BOOK REVIEWS

THE ARID FRONTIER: INTERACTIVE MANAGEMENT OF ENVIRONMENT AND DEVELOPMENT by Hendrik J. Bruins and Harvey Lithwick (eds.). Dordrecht: Kluwer Academic Publishers, 1998.

Sustainable and ecologically-sound development of natural resources is especially important in rather fragile arid regions, which occupy more than 30 percent of the world. Current land-use in these dry regions includes about 145 million hectares (ha) of irrigated agriculture, 170 million ha of dry farming based upon local rainfall and 3,600 million ha of natural pastures. The world's drylands are inhabited by some 1,000 million people—about 17 percent of the global population, currently put at six billion.

The arid lands have experienced significant anthropogenic pressures, especially during the last decades. The expansion of cultivated areas, increasing numbers of livestock, destruction of natural vegetation for fodder and firewood, and the introduction of industrial methods of land reclamation have disturbed the ecological and resource balance in various drylands. Appropriate development of the natural and economical potential of arid regions is only possible if based on thoroughly integrated physical, anthropological and socio-economic studies. Therefore, it is important to combine traditional methods of desert reclamation with modern technology, taking the utmost care to prevent or restrict undesirable consequences for the environment. This approach characterizes the importance and actuality of the reviewed book, prepared and edited by Bruins and Lithwick under the auspices of the Negev Center for Regional Development of the Ben-Gurion University of the Negev, and published by Kluwer Academic Publishers in the GeoJournal Library series.

The book includes six major parts, comprising 19 chapters by a total of 27 authors from 10 different countries and four continents. The editors and authors have succeeded in making a significant and timely contribution, as they link environment with development in a variety of arid frontiers. The book articulates the vital necessity to focus in an integrated manner on the environment and the people, combating both desertification and human livelihood insecurity. Severe drought and desertification have caused immense suffering to millions of people in drylands, which may repeat itself if appropriate mechanisms for proactive planning and interactive management, including disaster management, are not instituted by respective governments at national, regional and local levels. The approach of the book has opened new perspectives on policy, planning and management in arid-zone development. This book is the second volume to have been inspired by the international conference entitled *Regional Development: The Challenge of the Frontier,* which was held at the

Dead Sea, Israel, in December 1993, under the auspices of the Negev Center for Regional Development.

Part One of the book opens with the central theme and conceptual paradigm of proactive planning and interactive management (Chapter 1). The conceptual framework aims to guide development in drylands in a way that is beneficial both for society and the environment. Bruins and Lithwick emphasize the need for a rational and ethical discourse for development, avoiding extreme environmentalism and human destructionism. Such development has to be based on appropriate ethics, legislation, policy, as well as proactive planning and interactive management. Proactive planning attempts to include preconceived response and mitigation programs for ephemeral stochastic events in drylands, like drought and desertification. As proactive planning, obviously, cannot foresee every problem that may arise in arid-frontier development, the role of interactive management is crucial to maintain societal and environmental quality. The latter includes monitoring, evaluation, legal action, readjustment, and maintenance.

Part Two builds upon the basic paradigm, by introducing national, regional and multinational dimensions in environmental and development policy. Modifications are required when we shift our focus from the national unit, both inwards and outwards. Chapter 2 (Wilhite and Hayes) focuses on complex national (state and federal) dimensions of proactive drought planning in the United States. Chapter 3 (Powell) analyzes the Murray-Darling Basin in Australia, which covers several states, and gives us a view of the actors and environmental policy-making in a regional framework. Chapter 4 (Sandler) explores the interaction between national and international requirements of environmental law and management in the Gulf of Aqaba, situated in a hyper-arid region, shared by Jordan, Israel, Egypt, and Saudi-Arabia.

In Part Three, the authors turn to specific environmental problems for planning and management in arid frontier regions: desertification and climatic variability. Chapter 5 (Bruins and Berliner) discusses and defines these environmental concepts, evaluating standardized ways to express bioclimatic aridity on a comparable basis worldwide. The authors advocate the inclusion of the hyper-arid zone in the desertification concept. Chapter 6 (Warren) provides an analysis of the perceived role of environmental science in arid-frontier development in relation to policy. Sweeping grand solutions developed at the political core have usually failed in the reality of the arid periphery. Chapter 7 (Mainguet and Létolle) analyzes one of the most alarming cases of human-made desertification: the ecological disaster in the Aral Sea Basin, resulting from gigantic agricultural development conceived in the political core of the Kremlin. Chapter 8 (Dietz, Put and Subbiah) introduces a planning dimension for rainfed agriculture in semi-arid regions through detailed techniques of drought risk assessment focusing on the Andhra Pradesh area in India.

The complex environmental and human relationships in drought, food and land management are the themes of Part Four, which focuses on the most challenging of all continents, Africa. A review of indigenous social-environmental systems for managing drought and famine in Kenya is provided in Chapter 9 (Akong'a and Kareithi).

Chapter 10 (Rutten) presents the process of changes in land rights among Maasai pastoralists and its bearing on food security in a detailed case study in Kajiado District, Kenya. Chapter 11 (De Haan) explores land management in Benin in a classical dryland frontier, shared by peasants and pastoralists. Chapter 12 (Van Damme) is an ethnobotanical study focusing on Namibia and Senegal. The role of wild plants as hunger food provides some measure of food security in times of stress.

Part Five addresses the issue of development planning and management of the most limited or critical environmental resource in arid zones—water. Chapter 13 (Shanan) emphasizes the immense significance of proactive planning and interactive management in irrigation development. The potential environmental hazards of irrigation are presented in several case studies, showing examples of failure and success regarding the sustainability of irrigation. Shanan gives examples of readjustment of failing projects through new forms of management, in which the interactive approach, with built-in equity and anti-corruption mechanisms, is able to improve the situation drastically. Chapter 14 (Roos) presents the particular problems of drought and water management in California, which is one of the most developed arid-frontier regions in the world. Chapter 15 (El-Bihbety and Lithwick) applies the mother of rational planning techniques—cost-benefit analysis—to evaluate the world's two largest water projects, in China and India.

Part Six deals with the renewable energy potential for development of arid lands, including innovative architectural aspects. Solar energy is perhaps the greatest environmental resource in arid lands. Chapter 16 (Faiman) presents a detailed case study for designing a photovoltaic power plant in a hyper-arid frontier region of Israel. Chapter 17 (Meidav) compares some options for the development of rural electrification with renewable energy, focusing on geothermal power. Chapter 18 (Sauerhaft, Berliner and Thurow) presents innovative research for the production of firewood in drylands using rainwater-harvesting techniques. Firewood is the most important source of household energy in many countries. The book ends with habitation in arid zones: Chapter 19 (Pearlmutter and Meir) presents a study about thermal comfort and energy use in houses, situated in two different climatic regions of Israel. The authors show the passive cooling and heating potential in architecture by means of appropriate technology for housing construction.

The reviewed book, in conclusion, captures a new realism concerning the potential and constraints in arid-zone development, including the potential for disasters. It generally finds the right balance between theory and practical case studies, as well as between the environment and society. The editors and authors should be congratulated for a genuine and useful piece of work. This book will be of great interest to policy-makers and managers, as well as to geographers, biologists, ecologists, agricultural specialists, and land-use planners. It will also be of interest to students and non-specialists concerned with the fate of arid lands around the world.

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