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REDD and Smits Model Reforestation

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Climate alterations are already making several areas of the globe increasingly inhospitable to continued human occupation, and environmental refugees are becoming a measurable fraction of the world's displaced populations. Despite the clarity of the data, mitigation strategies around climate change have been difficult to implement. At the same time, climate research over the last decade has revealed unexpected and potentially rewarding opportunities to improve the circumstances of some of the world's most vulnerable people.

One of those opportunities is REDD, or Reducing Emissions from Deforestation and Forest Degradation, an international system for encouraging developed countries to fund both forest preservation and restoration in places where the destructive harvesting of forests for timber, irrigation water, wildlife, and agricultural land would otherwise be the only source of income for poor villagers. James Randerson, who studies global change at the University of California, Irvine, and colleagues have shown that deforestation, forest degradation, and peatland emissions account for roughly 15 percent of all global greenhouse gas emissions.[1] That makes REDD funding a primary climate change mitigation strategy.

REDD proposals, included within the 2007 Bali Action Plan and the 2009 Copenhagen Accord, are slowly gaining ground. Funds from the United Nations, the World Bank, Norway, and elsewhere have been pooled as compensation for reforestation efforts, and some international disbursements have started in Africa and the Amazon Basin. Useful discussions regarding the economic, environmental, and social indicators appropriate for monitoring and evaluating a forest have followed the funding. The result has been a rise in interest around complex adaptive systems modeling, natural capitalism accounting, corruption detection, carbon markets, remote sensing, and dynamic resource exchanges at the human-environment intersection.

Within the private sector, REDD has led to market-driven initiatives that benefit both local populations and larger agribusiness. A subset of those private ventures could be classified as "social businesses," focused on zero-dividend, zero-loss economic engines designed to maximize job creation and provide livable wages, without having profit as the driving force underpinning business.

Development agencies such as USAID and large global institutions like the World Bank and the United Nations, along with the members of the P8, the eight largest pension funds, are discussing REDD-modeled reforestation initiatives as one of several environmentally responsible investments. In May 2010, Norway, an active REDD contributor, and Indonesia agreed to implement a two-year moratorium on new forest-harvesting permits, coincident with Indonesia's decision to reduce greenhouse gas emissions by 26 percent by 2020 through reforestation and forest preservation. To assist compliance, Indonesia will establish a cabinet-level REDD agency in Jakarta to oversee the impact of the moratorium and the efforts at emissions reduction. This appears to be the first addition of REDD oversight to a national governance structure.

Between 1990 and 2005, Indonesia lost an estimated 108,000 square miles of rainforest and associated wildlife habitat—an area of destruction roughly the size of Italy. As a result of the carbon dioxide and methane released during deforestation, Indonesia's annual greenhouse gas emission totals are now third in the world, behind China and the United States.

Stimulated in part by the impact of deforestation and the economic draw of REDD discussions over the past decade, sustainable bioenergy-harvesting projects are developing in Indonesia to improve multiple indicators. Through careful biomimicry, zero-waste methods, and the inclusion of indigenous peoples, such bioenergy projects can restore lost forest, preserve existing ones, produce multiple sustainable forest-based products, produce ethanol as a biofuel, and alleviate poverty by paying laborers at rates significantly above the local minimum wage.

One of the most well-established and well-studied reforestation initiatives is located on the island of Borneo. Beginning in 2002, agroforester Willie Smits devised a rapid and comprehensive reforestation process on a 2,000-hectare plot of grassland in East Kalimantan, once an ancient and stable tropical rainforest. The Smits model contains more than a thousand species—from soil fungi to enormous hardwood trees eighty feet high—and the site at Samboja Lestari has already attracted many previously lost insects, birds, and mammals. Objective and significant changes to the reforested biome, the indigenous society, and the local microclimate have been documented by multiple evaluators, including NASA and the European Space Agency.

The Smits model takes advantage of the close relationship between local indigenous populations and the forests that sustain them. Local tribes have been involved in every aspect of the reforestation and the economic benefits that it provides. As a consequence, they have contributed generously to an understanding of the subtleties of biological interdependencies and have improved the health of the restored biome. The sugar palm (*Arenga pinnata*), which is important to the indigenous population, has helped provide food security and economic sustainability. This native sugar palm is *not* the very destructive “oil palm” grown in monoculture on many Indonesian plantations, and has long been a common dowry for Indonesian women on their wedding day.

In the Smits model, sugar palm serves as an anchor species for comprehensive rainforest ecosystem restoration. It only thrives in a healthy, complex, mixed-species rainforest and is the source of sugar palm syrup, which can be harvested every day of the year. The syrup is tapped much like maple syrup and then evaporated down into a rich, dark sugar. It can also be distilled into hydrous ethanol, a sustainable biofuel.

Sugar palm syrup can be harvested in reforested areas or through wild-forest gardening, enhancing both job creation and ecosystem integration. Monoculture and mechanization fail because sugar palm will not produce an acceptable yield in isolation. The Smits model has a zero-waste process—increasing forest cover, restoring natural ecosystems, improving social and economic indicators for rural peoples, and contributing to the reduction of greenhouse gases through carbon sequestration. Revenues are distributed through increased wages for rural tappers. Such carefully crafted efforts are ideal for REDD initiatives and, if successful, will go a long way to providing incentives for forest restoration and preservation in the developing world.

References

1. Van Der Werf, GR et al. CO2 emissions from forest loss. *Nature Geoscience* 2, 737–738 (2009).

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