

## Randomized controlled trial in Uganda finds that paying people not to cut down trees works

by Mike Gaworecki on 27 July 2017

- *Researchers with Northwestern University in the United States conducted a randomized controlled trial involving 121 villages in a region with high rates of deforestation and forest degradation.*
- *Sixty villages participated in the PES scheme from 2011 to 2013 and were paid 70,000 Ugandan shillings (currently worth slightly less than \$20, but worth \$28 in 2012 dollars) per hectare to conserve their forests, while 61 formed the control group and received no compensation.*
- *The researchers found that, during the study period, tree cover declined by 4.2 percent in villages that were part of the program, less than half of the 9.1 percent tree cover loss in control villages.*

Emissions from land-use change, primarily deforestation, are responsible for about nine percent of global carbon emissions, according to a [2015 study](#). That's why conservation efforts that aim to keep forests standing are considered crucial to the world's efforts to slow global warming — and one popular conservation strategy for keeping forests standing is to, essentially, pay people not to cut down trees.

The researchers behind a study published in [Science](#) last week say they've concluded that one such conservation initiative — known as a payments for ecosystem services (PES) program — in Uganda really paid off in terms of preventing deforestation.

While slowing rates of deforestation in developing countries, where most forest destruction occurs today, is considered a cost-effective way to reduce emissions, the effectiveness of PES programs is still poorly understood. There's the possibility that some people engaged in the program would have left their forests standing without being paid to do so, for instance, while others might leave their forests standing in exchange for cash but then simply shift their logging or land-clearing activities from a forest enrolled in the program to another area.

Past research has shown that [performance of PES programs can vary](#) in terms of delivering environmental and social benefits, depending on a number of factors. In order to remove as much of this variability as possible when studying the program in Uganda, researchers with Northwestern University in the United States conducted a randomized controlled trial involving 121 villages in a region in the western part of the country with high rates of deforestation and forest degradation.

Sixty villages participated in the PES scheme from 2011 to 2013 and were paid 70,000 Ugandan shillings (currently worth slightly less than \$20, but worth \$28 in 2012) per hectare to conserve their forests, while 61 formed the control group and received no compensation.



Participants in the PES program receiving their payments for conserving trees. Photo courtesy of Chimpanzee Sanctuary and Wildlife Conservation Trust.

Designing the study this way was intended to allow the researchers to measure exactly how much deforestation was actually avoided due to the PES program. High-resolution satellite imagery was used to measure changes in the amount of land covered in trees. The researchers found that, during the study period, tree cover declined by 4.2 percent in villages that were part of the program, less than half of the 9.1 percent tree cover loss in control villages.

“We found that the program had very large impacts on forest cover,” Seema Jayachandran, associate professor of economics at Northwestern and lead author of the study, said in a [statement](#). There was still deforestation in the villages that participated in the PES program, Jayachandran noted, but there was far less than in villages where people weren’t paid to keep their forests standing.

Jayachandran and team also found that this deforestation would not have been avoided without the program, and enrollees did not simply move to a neighboring forest and cut there instead. “It wasn’t the case that only forest owners who were planning to conserve anyway enrolled,” she said. “The payments changed people’s behavior and prompted them to conserve. And we didn’t find any evidence that they simply shifted their tree-cutting elsewhere. This truly was a net increase in forest cover in the study region.”

The team also analyzed the cost-effectiveness of the program by calculating the monetary value of the delayed carbon emissions using the "social cost of carbon," or an estimate of the damage done to the environment by carbon emissions, and comparing that to the cost of the program.

Based on the social cost of carbon as calculated by the U.S. Environmental Protection Agency, which was \$39 per metric ton in 2012, the researchers determined that the benefits of the program were 2.4 times larger than the costs. Not only that, but even if landowners immediately set to cutting down all the trees they would have cut down during the study period as soon as the two-year program ended, that delay in the emissions from deforestation would still be worth 0.8 times more than the program costs.

Either way, Jayachandra said that that is a substantial benefit for the global climate, even compared to other conservation intervention types: "We found that the benefit of the delayed CO<sub>2</sub> emissions was over twice as large as the program costs. For many other environmental policies, the value of the averted CO<sub>2</sub> is in fact smaller than the program costs."



Mountain gorillas in Bwindi Impenetrable Forest in southwestern Uganda. The villages studied are in western part of the country. Photo via [Wikimedia Commons](#), licensed under [CC BY-SA 3.0](#).

## CITATION

- Jayachandran, S., de Laat, J., Lambin, E. F., Stanton, C. Y., Audy, R., & Thomas, N. E. (2017). Cash for carbon: A randomized trial of payments for ecosystem services to reduce deforestation. *Science*, 357(6348), 267-273. [doi:10.1126/science.aan0568](https://doi.org/10.1126/science.aan0568)
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