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Carlos Navarro

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Study Projects Sharp Decline in Agricultural Productivity in Mexico Because of Global Climate Change

by Carlos Navarro

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Reports are beginning to surface on the potential impact of global climate change on Mexican agriculture, including a controversial study that ties a drop in crop yields to a significant increase in migration to the US. The study says that climate change will cause agriculture productivity to decline by 10% in Mexico, resulting in a major exodus of Mexicans to the US. But critics say the study makes too many assumptions, including that existing economic and political environments will remain unchanged.

The study on the relationship between climate change and migration was conducted by a group of researchers at Princeton University, led by Michael Oppenheimer. The study, published in the Proceedings of the National Academy of Science, centered on the relationship between agricultural decline and migration. Oppenheimer and his associates, Alan B. Krueger and Shuaizhang Feng, examined Mexican emigration patterns, crop yields, and climate data from 1995 to 2005 to develop projections for the next 70 years.

The team projected a 10% decline in agriculture productivity in Mexico because of climate warming. "Our findings are significant from a global perspective given that many regions, especially developing countries, are expected to experience significant declines in agricultural yields as a result of projected warming," the study's abstract states.

Reduced output would boost emigration to US

A decline in agricultural output could have a significant impact on migration, with a total of between 1.4 million and 6.7 million Mexicans migrating to the states by 2080. "Assuming that the climate projections are correct, gradually over the next several decades heading toward the end of the century, it becomes one of the more important factors in driving Mexicans across the border, all other things being equal," said Oppenheimer, professor of geosciences and international affairs at Princeton University.

Oppenheimer acknowledged that the conclusions were open to criticism. "This is the first time anybody's built a model to do this," said the researcher. "It's a simplification, and there are a lot of assumptions, but it's the start of a learning process. As we learn more, the model will improve, and the numbers will get more reliable."

Detractors suggest that the study does not consider other factors that could affect migration, such as politics and economics "I wouldn't take these numbers to the bank," Barry Smith, a researcher at the University of Guelph in Canada, told National Geographic News.

Smith suggested that the study's authors would have had to make some "heroic assumptions" to reach their conclusions, including the premise that the existing economic and political situations in the US and Mexico will not change for decades.

Oppenheimer acknowledged that some important considerations were left out of the study but noted this was only a simplified first step to examine the impact of global climate change on migration. "Our primary objectives were, No. 1, to give policymakers something to think about and, No. 2, to give researchers a spur to start answering some of the more complicated questions," Oppenheimer said.

UN expert also raises concerns

Concerns about climate change's impact on agriculture in Mexico and around the world are also being discussed in other settings, including a forum at the Universidad Nacional Autónoma de México (UNAM) in early August. Keynote speaker Rajendra K. Pachauri, chair of the Intergovernmental Panel on Climate Change (IPCC), warned of severe consequences, including increasing hunger, if countries did not act to address climate change. The IPCC was established by the UN Environment Program (UNEP) and the World Meteorological Organization (WMO).

Pachauri predicted there would be flooding in many areas, including the African continent and China. A country like Mexico would be affected both by floods in southern areas and drought in other parts of the country, said the IPCC chair. "There will be malnutrition and famine," said Pachauri. "In addition, flooding could result in a change in the geography of the Earth."

Pachauri said it was urgent that world leaders use the next round of consultations on global climate change to take concrete steps to try to reverse global warming.

President Felipe Calderón's administration has taken a leading role in calling attention to the perils of global climate change. Mexico will host the next round of consultations in Cancún in December ([SourceMex, January 27, 2010](#)). But some agriculture organizations say Calderón is not doing enough to respond to immediate contingencies at home.

"There is some mapping being done by the Secretaría del Medio Ambiente y Recursos Naturales (SEMARNAT) of probable impacts, but if there are no solutions or alternatives implemented to protect the population, people will emigrate," said Iván Polanco, a leader with the Asociación Nacional de Empresas Comercializadoras del Campo (ANEC), which represents small and medium-sized farms.

Polanco said climatic conditions have already had some adverse effects on Mexican agriculture this year. For example, he said atypical rains have destroyed bean harvests in the western states of Nayarit and Sinaloa, while rivers burst their banks and ruined crops in Michoacán. In July, Hurricane Alex brought heavy rain and massive flooding in Tamaulipas, Nuevo Leon, and other northeastern states, killing at least 30 people and destroying crops.

A recent study from the Servicio de Información Agroalimentaria y Pesquera (SIAP) anticipates that Mexico will have to greatly increase its irrigated area because of climate change. As part of the strategy to boost irrigation systems around the country, the Secretaría de Agricultura, Ganadería, Desarrollo Rural, Pesca y Alimentación (SAGARPA) has begun a program to store water to be used for irrigation, particularly in the country's driest areas.

"Facing an increase in population and greater demand for food, it is necessary to expand coverage of our irrigation systems to boost production," said the Mexico City daily newspaper *La Jornada*.

SIAP said the proportion of water in Mexico that goes to agriculture is already very high at 77%, compared with 41% in the US and 12% in Canada. In contrast, industry accounts for 9% of water

usage in Mexico, compared with 46% in the US and 68% in Canada. Domestic household usage is more even in the three countries at 14% in Mexico, 13% in the US, and 20% in Canada.

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