

Examining the ongoing global land rush

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Transnational agricultural large-scale land acquisitions pose a threat to biodiversity. This photos was taken in Mozambique several years ago and show how forests have been cleared for land investments. Credit: Kyle Davis/ University of Delaware

Since the beginning of the century, the world has experienced a global land rush with thousands of transnational land investments being made

by foreign entities resulting in a surge of large-scale land acquisitions, which are defined as land contracts or leases of at least 500 acres—or more than 370 football fields—each. Collectively, these large-scale land acquisitions have resulted in an area larger than South Africa being officially put under contract for agriculture, logging, and mining.

When used for agriculture, specifically, new research led by the University of Delaware shows these transnational agricultural large-scale land acquisitions (TALSLAs), and the forest loss associated with them, pose a threat to biodiversity in the Global South—broadly defined as the nations of the world with low levels of economic and industrial development that are typically located to the south of more industrialized nations.

The paper was recently published in *Environmental Research Letters*.

Kyle Davis, assistant professor in the Department of Geography and Spatial Sciences and the Department of Plant and Soil Sciences, as well as a resident faculty member with UD's Data Science Institute, served as the lead author on the paper and Saleem Ali, the Blue and Gold Distinguished Professor of Energy and the Environment at UD, chair of the Department of Geography and Spatial Sciences, who holds a secondary appointment in the Joseph R. Biden, Jr. School of Public Policy and Administration, was a co-author on the paper.

The work was supported in part by the National Science Foundation's (NSF) National Socio-Environmental Synthesis Center, which Ali credited as being a driving force behind the research.

"This paper exemplifies the power of international collaborations brought about through NSF's Socioecological Synthesis Center," said Ali. "Dr. Davis has admirably cultivated such ties and included me in the effort given my experience with international environmental agreements

such as the Convention on Biological Diversity."

Using data from the Land Matrix Database, a joint international initiative of several research and development organizations run out of the University of Bern in Switzerland that has been collecting data on transnational and domestic land deals since 2009, Davis said the dataset the researchers assembled for their research is, to date, the largest global dataset of georeferenced agricultural land investments.

Booming land acquisitions

There are a few notable reasons why these TALSLAs have surged since the start of the century.

For one thing, the global food crisis in 2008, and a similar event in 2010, saw a sudden spike in food prices and export bans occurred across the globe.

"Because of those events, many countries that rely on food imports realized that they were potentially vulnerable to these kinds of global or remote disruptions," said Davis. "To partly address these vulnerabilities So investments, specifically targeted at agriculture rose partly as a result of that."

In addition, a growing interest in renewable fuels, especially those related to first generation biofuel crops such as corn, sugar cane and oil palm, gave countries an incentive to invest in projects in places where agricultural land was relatively cheap. Once the cheap agricultural land was acquired, these items could be produced and exported to countries that would make use of them through refining and processing.

Historical forest loss

For this study, the researchers assembled the first global dataset of geo-located TALSLAs in 40 countries, focusing both on the historical environmental effects of these acquisitions and as well as their potential impacts to biodiversity if these investments are fully exploited.

First, the authors analyzed the extent to which [agricultural land](#) investments in different regions have been associated with accelerated rates of forest loss.

"We looked at four different regions most targeted by land investments: Latin America, Eastern Europe, Asia and Sub-Saharan Africa," said Davis. "We found that, for Sub-Saharan Africa and Asia, these types of investments tend to be associated with accelerated forest loss."

To determine this, the researchers used high-resolution satellite data for annual forest cover to quantify where forests were being removed and whether rates of forest loss were significantly higher within land investments. They also looked at when forest-loss was happening in relation to the contract year for each TALSLA. For land investments in Asia, they found a significant jump in the rates of forest loss after contracts were signed, suggesting that these investments directly lead to increased deforestation.

Interestingly, for the investments in Africa, they found that the enhanced forest loss tends to happen before the contract year occurs.

"That suggests that even though they are associated with increased [forest](#) loss, the investments in this region may be taking advantage of places where there has already been clearing so the observed [forest loss](#) isn't directly caused by the investment," said Davis.

Future biodiversity

The researchers also sought to understand what would happen to the biodiversity of vertebrate species (amphibians, mammals, reptiles) in areas that have been placed under contract but have not yet been fully exploited for their intended agricultural use.

Those areas currently have land cover, such as forests and other types of natural habitats that support a variety of species, and so the researchers wanted to estimate what would happen to the biodiversity if that land cover was converted for a more intensive, commercial agricultural purpose.

"We looked at two measures of biodiversity: [species richness](#) and abundance," said Davis. "Abundance is the number of individuals per species and species richness is the number of species observed in a particular location."

They found that 91% of the investments would be expected to result in a decline in species richness. For abundance, they found that it depended on which type of investment the land was going to be used for.

"We estimated that abundance could potentially increase because you have maybe an area that is not a very productive natural system but it gets converted into a tree plantation or an oil palm plantation," said Davis. "That type of agriculture can support large numbers of certain types of species but not necessarily a large number of species."

Still, with 39% of these TALSLAs falling at least partially in biodiversity hotspots—placing the areas at high risk of biodiversity loss—Davis said it is important for these factors to be considered when foreign land investments are made.

"Depending on the context, depending on the region and depending on the intended use of the [investment](#), you can have really serious

implications for forests and for biodiversity in the places where these investments are occurring," said Davis. "These types of things need to be kept in mind when policies are being developed to govern these types of investments and to do so responsibly."

More information: Kyle Frankel Davis et al, Transnational agricultural land acquisitions threaten biodiversity in the Global South, *Environmental Research Letters* (2023). [DOI: 10.1088/1748-9326/acb2de](https://doi.org/10.1088/1748-9326/acb2de)

Provided by University of Delaware

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