Monitoring and Predicting Agricultural Drought: A Global Study. Edited by VIJENDRA K. BOKEN, ARTHUR P. CRACKNELL and RONALD L. HEATHCOTE.

I am a meteorologist, who is primarily interested in climate change over time periods from seasons to decades. Over my career I have analyzed precipitation observations for the Sahel, India and the western United States. Currently, I am working with a regional climate model that predicts soil moisture both in rain-fed and irrigated regions. I agreed to do this review because I thought it would be a good opportunity to learn more about how recent advances in climate science have been transferred to researchers and agencies, which are responsible for monitoring and predicting drought in important agricultural areas around the world.

Overall, this is a well-produced 472 page volume with generally good to excellent figures. The fact that it has no color illustrations detracts very little. Despite the fact that English is probably not the first language for a number of authors, the text is generally well written and edited. It is a sewn binding hard bound volume, which should last for years. Production of this book was supported by the World Meteorological Organization.

As it states on the dust cover this book “focuses on accurate monitoring and prediction of these [agricultural] kinds of droughts.” It is expected that this book “will be an essential collection for those who must advise governments or international organizations on the current scope, likelihood, and impact of agricultural droughts.”

The book has thirty-nine chapters by a total of 79 authors from throughout the world. The broad representation from such different countries as Portugal, Niger, and Vietnam helps the work discussed to be truly global. It is divided into seven sections: Basic Concepts, Remote Sensing, The Americas, Europe, Africa, Asia, and Climate Change with about six chapters in each.

The first paper by the lead editor defines agricultural drought and attempts to be an introduction to the remainder of the volume. The discussion of definitions is useful, but few of the subsequent papers appear to utilize it. There is also a detailed description of a biometeorological time scale model, which is not used anywhere else in the text. Most disappointing, the introduction to the remainder of the book is not very enlightening. This is in part why I have had to quote from the dust jacket to summarize the contents and goals of the volume.

Having long been interested in El Niño I was very attracted to Chapter 3 which is entitled “Monitoring Agricultural Drought Using El Niño and Southern Oscillation Data.” Unfortunately, El Niño has been better defined and described elsewhere and little useful information is given relating it to agriculture. In particular there are no figures or tables quantitatively relating El Niño changes in climate to either regional precipitation or agricultural drought.

The chapters describing remote sensing are generally much more successful. The first defines the most popular drought indices such as Normalized Difference Vegetation Index (NDVI). The authors go on to give indications on how these indices are related to such things as precipitation and biomass. The last two remote sensing chapters discuss the relatively new use of both active and passive microwave sounding to infer soil moisture and other parameters. Both chapters provide very good reviews and useful examples of a hopeful technology.

The many chapters describing regional monitoring and prediction of agricultural drought generally have a similar format. They begin with an overview of the climate and agricultural economy of the area or country. This is followed by a qualitative description of droughts and then various indices, which quantify these droughts. A description of national or regional monitoring and warnings generally follow. Unfortunately, few of the chapters have useful conclusions sections.

The first of the regional chapters describes the status of drought monitoring in the United States. A generally good introduction to these chapters, it describes the operational U.S. Drought Monitor product. But it fails to relate the drought index to crop production or some other parameter that might be used to evaluate its utility. Regrettably, this is a failing which is common in many, although not all, of the chapters.

I was especially interested in the Russia chapter since there is a wealth of soil moisture data available for this region as described by Robock et al. (2000). However, there was no mention of these important data. What was described was a number of indices, which were at times poorly defined and never directly related to crop yields or agricultural measure.

One of the most satisfying chapters discusses southern Africa. This is in part because these authors give evidence that their simple drought indices are quite strongly related to small holder crop yields and national gross domestic product.

The final chapter relating global warming and agricultural droughts has a reasonable review of global change and presents some interesting agricultural yield statistics. However, few of these statistics were directly related to physical measures of agricultural drought. The authors do show a table presenting one estimate of possible yield changes in the years 2010 and 2050. As the authors note these contain a great deal of uncertainty.

Just as there is no proper introductory chapter there is no concluding chapter to help the reader to put into perspective the large number of chapters outlining agricultural droughts in various regions of the world. This lack of guideposts greatly diminishes the utility of this volume.

Overall, I find this an interesting, but ultimately unsatisfying, volume. On the positive side it gives reasonable summaries of applications of remote sensing to describing agricultural drought and provides some useful descriptions of regional drought indices and monitoring programs. On the negative side is the lack of useful introductory and summary chapters. In addition many of the generally interesting chapters discussing the situation in specific regions or countries fail to relate drought indices to any measure of agricultural production or even to traditionally measured precipitation. Because of this it is often very difficult to know how useful the indices are and how much progress is being made. This clearly limits the utility of most of these chapters to the target audience of those who “who must advise governments or international organizations.”

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REFERENCES