Mangrove Loss and Climate Change - A Global Perspective

Mangroves are the rainforests by the sea. Large stretches of the sub-tropical and tropical coastlines of Asia, Africa, Oceania, the Americas and the Caribbean are fringed by mangroves, once estimated to cover an area of over 32 million hectares. Now, less than 15 million hectares remain —less than half the original area.

The importance of the protective mangrove buffer zone cannot be overstated. In regions where these coastal fringe forests have been cleared, tremendous problems of erosion and siltation have arisen, and terrible losses to human life and property have occurred due to destructive hurricanes, storm surges and tsunamis.

Today there is a growing urgency to recognize the importance of conserving and restoring protective mangrove greenbelts to lessen the dangers from future catastrophes, because as sea levels rise so will the frequency and intensity of hurricanes and storm surges. Mangroves can buffer against the fury of such destructive storms, protecting those settlements located behind a healthy mangrove fringe.

Mangrove Action Project (MAP) is working with other organizations in the global South towards restoring degraded and cleared mangrove areas as a high priority. MAP is especially interested in restoring some of the 250,000 ha of abandoned shrimp farms located in former coastal wetland areas, especially in Asia and Latin America. But, even more importantly, MAP is working to help conserve and protect existing mangrove wetlands around the world.

Conserving existing mangroves and restoring the vast areas of degraded and cleared mangrove wetlands will serve as a partial solution to global warming. Our planet perhaps faces one of the greatest threats to life as we know it. This crisis is being fueled by human induced climate change. Because nearly half of humankind today lives in cities and settlements located along the now vulnerable coasts, global warming and consequent sea level rise cannot be ignored. Already evacuations of low-lying islands have begun in South Asia and the South Pacific Islands. It is expected mass evacuations of millions of coastal residents will occur within the next 50 years as sea level continues to rise as a result of the greenhouse effect caused by excessive carbon gas emissions.

Nevertheless, mangrove wetlands are often the first line of defense, helping to secure the coasts against erosion and storms. Mangroves are also one of nature’s best ways for combating global warming because of their high capacity for sequestering carbon. This is a characteristic of mangrove wetlands that now demands our most immediate and undivided attention. One of the greatest contributions that mangroves may have to offer is their great propensity to sequester carbon from the atmosphere and store this in their wetland substrate. According to the Feb. 2007 issue of National Geographic, “Mangroves are carbon factories… Measurements suggest that mangroves may have the highest net productivity of carbon of any natural ecosystem (about a hundred pounds per acre per day)…”

Mangroves have been seriously undervalued by those government agencies responsible for their protection and management, as is so clearly evidenced in the Caribbean, especially in the Bahamas where such travesties in shortsighted developments are now occurring at Guana Cay and Bimini Islands.

This combined lack of conservation ethic, shortsighted greed and weak law enforcement have allowed massive losses of these coastal wetlands, with one huge, hidden cost arising from the oxidation and release of stored mangrove carbon.

From a study performed by Dr. Ong of Universiti Sams in Malaysia, it was found that the layers of soil and peat composing the mangrove substrate have a high carbon content of 10% or more. Each hectare of mangrove sediment might contain nearly 700 metric tons of carbon per meter depth. In building large numbers of shrimp farms or tourist complexes, the resultant clearing of mangroves and subsequent excavation of the mangrove substrate could result in the potential oxidation of 1,400 tons of carbon per hectare per year.

Again, according to Dr. Ong, “Assuming that only half of this will become oxidized over a period of 10 years, we are looking at the return of 70 tons of carbon per hectare per year for ten years to the atmosphere. This is some 50 times the sequestration rate. This means that by converting a mere 2 percent of mangroves, all of the advantages of mangroves as a sink of atmospheric carbon will be lost…”

According to the latest study by the UN’s Food and Agriculture Organization (FAO), the current rate of mangrove loss is around 1% per annum—or around 150,000 ha of new mangrove area loss per year. This translates to around 225,000 tons of carbon sequestration potential lost each year, with an additional release of approximately 11 million tons of carbon from disturbed mangrove soils each year.

Obviously, this is an immense problem requiring our concerted action. Not only are we losing the important potential for carbon sequestration offered by the mangroves, but we are also seeing the release of major quantities of polluting gases from the disturbed mangrove substrate itself. This continued clearing of mangroves for whatever reasons must now be perceived in an entirely new light…a light that illuminates far beyond the dark crevices of development for convenience and profit to a future for life and a sustainable living on this now endangered planet…this home we call our Earth.

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REFERENCE: Ong, Jim Eong, Prof., Centre for Marine & Coastal Studies, Universiti Sams, Malaysia, The Hidden Costs of Mangrove Services, Use of Mangroves for Shrimp Aquaculture , Intl. Science Roundtable for the Media, 2002.