

Restoring Damaged Ecosystems

U.S. spraying left behind nearly 5 million acres of denuded or heavily defoliated upland and coastal forests in southern Vietnam – about 36 percent of the total mangrove forest area¹ – and damaged some 500,000 acres of rice and other crops. The total affected area is about the size of Massachusetts. It would take centuries to reproduce the ecologically balanced mix of flora and fauna that once thrived there. Four decades later, many ecosystems have not yet recovered.

Soil erosion and landslides have sharply reduced soil nutrients and altered runoff patterns. Invasive grasses of low value have taken hold in many areas. The loss of trees, biological diversity and usable cropland has slowed development and led to economic stagnation, poverty and malnutrition. Animal and bird species have suffered from habitat loss; some are now in danger of extinction.²

The most heavily sprayed areas were in the Rung Sat Special Zone, along the rivers approaching Saigon, the Ca Mau peninsula south of the Mekong Delta, and the inland forests near the demilitarized zone. Some areas were sprayed more than four times; 34 percent of the regions were sprayed more than once. Areas along the Laos and Cambodia borders were also sprayed. The total area covered included about 24 percent of southern Vietnam.³

Has the landscape recovered? Only in part. The most severe defoliation was in coastal mangrove forests, where extensive stands of the dominant tree (*Rhizophora apiculata*) were killed. Shrubs below were heavily defoliated but generally survived. Areas around the 17th parallel former demilitarized zone near the Laotian border remain denuded. Most of the triple-canopy forests were replaced by invasive weeds (villagers call some varieties “American grass”), tussock grass and bamboo. Mangrove regeneration has been slow because of degraded soils, hillside erosion and repeated flooding and fires. Intensive mangrove replanting has occurred in some areas.

What was the impact on area residents? Villagers harvested the dead mangroves for fuel, but many who had depended upon forest crops and hunting lost their livelihoods. In areas where crops were destroyed, barren soils became heavily eroded, losing fertility, and many peasants abandoned their lands. They suffered poverty, unemployment and malnutrition as a result.

Is reforestation possible? Yes, and necessary, because natural regrowth could take more than a century, with unpredictable results. Active replanting with ecologically viable trees and shrubs with economic value will require substantial and sustained long-term investment.⁴ The Vietnamese government has already demonstrated the promise of several interventions.

The Vietnamese government plan is to reforest half the degraded area over the next several decades, to re-establish ecological balance, preserve and restore biodiversity, help combat global warming, and improve the lives of local people.

- In 2008, a training project in central Quang Tri province educated 91 farmers and 92 farm managers and technicians in habitat restoration and damaged land re-use techniques. Residents of other regions have requested similar courses. Course elements have been used in the Ma Da Forest:
 - Establish a “cover crop” of fast-growing *Acacia* trees to create shade to protect rain forest tree seedlings from the intense tropical sun.
 - When cover crop trees are tall enough (in about three years), plant seedlings of several indigenous species of forest trees such as *Dipterocarp* beneath the cover crop.⁵

- In the mountainous A Luoi area near Hue, 256 spraying missions denuded 175,000 acres around three former U.S. Special Forces bases. A Vietnamese project has planted “green fences” of thorny honey locust trees (*Gleditschia australis*) around the worst-contaminated areas of the former A So airbase to prevent further human and animal exposure.
 - In two to five years, the fruit of the trees can be used or sold to produce soaps, shampoo and medicines, providing an income source and paying for the trees’ upkeep.
 - The soft-wood trees have no use as fuel, thrive in stony areas, are hardy against local insects and diseases, and live 50 to 60 years.

- The government began a program in the 1970s to replant ravaged coastal mangrove forests with *Rhizophora apicauda* seedlings. Some 70,000 hectares (144,000 acres) of forest have been replanted and are now a self-sustaining and profitable source of fuel and wood for construction.
 - Area fisheries and wetland bird colonies that vanished during the war are returning.
 - In the Can Gio district southeast of Ho Chi Minh City, more than 35,000 hectares (77,000 acres) of mangroves were nearly destroyed. Now, 22,000 hectares have been replanted and are growing well enough for *Man and the Biosphere/UNESCO* to have included the area in its Biosphere Reserves world network in 2000.⁶

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¹ McElwee, Pam, “Agent Orange and Global Environmental Justice: Secondary Effects of Wartime Damage,” abstract of paper presented to the AAAS Annual Meeting, March 22-25, 2007, Boston: <https://www.aasianst.org/absts/2007abst/Southeast/se-172.htm> Accessed Nov. 30, 2009

² Vo Quy, “Statement to the House Subcommittee on Asia, the Pacific and Global Environment,” June 4, 2009 <http://www.internationalrelations.house.gov/111/quy060409.pdf>.

³ Vo Quy, “Statement...”

⁴ Dwnerychuk, Wayne and Bailey, Charles. Dwnerychuk, “Clarity on Two Terms,” July 7, 2009. <http://www.warlegacies.org/Agent%20Orange/Clarity.pdf>.

⁵ Phung Tuu Boi, *Agent Orange and the Environment: From Research to Remediation*, Center for Assistance in Nature Conservation and Community Development, powerpoint presentation to the American Association of Asian Studies, March 2007, p. 35

⁶ Boi, *Agent Orange...* powerpoint p. 37