

holistic approach that upturns whole systems, environmental and social, is that it allows for continuation of the internal adaptive process. The responses that have already been demonstrated should be more effective if the Malthusian effect were diminished. This is not to deny the great value of this book as making a realistic case for development; rather, it is a suggestion for phasing the priorities among the developmental alternatives that are presented. It is to be hoped that, under circumstances such as those of the hill peoples of Thailand, preservation of options for cultural adaptation is as practical an aim as agricultural improvement.

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Drought

Proceedings of the Symposium on Drought in Botswana. Gaborone, Botswana, June 1978. MADALON T. HINCHEY, Ed. The Botswana Society, Gaborone, and Clark University Press, Worcester, Mass., 1979 (distributor, University Press of New England, Hanover, N.H.). xii, 306 pp., illus. Paper, \$15.

It is probably true that no year passes without a serious drought somewhere in the world. Recent droughts—in the Sahel from 1969 to 1974, in the Soviet Union in 1972, in the United States in 1976 and '77, in western Europe in 1976, and in much of the Indian subcontinent at this writing—have been the subject of headlines and television reports. Although this attention may have led some to think that something is happening to the world's climate that makes drought more frequent, documents of governmental agencies and colonial bureaucracies, the literature and the oral traditions of many peoples, and even the relatively short record of instrumented climate observations (100 to 200 years, for most of the globe) indicate that there really is nothing new about these situations. It is true, though, that, with surging world population and wildly inflating costs of the energy that is needed for such amelioration tactics as irrigation and emergency tillage, the impact of drought may become far more serious in the developed as well as the less developed countries than it has been in even the recent past.

The proceedings of the symposium on drought in Botswana are welcome, since they offer information from a wide range of viewpoints to help us understand the

impact of drought in a sensitive region. The proceedings are, on the whole, interesting for the number and integration of the disciplines considered relevant to the problem of drought in southern Africa. The book is scholarly and carefully edited.

In the first three sections (Background Papers, Towards a Definition of Drought, Physical Aspects of Drought) we gain some understanding of the physical setting of Botswana, a nation imposed on the Kalahari desert. In the next section, Social Aspects of Drought, the culture of the peoples of Botswana and their traditional techniques for coping with drought—migration, reduction of herd size, and sharing of food supplies, for example—are described by a number of social scientists. This section contains a paper by Campbell on the 1960's drought in Botswana, the primary concern of the symposium. I would have preferred to see this paper at the beginning of the book, since it provides a clear explanation of the chronology and impact of the drought and a systematic description of attempts made to mitigate its effects.

All of the problems and impacts associated with drought in the less developed countries were manifested during the Botswana drought. Human and animal populations had increased from precolonial times and again following recovery from prior 20th-century droughts. Stress on the available forage supplies became great. The tendency of animals to concentrate near available water resulted in overgrazing in certain areas. The level of human nutrition fell seriously below acceptable standards in many areas.

This story has clear parallels in the far better publicized events in Sahelian Africa, as papers by Wetherell, Holt, and Richards and by Rijks make clear. Another parallel to the Sahelian experience is the almost total lack of governmental preparedness to cope with drought. It was not until the fourth or fifth year of the drought that any effective measures were taken to ameliorate the condition of the affected herdsman and farmers.

Apparently, the government of Botswana does not intend for such a situation to occur again (nor do the nations of the Sahel, which have established a seven-nation intergovernmental agency to develop drought preparedness measures). Thus the book concludes with a consideration of networks and information systems to provide early warnings of drought. The importance of information collected in the districts as well as from meteorological and satellite networks is

stressed. Nutritional surveillance as a method of planning the prevention of hunger is also examined.

This volume is one of a number of new reports dealing with recent droughts in the semiarid regions of the world. The lessons to be learned from these reports seem clear: drought is a normal, recurrent phenomenon of the semiarid regions and one for which preparation and advance planning are necessary; whether or not nonreversible desertification is occurring on the margins of the semiarid zones today, overpopulation by humans and animals and overgrazing seriously exacerbate the impact of periodic droughts; if drought preparedness and amelioration efforts are to be effective, an understanding of the workings of tribal and village societies and their traditional modes of coping is essential—though one must not assume that they always cope well.

The book constitutes one of the best and most useful recent reports I have seen on the subject of drought in the developing countries. I also recommend *The Aftermath of the 1972-74 Drought in Nigeria* (G. J. van Apeldoorn, Ed., Federal Department of Water Resources and Center for Social and Economic Research, Ahmadu Bello University, Nigeria, 1978). It, too, contains a wealth of material on local agronomic, pastoral, and water resource problems that occur in times of drought. In neither report does the wealth of biological and physical detail obscure equally important information on and analysis of the social and economic impacts of drought.

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Volcanism in Human History

Volcanic Activity and Human Ecology. PAYSON D. SHEETS and DONALD K. GRAYSON, Eds. Academic Press, New York, 1979. xviii, 644 pp., illus. \$49.50.

Through the course of earth and human history volcanoes have been of great significance both as a biological and human hazard and as a resource. As specific features, volcanoes only occupy a limited part of the earth, but landscapes of volcanic origin occupy some 2 percent of the total continental surfaces and 4 percent of North America, Africa, and Asia. These surfaces range in age from Mesozoic to Holocene and are pri-