

## Global warming may cause world crop decline

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Wed Sep 12, 2007 3:25pm EDT

By Deborah Zabarenko, Environment Correspondent

WASHINGTON (Reuters) - Global warming could send world agriculture into serious decline by 2080 with productivity collapsing in some developing countries while it improves in a few rich nations, a study reported on Wednesday.

India, Pakistan, most of Africa and most of Latin America would be hit hardest, said economist William Cline, the study's author. The United States, most of Europe, Russia and Canada would probably see agricultural gains if climate change continues on its current course, the study found.

Overall, the world's agricultural productivity was forecast to decline by between 3 percent and 16 percent by 2080, according to the study published by the Washington-based Center for Global Development and the Peterson Institute for International Economics.

Among developed countries, Australia's outlook was bleakest with predicted declines in crop yields ranging between 16 percent and 27 percent. In the developing world, fast-growing India's declines were forecast between 29 percent and 38 percent while Sudan and Senegal both had predicted crop declines of more than 50 percent, essentially a collapse of agricultural productivity.

The wide range between the low and high end of the forecast depends on how much carbon dioxide emissions actually spur some crops, Cline said. Plants absorb carbon dioxide, a climate-warming greenhouse gas emitted by coal-fired power plants, petroleum-fueled vehicles and some natural processes.

Some analysts maintain that global warming could actually be a boon to crops, making the impact of human-caused climate change negligible. They cite laboratory studies that have shown potential gains in crop yields of up to 30 percent when carbon dioxide emissions were increased.

### CARBON FERTILIZATION

Cline disputed these contentions, saying that similar tests performed in farm fields have shown gains to be around 15 percent. He said the boost from so-called carbon fertilization tends to flatten out.

For corn, there is already so much carbon dioxide in the atmosphere that putting more of this gas in the air would not help increase yields, Cline said. Wheat, rice and soybeans are continuing to benefit from increased carbon dioxide emissions but that improvement is likely to taper off, he said.

"It turns out that global yields for the major cereal (crops) have in fact slowed down, that the Green Revolution has slowed down," Cline said, referring to the global technological transformation of agriculture between the 1940s and 1960s.

"There's already a sign that there is fatigue in the Green Revolution," he said, noting that the average annual growth in yields in the 1960s and 1970s was 2.6 percent per year, but by the 1980s and 1990s it had slowed to 1.8 percent.

"The problem is that you need the technical change to keep up with demand for food," Cline said. "I estimate that the global demand for food after you take into account higher population, as well as higher incomes, would about triple from now to late in the century."

Northern countries such as parts of the United States, Russia and Canada would have longer growing seasons due to global warming. But Cline said the world probably could not rely on increased crop yields in those areas.

"By the end of the century, they're probably going to be earning so much money from their energy exports that their exchange rates are going to be very strong," he said.

These strong currencies would make it prohibitively expensive for most other countries to buy Russian or Canadian agricultural goods.