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**Floods, Droughts, and Climate Change, by Michael Collier &  
Robert H. Webb**

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very few of the landless and poor. It did stimulate land speculation, driving up prices where irrigation combined with fertile soil and market access and generally leading to greater concentration of ownership. When bestowed on Indian reservations, reclamation improved lands that were subsequently sold to whites while increasing the costs and reducing the size of Indian holdings. In the end, government works effectively reclaimed a relatively small amount of land by contrast to the efforts of private land, power, and canal companies. By the 1920s, costly reclamation projects moved ahead in the West despite a growing surplus of arable land in other regions. When the depression arrived, Franklin D. Roosevelt's New Deal administration recast the Reclamation Service as an unabashed jobs program and showcased projects like Boulder Dam as symbols of hope.

Pisani draws from this experience a number of lessons about the consequences of ill-considered efforts to dominate nature, promote social engineering, or maintain centralized control over public policies that rely on local conditions and collaboration. He ends by drawing a provocative parallel between his study and James C. Scott's *Seeing Like a State: How Certain Schemes to Improve the Human Condition Have Failed* (1998), quoting Scott to the effect that both are "making a case against an imperial or hegemonic planning mentality that excludes the necessary role of local knowledge and know-how" (p.295). In abundant detail necessarily excluded from this short review, Pisani identifies a good deal of local knowledge among Indians, dirt farmers, canal diggers, dam builders, and the occasional clear-eyed legislator that might have informed an alternative history.

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*Floods, Droughts, and Climate Change.* By Michael Collier & Robert H. Webb. The University of Arizona Press, 2002. 160 pp. \$17.95 paper.

*Floods, Droughts, and Climate Change*, by Michael Collier and Robert H. Webb, offers an overview of the global environmental forces underlying and affecting weather's daily mechanisms. Until relatively recently in history, humans had generally perceived only the immediate patterns of weather without appreciating such slower-moving and less detectable long-term processes as oceanic and atmospheric currents or shifting land masses. In this enlightening book, the authors blend natural and human history, meteorology, geology, and climatology to offer an accessible introduction to these enigmatic climate patterns and the imperceptible forces that cause them.

The authors demonstrate that nature's dramatic events are often related and result from larger, hidden processes. Floods and droughts,

for instance, occur in the context of regional climate patterns and do not happen in isolation. Hurricanes, such as the major storms that ravaged Florida in the summer of 2004, can occur during any given year but are much more likely to cause severe damage during "La Niña" periods.

A large portion of the text discusses the intercontinental ramifications of the *El Niño-Southern Oscillation* (ENSO) phenomenon, also known as "El Niño." ENSO events occur roughly every three to seven years and are caused by the interaction of oceanographic and atmospheric forces in the equatorial Pacific Ocean. Generally speaking, the events are characterized by the following concurrent environmental conditions: (1) a current of warm ocean water in the western Pacific drifts eastward along the equator to South America, (2) Ecuador and Peru experience unusually heavy rainstorms and floods, (3) drought conditions develop in India and Australia, (4) floods occur in the Southwest portion of the United States while the Pacific Northwest remains relatively dry, or alternatively, droughts form in the Southwest while high precipitation accumulates in the Northwest. La Niña reverses El Niño: dry weather occurs where El Niño had caused wet weather, and wet conditions occur where El Niño had caused dry conditions.

In addition, the authors relate these ENSO events to the *Pacific Decadal Oscillation* (PDO), a weather phenomenon triggered by fluctuating temperatures in the northern Pacific Ocean, and suggest that the two combine to predict regional weather. About every two decades, when the PDO is "high," the temperature of the northern Pacific Ocean decreases slightly, the western coast of North America becomes especially warm and dry, and the Southwest tends to be wet. The two processes—the PDO and ENSO—can constructively reinforce or interfere with the flood or drought tendencies of each other under certain conditions. Similar regional oscillations occur elsewhere throughout the globe, such as the *North Atlantic Oscillation*, whereby temperatures in northern Europe and Greenland vary inversely.

Another recurring theme of the authors is the connection between human activities and their impact upon environmental processes. They consider the possibility that the forty-year drought in Africa's Sahel Desert could be the result of destructive farming practices that introduced dust into the air, displacing moisture-bearing storms away from the Sahel region. Chapter thirteen, "Watching the World Warm," is devoted to the problem of global warming. The authors provide a background history of the global warming crisis, its largely human causes, and offer some uncertain predictions as to how environmental processes might be affected in the long-term.

In various sections of the book, the authors express sympathy for groups of people who are impacted by natural disasters, especially the

poor. Discussions of Hurricane Mitch in Honduras during the fall of 1998, flooding of China's Yangtze River in 1998, and the relocation of Peruvian families after flooding associated with the 1997-98 El Niño, include character sketches and photographs illustrating the kinds of impoverished families that suffer most as a result of these natural disasters. These discussions add depth to the book and help readers relate to those whose lives have been disrupted by violent weather.

There are a few criticisms I have about this book. First of all, the curious blend of scientific and informal language was somewhat unsettling for me at first, though I suppose this writing style might be acceptable in light of the book's intended mainstream audience of non-scientists and interested laypersons. However, I would have edited out some of the more eccentric phrases such as that found on page 56: "For those of us of the lumper (not splitter) persuasion...ocean currents come in two flavors: surface currents and deep-water currents." Secondly, chapter titles like "Entering the Atmosphere" and "The Christ Child" are too vague for my taste and do not give a sense of the overall structure of the book. Indeed, the book generally suffers from a rather haphazard organization.

Finally, I believe this book could benefit from the inclusion of a unit measurement and conversion chart as a reference, listing the various measurement units, their abbreviations, and perhaps one or more tangible examples of what representative amounts would look like. Some readers would find it confusing to encounter the full name of a measurement unit and its corresponding abbreviation only the first time they are used. As a book geared toward laypersons, a unit chart would be helpful in the same way that a glossary and index (included here by the authors) are helpful in this book.

Overall, the authors convey a genuine sense of excitement about the emerging discoveries in climatology while leaving the reader with the impression that very little is fully understood about the root causes of environmental processes. For example, no one really knows what triggers the emergence and collapse of ENSO events. Predicting future weather patterns is also problematic because we're only beginning to understand the many variables that affect global climate. However, scientists have been assembling an indispensable network of buoys, barometers, and anemometers to monitor real-time data about the oceans and atmosphere, and integrating a new understanding of atmospheric behaviors such as the *Pacific Decadal Oscillation* will further refine these forecasts.

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