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BOOK REVIEWS

Agriculture in the Tropics. (Third Edition). Edited by C. C. Webster and P. N. Wilson. Oxford: Blackwell Science Ltd (1998), pp. 539, £69.50. ISBN 0-632-04054-8.

Written from the perspective of their long involvement in one or more aspects of the subject, the twelve authors of this book cover, in eighteen chapters, the main features of tropical agriculture. The first two chapters set the scene in terms of the socio-economic, climatic and ecological background. There follow eight chapters in a logical sequence, describing aspects of the agricultural environment, farming systems, plantation crops and agroforestry, together with a conspectus of tropical crops and their improvement. The remaining eight chapters deal with pastures, animal feed and livestock production.

The editors have obviously done their best to avoid duplication and to harmonize the presentation of the various chapters. As a book aimed primarily at students and generalists, it succeeds in portraying a wealth of relevant information, with each chapter giving leads into the more specialized literature. The book might have benefited, however, from a concluding chapter giving a forward-looking overview of the material presented (albeit a difficult task). Harvest and post-harvest aspects are not covered and there is only a cursory discussion of genetic engineering and biotechnology. Topics such as these are of such wide interest and debate that their virtual omission might be a disappointment to some. Nonetheless the book, like its previous editions, will be valued both as a work of reference and as an introduction to the wide-ranging aspects of tropical agriculture.

M. H. Arnold

Plant Virus Disease Control. Edited by A. Hadidi, R. K. Khetarpal and H. Koganezawa. St Paul, USA: APS Press (1998), pp. 704, US\$99.00. ISBN 0-89054-191-4.

This massive book comprises 50 chapters plus two 'overviews'. After a scene-setting chapter on Economic Losses due to Plant Viruses, 31 chapters deal with Strategies of Control. They are divided into Resistance, Control of Vectors, Quarantine and Certification, Elimination and Detection. The remaining 18 chapters are case studies on the control of particular virus diseases. The coverage is broad, and includes a great deal of information on associated topics, such as resistance mechanisms, transmission mechanisms, epidemiology, vector behaviour and phytosanitary aspects of genebank management.

Some chapters are authoritative, but perhaps inevitably in a book with almost 100 contributors, the quality is uneven. For example, chemical control of vectors is dealt with rather sketchily in two chapters that include no references after 1993. The quality of the English varies from excellent to idiosyncratic. The case studies are all of insect-transmitted viruses, except for a rather general chapter on peanut viruses, and some are rather scantily referenced. The index is poor, and contains several mistakes.

The strength of the book is in its breadth of treatment and, despite its shortcomings, it will be a valuable reference work for those who are interested in the practical application of plant virology.

David J. Robinson

Directions in Tropical Agroforestry Research. Edited by P. K. R. Nair and C. R. Latt. Dordrecht, The Netherlands: Kluwer Academic Publishers (1998), pp. 230, £85.00. ISBN 0-7923-5035-9.

This book is a collection of papers from a symposium representing a watershed point of 20 years of

tropical agroforestry research. The editors have summarized the past and present of agroforestry research and considered the future direction successfully – most papers follow this format and are comprehensive, enlightening, illuminating and challenging, although some areas are not covered and there is a reliance on the ICRAF time-scale. The emphasis to date on biophysical research is highlighted in an overbalance of papers on this subject. The paper by Rao *et al.* is seminal in this field and is an excellent summary of the state of the science. It was somewhat surprising that many very interesting issues were supported only by unpublished work, for example, the table on biomass of soil faunal groups on p. 34, and work on earthworms (Buresh and Tian).

The gradual improvement in scope and quality of socio-economic research must be welcomed (paper by Mercer and Miller). Nair's concluding and synthetic paper is an excellent summary and contains two points of interest to those involved in temperate agroforestry research. Tropical researchers have put much more emphasis on the 'forestry' component of agroforestry and they need to put more emphasis on the 'agro' element (Nair p. 238) – the reverse is largely the case for temperate agroforestry research. Secondly, highlighting the potential importance of temperate agroforestry research – the range of annual rates of bare soil erosion in the UK are greater than those for India, Ethiopia or Nigeria!

I would happily recommend my library to stock several copies and recommend all my students to read this timely book – it serves its title well.

J. H. McAdam

Engineering Genesis: The Ethics of Genetic Engineering in Non-Human Species. Edited by D. Bruce and A. Bruce. London: Earthscan Publications Ltd (1998), pp. 337, hardback £40.00, paperback £12.99. ISBN 1-85383-571-4.

New technologies are increasingly engendering polarized discussion, sometimes verging on illegal activities to promote certain positions. This is currently so with genetic engineering, scientists advocating the perceived advantages and the opposition focussing mainly on ethical issues while often neither appreciating nor fully understanding the other's point of view.

'Engineering Genesis' results from a multidisciplinary working group of the Church of Scotland's Society, Religion and Technical programme. It presents in laypersons' terms the facts and arguments for both sides of this controversial topic by presenting 11 case studies ranging from modified soil bacteria, through genetically modified plants to genetic modification of animals for various purposes. These are used to explore various ethical issues including human benefits, transgenic food, patenting and environmental risk. The arguments are very stimulating and my responses ranged from 'hey that's an interesting point' to 'I disagree and would like to argue it with the writer'. However, the book does not, and is not intended to, give the answers and leaves most issues unanswered.

This book is a paradigm for how to tackle the interface between technology and society. I strongly urge proponents of both sides of the genetic engineering arguments to read it. The discussions would be better informed and more rational.

Roger Hull

Cultivating Diversity: Agrobiodiversity and Food Security. By L. A. Thrupp. Washington DC: World Resources Institute (1998), pp. 79, no price quoted. ISBN 1-56973-255-8.

The author presents a brief but lucid account of the importance of agrobiodiversity, the concerns about its erosion and the steps and actions needed to reverse the trend. She rightly points out that agrobiodiversity not only includes diversity of plants, animals, soil organisms and agro-ecosystems but also covers diversity represented in elements of natural habitats that relate to food production. She also stresses that while agrobiodiversity is important for sustainable agriculture, its relevance extends to a much broader area as an essential ingredient for sustainable human development.

She recalls the many well known benefits accruing from diversified agriculture and farming practices and provides examples from various regions which highlight the positive role of traditional agricultural practices in enhancing agrobiodiversity and sustainable production. The factors contributing to the erosion of agrobiodiversity and its consequences on human nutrition and food security are discussed, including the Green Revolution and supporting institutional policies and market practices.

Whereas the diagnosis appears to be acceptable, the prescription is less convincing. The author advocates a paradigm shift to an ecosystems approach and for a major attitudinal change in research strategies, business policies and market practices, but how one shifts to an ecosystems approach is unclear. Also, as the author points out, the transition costs and time lag in reverting to sustainable agriculture could be considerable. Conflicting international legislation pertaining to Intellectual Property Rights and Farmers' Rights add further stumbling blocks.

The feasibility of the implementation of many suggestions is limited. For example, organic farming, vermiculture and the use of blue green algae require considerable skill and labour. Moreover, will it be possible to maintain the level of production of high-input agri-technology by adopting traditional agriculture? Also, it is incorrect to ascribe all ills of the present to modern science and technology and regard all traditional practices as environmentally friendly. This is not to say, of course, that one should not give a fair chance to alternative green-technology. The book is a good read with many useful suggestions for individuals and groups, policymakers and administrators, researchers and farmers, sellers and consumers.

V. L. Chopra

Wheat. Research Needs beyond 2000 AD. Edited by S. Najarajan, G. Singh and B. S. Tyagi. New Delhi: Narosa Publishing House (1998), pp. 396, £70.00. ISBN 81-7319-242-1.

This book comprises papers read at a conference held at Karnal, India, in 1997 and views problems of wheat research from an Indian viewpoint. Although the papers are of a somewhat mixed standard, there are a number of useful contributions. Following an overall review by S. Rajaram, a long term projection by D. Jha suggests that India is likely to remain self-sufficient in wheat for the next twenty years but J. B. Chowdhury expresses much concern about the implications of international legislation on Intellectual Property Rights and stresses the need for India to frame legislation to protect its natural crop diversity from exploitation. Papers by R. N. Sawhney, E. E. Saari and A. K. Sharma review the prospects of breeding for disease resistance, including the prospects of using biological control to enhance genetic resistance. Problems of weed control, especially those following the development of isoproturon-tolerant strains of *Phalaris minor*, are considered by D. S. Chauhan and R. K. Malik. Although major long-term climate changes are thought unlikely (A. Sastri), the possibility of breeding for tolerance of drought and salinity is discussed by S. Najarajan, T. L. Setter and K. N. Singh, while T. N. Tyagi considers the possibility of improving the efficiency of water use in irrigated crops.

This book would be mainly of interest to wheat breeders working in the Indian sub-continent.

F. G. H. Lupton

Artificial Intelligence for Biology and Agriculture. Edited by S. Panigrahi and K. C. Ting. Dordrecht, The Netherlands: Kluwer Academic Publishers (1998), pp. 262, £66.00. ISBN 0-7923-5098-7.

The scope and structure of this book causes some surprise and difficulty. It presents selected examples of image analysis (in 8 of the 13 chapters), neural networks, fuzzy logic and robotics. Half of the chapters include little or no Artificial Intelligence, even in its broadest sense, and the sequence of chapters appears to be random. The chapters, 'Fuzzy logic for biological and agricultural systems' and 'Automatic plankton image recognition', give excellent introductions to fuzzy logic and neural networks respectively and should be read first. A strong point is the rigorous evaluation of the

performances using real data, for example, grading eggs and oranges, taxonomic classification in plants and plankton. The neuro-fuzzy approach to modelling lettuce growth and greenhouse climate provides an interesting insight into time-dependent modelling. As presented, the robotics is largely an engineering challenge and again the penultimate chapter should be read before the first chapter! The case for fuzzy logic is weak and would have benefited by contrasts with Bayesian methods, perhaps at the expense of some image analysis and robotics. This is not a book for beginners. It provides a taste of the potential for practical applications, those with neural networks being particularly stimulating.

B. Marshall

The Living Fields: Our Agricultural Heritage. By J. R. Harlan, Cambridge: Cambridge University Press (1998), pp. 271, paperback £11.95. ISBN 0-521-64992-7.

This book encapsulates a career devoted to studies of crop evolution. Like N. I. Vavilov, with whom Harlan hoped to study had Lysenkoism not intervened, Harlan travelled and collected extensively 'before the great homogenisation set in, before ... The Big Mac and Kentucky Fried Chicken penetrated the Orient'. He worked at the grassroots, brown knees level and this has led him to opinions which may not be politically correct but are founded on personal experience: 'famine and starvation are an integral part of agricultural systems', 'slash-and-burn is probably the most efficient way to manage a tropical forest for agriculture', 'no germplasm is removed from a country or a farmer's field that does not also remain.'

This book was published in hardback in 1995, but contains no references later than 1990. It omits recent controversies: the Rio 'Earth Summit' and *in situ* conservation of agricultural biodiversity are not mentioned. Irritating minor errors have not been edited out of this reprinting: horse chestnut is assigned to the genus *Aeschylus* (!) and sunflower is inexplicably included under the subheading 'beans'.

The book's strengths are its first-hand observations, historical perspective and general readability. While it may not prove as durable, it is in the same mould as Edgar Anderson's classic 'Plants, Man and Life' – a work which the crop scientist and the interested layman alike can read with enjoyment and from which each can learn something new.

Barbara Pickersgill

Farmers, Gene Banks and Crop Breeding. Economic Analysis of Diversity in Wheat, Maize and Rice. Edited by M. Smale. Dordrecht, The Netherlands: Kluwer Academic Publishers (1998), pp. 270, £67.75. ISBN 0-7923-8368-0.

This shiny, expensive book has 42 authors, 5 sections and 15 chapters. It is well made, well proof-read, has fair/good figures and an adequate index. Over half the authors are from CIMMYT or IRRRI and the rest are nearly all from the USA. The book is by economists, about economics and for economists: little of it will be accessible to plant breeders but they may not lose much thereby. I have long advocated the intrusion of economics into plant breeding but not quite like this: 'explanatory' multiple regressions (that is, Cobb/Douglas production functions) are not advised in respectable biological circles. The background literature used for reference in the work is essentially domestic and it does not look as if CIMMYT/IRRRI scientists read anything that they do not write themselves. Nor do the authors give evidence of reading outside their own crops; the three chosen cereals are much in evidence but sorghum and millets are not; cassava and sweet potatoes attract passing mention, while potatoes and sugarcane do not even get into the index; and legumes might as well not exist.

However, some serious economics about plant breeding is to be welcomed and the authors do try to be sensible about variability, its extent, distribution and uses; shadowy hints of ideas about local adaptation and polygenic disease resistances do intrude. There can be little doubt that plant

breeding in the CGIAR institutes is economically favourable but we knew that anyway. Good marks for effort, not so many for achievement.

N. W. Simmonds

Readers may be interested to know about the following publications received but not reviewed because of their limited relevance to readers of *Experimental Agriculture*.

A Sound Reference Base for Soils. Translation of *Référentiel Pédologique*. Translator J. M. Hodgson, N. R. Eskenazi and D. Baize. Coordinator D. Baize. Paris: INRA (1998), pp. 320, F 250.00. ISBN 2-7380-0811-9.

Transgenic Animals in Agriculture. Edited by J. D. Murray, G. B. Anderson, A. M. Oberbauer and M. M. McGloughlin. Wallingford, UK: CAB INTERNATIONAL (1999), pp. 290, £95.00. ISBN 0-85199-293-5.

Progress in Botanical Research. Proceedings of the 1st Balkan Botanical Congress. Edited by I. Tsekos and M. Moustakos. Dordrecht, The Netherlands: Kluwer Academic Publishers (1998), pp. 632, £177.00. ISBN 0-7923-5305-6.

Agricultural Research Priority Setting. Information Investments for the Improved Use of Research Resources. Edited by B. Mills. The Hague: ISNAR (1998), pp. 151, no price quoted. ISBN 92-9118-040-8.

Instability of National Agricultural Research Systems in Sub-Saharan Africa. Lessons from Nigeria. ISNAR Research Report No. 13. By F. S. Idachaba. The Hague: ISNAR (1998), pp. 158, no price quoted. ISBN 92-9118-033-5.

Ten Tools for Managing Change in National Agricultural Research Organizations. By S. H. Hobbs. The Hague: ISNAR (1999), pp. 30, no price quoted. ISBN 92-9118-042-4.

A Field Guide for On Farm Experimentation. By H. J. W. Mutsaers, G. K. Weber, P. Walker and N. M. Fisher. The Hague: ISNAR (1997), pp. 235, no price quoted. ISBN 978-131-125-8.

Reforms in Albanian Agriculture. Assessing a Sector in Transition. World Bank Technical Paper No. 431. Europe and Central Asia Environmentally and Socially Sustainable Rural Development Series. By S. Kodderitzsch. Washington DC: The World Bank† (1999), pp. 52, US\$22.00. ISBN 0-8213-4429-3.

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