Science & Technology

Water Wars

A drought as severe as the 1930s Dust Bowl could ignite conflicts over water, scientists say.

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Searing heat and little rain. Once-verdant lawns parched. Precious water in short supply.

Welcome to perpetual drought in the American Southwest, an area with one of the fastest growing populations in the United States. Columbia researchers attribute the region's new, increasingly arid climate to global warming.

If these scientists are correct, a drought as severe as the 1930s Dust Bowl could ignite conflicts over water and have epic effects on development, immigration, and even international politics.

"The drought is already on the way," says Richard Seager '90GSAS, a geophysicist and senior research scientist at the Lamont-Doherty Earth Observatory in Palisades, New York. "Even if we intervene and reduce CO2 emissions now, it will persist. The result of the overall warming of the planet and its intensifying cycle will continue for decades. It takes that long to respond."

Seager and his colleagues looked at 19 different models of the atmosphere, ocean, and land surface that simulate climate variability and change. Similar to those used for weather forecasting, these models have been developed by groups all over the world and contributed to the Intergovernmental Panel on Climate Change's (IPCC) report earlier this year.

The models showed a marked increase in barren landscape beginning now and worsening throughout the 21st century. In addition to the American Southwest, large

parts of Mexico, the Mediterranean, the Middle East, South America, South Africa, and Australia will dry out. The study, a collaboration with the National Oceanic and Atmospheric Administration's Geophysical Fluid Dynamics Laboratory in Princeton, New Jersey, was published April 5 in the online journal *Science*.

This new climate isn't linked to a change in sea surface temperature following a particular wind pattern or tidal motion, like the naturally occurring El Niño and La Niña temperature fluctuations in the Pacific Ocean that brought droughts to North America in the 1930s, 1950s, and between 1998 and 2002. Rather, subtropical drying seems to be the result of overall warming of the oceans and atmosphere caused by greenhouse gases, according to the study.

Currently, hot air from the equatorial tropics rises 8 to 12 miles before hitting the stratosphere, and then spreads out north and south, absorbing moisture that would otherwise become rainfall. When it reaches 30 degrees latitude to the north and 30 degrees to the south, it cools and descends again. And as the planet warms, the area where the hot air remains aloft is widening, causing arid regions to expand and become drier.

The study predicts that annual rainfall in the region along the already arid U.S.-Mexico border will drop by 10 to 20 percent by the end of the century, significantly reducing the flow of the Colorado River, which supplies much of the region's water. A drought that has affected much of the Southwest since 1999, significantly drying the river, may partly be the result of global warming, the researchers say.

Last year nearly one million newcomers moved to Arizona, Nevada, Texas, Utah, and Colorado, according to 2006 U.S. Census figures. Without good planning, water resources could be "stretched to the point of social conflict," says Seager.

"Being in the desert is unnatural," he adds. "The whole Southwest is dependent on massive works of engineering. How is that whole system going to stand up to this kind of stress?"

Border and immigration conflicts could flare, too, as drought in Mexico pushes thousands of poor migrants into the U.S. to look for work. International relations with that country also will be strained over the fight for water.

Historian and social critic Michael Davis cited the Lamont-Doherty study in his essay, "Denial in the Desert," which appeared in the April issue of *The Nation*, warning that

drought has historically set the perfect storm for social conflict.

“Although President Bush now grudgingly accepts the IPCC warning that the Arctic is rapidly melting,” Davis wrote, “he has probably not yet registered the possibility that his ranch might someday become a sand dune.”

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