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This book stimulates awareness of the critical role of land resources in sustainable development, and the need to improve land management. It provides an authoritative review of the resources of soils, water, climate, forests, and pastures on which agriculture and rural land use depend, and assesses prospects for feeding future populations. Addressing the environmental issues of erosion, loss of soil fertility, deforestation, and desertification, it is critical of present methods of assessing land degradation and placing an economic value on land. It emphasises the links between land resources and wider aspects of development, including population and poverty. It shows that land available for food production is less than previously estimated, and that, unless action is taken, the developing world will face recurrent problems of food security and conflict.

The book should be read by all involved in rural development, including natural scientists, economists, geographers, sociologists, and planners, together with students of development studies. It provides a summary and perspective of the field of land resources, gives some forcefully expressed criticisms of current methods, and suggests improvements needed to conserve resources for future generations.

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Now and for the future

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Preface

In 1958, I began a three-year period as Soil Surveyor to the Government of Malawi, then Nyasaland, carrying out a reconnaissance land resource survey of the country; and, in 1993–5, completed consultancies on land use policy in Jamaica, land degradation in South Asia, and the preparation of an international programme to monitor changes in land conditions. Between those times I have worked on soil survey methods, land evaluation, land use planning and policy, and carried out research into land management, particularly through agroforestry.

This book is a review of land resources: their evaluation, management, and conservation, and their role in human welfare. Land resources are the environmental resources of climate, water, soils, landforms, forests, pastures, and wildlife, on which agriculture, forestry, and other kinds of rural land use depend. Renewable natural resources is an alternative name. Whilst details of the methods used differ from one kind of resource to another, many principles are common to their survey, evaluation, planning, and management. I also set down the opinions I have formed, in places more forcefully than was possible when writing as a consultant.

The objectives of the book are:

- to improve awareness of the critical role of land resources as a major element in the development of agriculture and the rural sector;
- to review the progress that has been made in different aspects of land resources, and to point to priorities for the future;
- to draw attention to the urgent need for action to improve the management of land resources, if they are to be conserved for the benefit of future generations;
- to show how land resources interact with wider aspects of development, including food security, poverty, and population policy.

Much of what is said has world-wide applications, for the need to care for resources is universal. However, most countries in the developed world have responsible and effective policies already in place. In contrast, there are many needs for improvements in policies and land management practices in developing countries, and it is to these that the discussion and comments are primarily directed. There is also much need for action to improve land resource management in the countries of the former Soviet Union.

The text is written so that it can be read without the interruption of references.

PREFACE

For those who wish to know the origin of statements, or seek further information, the sources can be followed up through the notes and references.

The book is intended to reach four groups of readers: scientists, the professional development community, students, and, if possible, policy-makers. Fellow resource scientists will already be familiar with much of what is written, but this wide-ranging review will give a perspective to their specialist knowledge. It is the wider community of development planners, including economists, geographers, sociologists, and technical specialists in agriculture and forestry, that are intended as the main audience; for them, the book provides a summary of progress and future needs in the area of land resources. I hope that it will also persuade them of the critical role which these play. All of this applies equally to the students who will take their places in the future. If possible, I should like also to influence policy-makers, directly or through those who advise them. To this end, executive summaries are given after each chapter heading, and the arguments are brought together in the final chapter.

A theme which runs through the book is that lasting improvements will ultimately depend on awareness, concern, and action by governments, scientists, and people of the developing nations. The international community can provide technical guidance and assistance, but lasting progress depends on political will in the developing countries themselves, arising from community awareness, and supported by financial provision and action. This book will accomplish its purpose every time it is read by citizens of developing countries, scientists, planners, policy-makers, and the students who will succeed them.

Acknowledgements

Travel for the preparation of this book was assisted by an Emeritus Fellowship from the Leverhulme Trust. Writing was begun during tenure of a Residency at the Bellagio Study and Conference Center of the Rockefeller Foundation. I am most grateful to both these foundations for their support.

Five institutions kindly granted me periods of residence for study and writing: Cornell University, New York; Stanford University, California; the University of Guelph, Ontario; FAO, Rome; and the World Bank, Washington DC. I thank their directors, and the many staff who spared time for discussion.

Many institutes also gave valuable information during visits: in The Netherlands, the International Soil Reference and Information Centre (ISRIC) and the Winand Staring Centre for Integrated Land, Soil and Water Research, Wageningen, and the International Institute for Aerospace Survey and Earth Sciences (ITC), Enschede; in the USA, the World Resources Institute and the Worldwatch Institute, Washington DC; in Kenya, the United Nations Environment Programme (UNEP) and my former employers, the International Centre for Research in Agroforestry (ICRAF), Nairobi; and in the UK, the Natural Resources Institute, Chatham. I thank their staff, too numerous to list, for generously giving their time.

It would be impossible to list the many kind friends who gave individual advice and help, over years of working on land resources. However, I should particularly like to thank the following friends and erstwhile colleagues for their advice and comments during the period of writing the book: Hugh Brammer, Robert Brinkman, Marion Cheate, Malcolm Douglas, Dennis Greenland, Norman Hudson, Sir Charles Pereira, Christian Pieri, Maurice Purnell, Francis Shaxson, and Wim Sombroek; I must make it clear that those who were employees of international organizations gave advice in a personal capacity. I am equally grateful to colleagues at the University of East Anglia, including Neil Adger, David Dent, Michael Stocking, Ian Thomas and Kerry Turner. I should like to thank my copy editor Gillian Maude, for seeing what I was trying to say and, in a number of critical places, improving the way it was expressed. The Figures were kindly drawn by Phillip Judge, of the University of East Anglia. Responsibility for errors of fact and statements of opinion is my own.

Lastly, after 40 years of continuous help and love in many parts of the world, this book can only be dedicated to my wife, Doreen.

Note on acronyms and currency

Those working in international development swim in a sea of acronyms, in which NARS work with IARCs, who live in the CGIAR. Excessive use of these has been avoided. However, some institutions are recognized better by acronyms than by their full titles, therefore the acronym is given on its first appearance, but only used immediately following this. Acronyms for the institutes which belong to the Consultative Group on International Agricultural Research (CGIAR) are given on p. 214. Only the following are employed throughout the text:

- FAO Food and Agriculture Organization of the United Nations
- UN United Nations
- UNDP United Nations Development Programme
- UNEP United Nations Environment Programme
- UNESCO United Nations Educational, Scientific and Cultural Organization.

Following usual practice, the US dollar is employed as a standard unit of currency, taking its value in the mid-1990s.

World Wide Web site

The principle conclusions from this book, together with policy implications, supporting information, extracts from reviews, and updating, can be found on the Internet at World Wide Web site: <http://www.land-resources.com>

This site is personal to, and the sole responsibility of, the author, and does not form part of the publications of Cambridge University Press.