This book gives an account of the evolution of our major crop plants, of their migration with man from their centres of origin and of the consequent development of an astonishing range of locally adapted landraces. The wild ancestral species, the landraces and the early varieties derived from them by breeding constitute the genetic resources of each crop. The book traces the impact of purposive breeding and selection, and of the substitution of uniformity for diversity, thereby destroying the resource base on which further change depends.

The collecting of crop genetic diversity, its conservation and management for future use are discussed. The role of conserved genetic diversity in the current movement to find low-input sustainable systems of food production is considered. Throughout the book, the dependence of adaptive change on the availability of genetic diversity is stressed as the key to survival in a changing world. The book considers the need for world-wide collaboration in conservation, outlines gaps in the science base, and suggests some urgent research needs. It concludes by placing crop plant genetic diversity in the wider context of the conservation of the biosphere.

This book is intended as a non-technical introduction to the conservation of crop genetic diversity for members of the public, policy-makers, and undergraduates and postgraduates in agricultural, biological and environmental sciences.

GENES, CROPS AND THE ENVIRONMENT

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JOHN HOLDEN, JAMES PEACOCK AND TREVOR WILLIAMS

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Preface

On hearing that this book was in preparation, a scientist friend remarked, 'Surely not another book on plant genetic resources'. Friends, of course, have the right to make candid remarks, and scientific friends seem to exercise the right freely. In this case the comment was, we think, inappropriate.

It is true that a considerable literature has built up on this subject in the past fifteen years, in the form of books, papers in scientific journals, periodic newsletters, many specialist technical and scientific reviews, reports and booklets and at least two journals devoted to plant genetic resources issues. These different types of publications, apart from their subject, have one other feature in common; they are addressed largely or wholly to those already working in plant genetic resources conservation.

On the other hand, there has been a steadily increasing output of material in newspapers and popular-science journals, on radio and on television, addressed to the public at large. This publicity has aroused some interest in an issue which, despite its implications for us all, might otherwise have remained as another obscure branch of applied science and technology, unknown except to those on the inside. However, the mass media presentations have usually dealt with separate aspects of what is a large and complex issue, and inevitably the picture presented has been fragmentary.

Much of the success of these presentations has been due to the intrinsic interest and obvious importance of the subject, but much is also due to the skill of professional communicators, in presenting new ideas in an attractive and accessible form. Scientists too are communicators, but usually they write for their colleagues in the same field, which makes their task easier in that they know that their intended audience is familiar with the origins and meaning of the terminology which they use, but which prevents their ideas being accessible to a wider audience.

In this book, we attempt to unite these two different approaches; to present an overall picture of plant genetic resources conservation – why it is necessary, what it involves and what are the benefits which it is likely to bring to world food production in a time of rapid environmental, social, economic and scientific/technological change – and to reach a wider audience than has been reached by most previous comprehensive treatments.

To this end we have tried to concentrate on essentials and to avoid confusing detail, to illustrate principles and practices and to make as few assumptions as possible about the background knowledge in biological science of our readers. We have avoided the use of technical terms and, where this has not been possible, we have attempted to provide explanations in plain words.

We hope that this book will be of value to scientists of other disciplines, to students, to politicians and policy-makers, but above all to taxpayers who are interested in conservation issues and who ultimately are the ones who determine what resources are devoted to the protection of the environment and the genetic diversity of our crops.

The reference list is not intended to be comprehensive but has been selected to lead the reader, either to key source books or to reviews, which through their contents or bibliographies can provide doorways into wider areas of reading.

It is a pleasure to acknowledge our debt to IBPGR for permission to reproduce Figure 4.1, 6.1 and 6.2 and in particular to Dr Mark Perry for generously providing and allowing us to publish the data in Table 4.1 which, we believe, is the most accurate and up-to-date available on the number of world-wide accessions of crop germplasm. Other sources from which illustrations have been specially prepared, are acknowledged in the figures and tables.

Especial thanks are due to professor Don Marshall who read through the text in draft and made valuable critical comments, to Dr Peter Holden for his expert assistance in the presentation of the figures and tables and, last but not least, to Bronwen Holden, who first drew our attention to the need for a book addressed to the interested layman. We hope that we have not disappointed her expectations, nor those of our other readers.

John Holden

Abbreviations

AVRDC	Asian Vegetable Research and Development Center
CGIAR	Consultative Group on International Agricultural Research
CIAT	Centro Internacional de Agricultura Tropical
CIMMYT	Centro Internacional de Mejoramento de Maiz y Trigo
CIP	Centro Internacional de la Papa
CPC	Commonwealth Potato Collection
DNA	Deoxyribose nucleic acid
FAO	Food and Agriculture Organisation of the United Nations
GRAAS	Genetic Resources Accession Assessment Score
GREWS	Genetic Resources Early Warning Systems
IBP	International Biological Programme
IBPGR	International Board for Plant Genetic Resources
ILDIS	International Legume Database and Information Service
IRRI	International Rice Research Institute
IUCN	World Conservation Union (formerly International Union for the Conservation of Nature and Natural Resources)
IVAG	*In-vitro* Active Genebank
IVBG	*In-vitro* Base Genebank
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organisation
WWF	World Wide Fund for Nature