

# Economic incentives could massively reduce deforestation emissions in Indonesia, yield billions of dollars

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Indonesia has the potential to realize major reductions in national greenhouse gas emissions from deforestation, and simultaneously earn significant new income for national and regional governments, if policies to Reduce Emissions from Deforestation and forest Degradation (REDD+) are developed with strong and specific economic incentives, said scientists in a new paper published in the leading scientific journal *Proceedings of the National Academy of Sciences*.

These encouraging conclusions were reached following groundbreaking economic modeling performed by scientists who reviewed observed deforestation in Indonesia from 2000 to 2005, as well as variations in the benefits and costs of converting land to [agriculture](#) during that same period. Scientists then mapped and estimated the impacts that alternate economic policies, such as cap-and-trade, simple voluntary, or well-structured voluntary incentive structures would have had on reducing [emissions](#) during that time.

The study, “Structuring economic incentives to reduce emissions from deforestation within Indonesia” was led by scientists at Conservation International and Environmental Defense Fund, with co-authorship from Padjadjaran University and World Resources Institute.

The authors’ research makes a strong case for Indonesia to design a comprehensive, national-level set of [economic incentives](#) for reducing

deforestation emissions at broad scales to achieve maximum climate and financial benefits from the U.N.-supported REDD+ program.

“Our goal with this research was to provide Indonesian leaders a window into a climate-smart future”, said Dr. Jonah Busch, lead author and climate and forest economist for Conservation International. “By studying the recent past, and comparing historic economic conditions with deforestation rates, we estimate the likely financial benefits of different policies for slowing deforestation in the country’s future.”

Dr. Ruben Lubowski, co-author and chief natural resource economist in the international climate program at Environmental Defense Fund, added, “This is the first time potential emissions reductions from deforestation in Indonesia have been estimated using actual historical data on how deforestation varies with economic factors. Our analysis shows that the way REDD+ policies are designed can make a huge difference in achieving large-scale, cost-effective emissions reductions.”

Scenario one, which reviewed the likely outcome of a cap-and-trade or tax-and-subsidy program with international carbon payments at \$10/ton, revealed the highest potential benefits for Indonesia during the 2000-20005 study period:

- Reduction in national emissions from deforestation 26% below reference levels
- Avoidance of 211 million metric tons of carbon dioxide from deforestation emissions every year
- Annual net revenue (national revenue minus expenses) of +\$1 billion per year for Indonesia

A second scenario, which explored the outcome of a payment-for-ecosystem service program on a site-by-site basis would have been less effective in preventing deforestation from shifting within the country

and have accomplished significantly less:

- Reduction in national emissions from deforestation by just 8% below reference levels
- Avoidance of an estimated 62 million metric tons of carbon dioxide from deforestation emissions every year
- Annual net cost (national expenses minus revenue) of -\$6.2 billion paid per year for Indonesia

A third scenario, which may offer Indonesian leaders a more politically attractive option to a mandatory system, would be voluntary but nearly as effective. This approach would require a well-structured incentive structure based on several critical policies including: a combination of shared revenues and responsibilities for the program between national and subnational governments; benchmarking within-country incentives against the best estimates of future “business-as-usual” deforestation rates; and making payments for emission reductions to districts or provinces, rather than individual sites, to help account for less predictable emissions at the local level. These could achieve:

- Reduction in national deforestation emissions by 22% below reference levels
- Avoidance of an estimated 175 million metric tons of carbon dioxide from [deforestation](#) emissions each year
- Annual net revenue of +\$331 million per year for Indonesia

“We find that Indonesia’s choice of policies for REDD+ will greatly affect the level and cost-effectiveness of greenhouse gas reductions, as well as the distribution of the costs and benefits within the country,” said Busch. “Using cap-and-trade rather than simple voluntary incentives can make the difference between a program that reduces national emissions by 8% and costs \$6.2 billion (USD), and a 26% reduction with \$1 billion in revenue. A well-structured voluntary

program could bring about a 22% reduction with \$330 million in revenue.”

“Indonesia has a valuable opportunity to inform its National Strategy for REDD+ with this scientifically sound analysis on the kinds of policies and incentives that will deliver the highest economic returns, and largest reductions in carbon dioxide emissions,” said Fred Boltz, Senior Vice President and Climate Change Lead for Conservation International, and paper co-author. “As a critical leading nation in REDD+ efforts, Indonesia has made important emissions reduction commitments. We hope that this study will enable [Indonesia](#)’s leaders to adopt policies that achieve the greatest benefit for its people, its rich biodiversity and for the global climate.”

To conduct the scenario modeling, scientists employed OSIRIS-Indonesia, or the Open Source Impacts of REDD+ Incentives Spreadsheet, a suite of free, transparent, open-source, spreadsheet-based decision support tools for estimating and mapping the climate, forest and revenue benefits of alternative policy decisions for REDD+. ([www.conservation.org/osiris](http://www.conservation.org/osiris))

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