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# CLIMATE *for growth*

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ENVIRONMENTAL ECONOMIST ARIASTER CHIMELI  
TAKES A FRESH LOOK AT THE RELATIONSHIP  
BETWEEN CLIMATE CHANGE AND GLOBAL  
ECONOMIC DEVELOPMENT

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ENVIRONMENTAL  
ECONOMICS

by MARY REED

As Ohio University environmental economist Ariaster Chimeli sits down to discuss his work, it's the final day of the United Nations Climate Change Conference in Copenhagen. While world leaders try to hash out an agreement that will encourage developed and developing nations to reduce their greenhouse gas emissions, economists such as Chimeli all over the globe inform the debate through their research.

"Climate systems are so complex, we don't understand them that well, and we're talking about very long time spans," Chimeli says, reflecting on the conference. "It makes sense to understand what's happening right now."

Chimeli is doing just that through his research on the linkages between economic growth and environmental quality in developing nations. Much of his contributions to the field surround theoretical papers he has written connecting environmental quality and economic growth. For example, in the early 1990s, new empirical evidence showed that pollution increases as income per capita (a measure of economic development) rises. The pollution peaks and then—for some pollutants such as sulfur dioxide—actually starts to decrease. Sulfur dioxide is one of the key ingredients in acid rain. In the 1990s, pollution was increasing.

"That's when people started paying attention to solutions coming from economics," Chimeli says. "That's when we had the cap and trade system apply to (sulfur dioxide) emissions."

Some people jumped into the debate, arguing that the best way to deal with pollution is to let economies grow. Not so fast, Chimeli says, because this assumes that every economy is the same. Studies on countries where there is reliable, long-term data—the United States, Germany, and Japan—suggest that when income grows, pollution eventually decreases for some pollutants, but analysis of other countries shows that this isn't always the case. Chimeli's research tries to explain these findings by examining the specific issues in each nation.

"We cannot look at a cross-section of countries at one point in time and say we can recover the relationship between economic growth and environmental quality," Chimeli says, adding that his papers are an invitation to another generation of empirical research.

Theoretical economics helps move the broader field forward in ways that empirical evidence cannot. "The world cannot be described by a simple set of mathematical equations," he says, "but if you have a very good theory, the world behaves as if guided by that theory."

Chimeli's empirical work is adding to the literature on economics and development as well. Much of his work focuses on his native Brazil, where Chimeli was a student in the late 1980s and early 1990s. "Everybody was studying inflation and macroeconomics because the country was going through inflation," he says. "I wanted to do something different."

Working for a cousin's consulting firm inspired him to study economics and development, and he eventually wrote an undergraduate thesis on water pollution in a Brazilian state. The thesis won a state and a national prize, which set Chimeli on his path to a Ph.D. in economics and a postdoctoral appointment at Columbia University's International Research Institute on Climate and Society.

His latest work as an associate professor of economics at Ohio University is a paper in the journal *Land Economics*. It looks at what happened to the mahogany market in Brazil after the government reduced and then prohibited the extraction of mahogany, the highly valued wood tree that is at risk of extinction.

"When there is a prohibition—say, alcohol—you know there is going to be an illegal market, but you hope there is going to be a greater cost to production," Chimeli says, giving a few examples of these costs: potential jail time, fines, bribes, violence. Policymakers intend that these additional costs eventually will increase prices and lead to less consumption of the illegal goods.

"There is another side of the coin," he continues, "which is that when you prohibit a market, those who go underground don't have to pay taxes, they don't have to pay attention to quality control, they don't have to pay attention to safety."

But in the case of most illegal markets, like illegal drug markets, economists simply don't have the data to accurately measure the effects of prohibition. Brazilian mahogany, however, gave Chimeli a rare opportunity.

In data from a Brazilian government website that collects export figures, he was able to find what economists refer to as a structural break—a major change in a time series caused by an external factor.

In March 1999, the Brazilian government canceled 85 percent of all mahogany licenses in the country—that's the abrupt external factor. Within five months, exports of "other tropical species" had increased 1,800 percent. "It goes from zero to volumes that were comparable with previous productions of mahogany," Chimeli says.

It turns out that prohibition did not reduce the amount of mahogany being cut and exported (it was simply renamed), and it was now not even subject to regulation. Price and quantity before prohibition and after prohibition suggest lower cost to the loggers for illegally extracting the species. "A successful policy would have resulted in a price increase," Chimeli notes.

In an earlier study, Chimeli examined the correlation between climate variability and economic impacts. Specifically, climate scientists have become more adept at predicting climate patterns related to ocean temperatures and currents, like that of northeast Brazil—El Niño years are correlated with drought in a region that produces corn. Based on the climate data, Chimeli explains, "we were able to do a reasonable job of doing predictions on the market for rain-fed corn in Brazil."

This, in turn, was highly correlated with monetary transfers from the federal government to the state for aid to farmers. "The government was responding after the fact," Chimeli says. "Whenever that happens, there is room for wasting (and) room for corruption." Chimeli says that if the government could use climate predictions to budget payments to the state proactively instead of reactively, some corruption and waste could be avoided.

In the end, when it comes to the environment and economic development, as with climate change and carbon emissions ("That is exactly the tragedy of the commons because the atmosphere belongs to everyone and no one," he notes.), economists generally do not make policy, but they inform it.

"Sometimes our policies have good intentions," Chimeli says, but "good intentions can be counterproductive."



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