple services and economic activities.



Ecosystem Services

Carbon Storage & Sequestration

Over 50 years, the Sumatra Vision will replenish 350 million tons of carbon stock, whereas the government's spatial plan would result in net carbon loss. Forest carbon projects in Central Sumatra's peat swamps and upland forests offer global climate benefits, and support Indonesia's goal to reduce emissions by 26% from 2005 levels by 2020.

Biodiversity

Sumatra's tropical rainforests are home to many endangered species of animals including Sumatran tigers, elephants, orangutans and rhinoceroses. They also harbor over 15,000 known species of plants.

Hydropower

Hydropower is an important source of electricity in the region. Healthy forests upstream forests can reduce sedimentation in the rivers and limit the amount of dredging downstream.

Sumatra Roadmap Action Plan

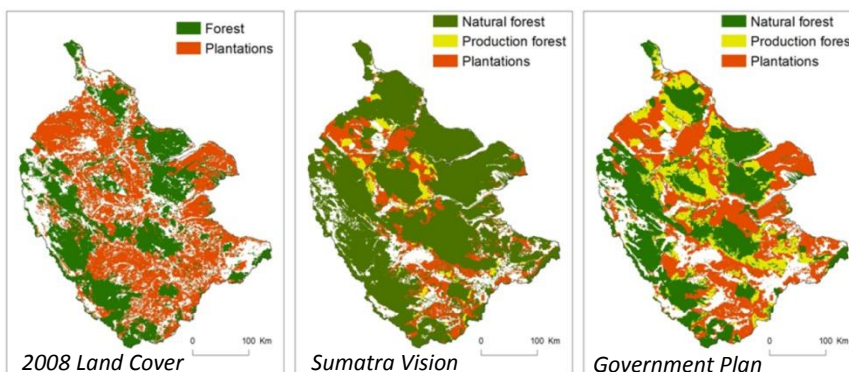
The Indonesian government selected 19 districts and six main watersheds to initiate programs aimed to restore the delivery of ecosystem services. Using InVEST software, habitat for tigers and multiple ecosystem services were assessed for the region, including carbon storage, water yield, erosion control and avoided nutrient pollution. Spatial and economic analyses of these areas informed conservation management objectives for provincial and district planners. Five priority programs are emphasized:



- **Forest Restoration**, targeting highly damaged areas for protection;
- **Forest Carbon Projects**, intended to maintain or increase carbon stock;
- **Payments for Watershed Services**, identifying opportunities to maintain or restore hydrological services modeled with InVEST;
- **Forestry Best Management Practices**, such as avoiding clear cutting and human-wildlife conflicts, and preserving forest buffers along water bodies;
- **Plantations Best Management Practices** to reduce the environmental footprint of their operations or seek environmental certification.

Comparing Development Scenarios with InVEST

InVEST models were used to map variables including carbon storage and sequestration, hydrological services such as sediment retention, water yield and water purification, wildlife habitat quality, and biodiversity conservation. Tradeoffs and synergies among ecosystem services were evaluated under the Sumatra Vision and the Government Spatial Plan relative to 2008.



In the map above, both development scenarios are shown to have significantly more forest cover than in 2008. Production forests - where logging and conversion can take place - drive the increase under the Government Plan, while the Sumatra Vision results in a greater proportionate increase in natural forest cover. Indonesian officials can draw from these scenario maps to design spatial plans that strengthen priority ecosystem services and maximize socioeconomic benefits. Implementing the Sumatra Vision should also result in net gains in habitat quality, carbon storage and sequestration, and water quality.

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