

problem is the uneven examination of different aspects. Some chapters follow a broad examination and are suited for the generalist. Others concentrate on fine detail which requires a familiarity with the topic to place it in perspective.

The introductory chapters provide an overall perspective and highlight human factors, climate, stocking rate and nutritive value as the important factors limiting animal production from pastures. Subsequent papers focus primarily on nutritive value and feed utilization; these being amenable to change through technological advances.

Limiting factors are reviewed in the ten separate chapters. Together they provide a comprehensive review of current knowledge. The overwhelming message is that we are dealing with a complex process within which many factors interact, and feedback mechanisms have important modifying effects on end results. In such an environment it is not surprising that eight of the ten papers on limiting factors made a call for more reductionist research or definition of important factors. However the call for integrative studies was much more muted in these chapters.

The following ten chapters discuss ways of overcoming limitations to animal production, and they provide a nice counterbalance to the earlier section. Whereas the section on limiting factors had a large component of information from the frontiers of knowledge, chapters in the next section will be of more interest to people who wish to use existing information. Plant breeding and selection is presented as the best long-term option for overcoming nutritional limits. However it is salutary to read that despite a difference of only 0–15% in herbage production between grass species, the associated animal production varies from 0–50%. The differences are assigned to a lack of appropriate management systems. The “overcoming limitations” chapters provide few recipes for direct application on farms, but they do provide a contemporary statement on our current ability to apply technical knowledge to farm problems. A person looking for recipes will be frustrated by the breadth of production systems covered by the authors, but a generalist will be more than pleased.

The problem of animal production from pastures is complex, difficult and expensive to research, and answers are frequently specific to a region. Despite the allocation of a considerable proportion of the Symposium to ways of overcoming limitations, it is obvious that many “why’s” remain and they limit the contribution of new technology to increase production. This leads to an increased acceptance of the statement in the keynote address that “with few exceptions, any production increase has been mainly due to livestock numbers rather than productivity”. The book provides a comprehensive coverage of the topic and will serve as a useful reference volume both in its own right and from the collation of extensive lists of pertinent literature.

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Tropical grazing land ecosystems. A state-of-knowledge report—Prepared by UNESCO/UNEP/FAO. Natural resources research XVI. (1979) ISBN 92-3-101611-3. Published by the United Nations Educational Scientific and Cultural Organization, Paris, 655 pp. \$A28.75 (+ postage) Softcover. From Hunters Publications, Melbourne.

Since 1956 UNESCO has had interests in research programmes on natural resources of the tropical world and works such as *A Review of the Natural Resources of the African Continent* (1963) and *Natural Resources of Humid Tropical Asia* (1974) are earlier volumes in the Natural Resources Research Series. The present volume is the most ambitious yet attempted in the series. It has a broad scope and substantial coverage being broken into three main parts.

Part 1 deals with Description, functioning and evaluation of tropical grazing land ecosystems:—with individual chapters on description and floristic composition,

climate, water resources, soils and erosion, phenology and primary production, secondary production, consumption and decomposition.

Part 2 is Man and the pattern of use of tropical grazing land ecosystems:—with chapters on human biology, human occupation, types of utilization, domestic animals, management and marketing of herds and flocks and management schemes.

Part 3 is Some regional case studies:—and has several chapters each on specific regions in Africa, America or Asia.

The stated intention of the report is to “attempt to summarize the results of research undertaken over the past two decades, to point out gaps in knowledge and to sketch out the lines of future research”. It is, according to its preface, “intended as a tool for action while at the same time offering teachers and students a valuable source of information and documentation”.

Preparation of the report started in 1975 and a wide range of specialist authors prepared drafts of the various chapters and sections for review and synthesis at two specialist workshops held in Paris in July 1975. The final editing and many revisions required over 1976–77, were carried out by A. Sasson (Division of Ecological Sciences, UNESCO) with the assistance of B. Hopkins (New England College, Tortington Park, Arundel, Sussex, U.K.).

The result is a monumental work with, as is to be expected from a wide range of authors, variable quality coverage of the individual chapter titles. No amount of close editorial attention can prevent this and overall this volume contains no more or no less variation than can be expected in such work.

Each chapter is an independent publication, with an initial listing of individual section headings and a so called “selective bibliography”, many of which are comprehensive and well classified, but there is no general index. Maps and figures are freely used in early chapters but there are few photographs.

The volume is available in soft or hard covers and overall is an excellent effort and an invaluable reference source.

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