

Book reviews

Tropical Forages: Their role in sustainable agriculture

By L.R. HUMPHREYS. Published by Longman Scientific & Technical, 1994. 414 pp. ISBN 0-582-07868-7. Price A\$198.

With the publication of *Tropical Forages*, Professor Ross Humphreys has completed a massive task that fills a void for an authoritative text on the sustainability of tropical farming systems that use sown pastures and crops. It takes a world-wide perspective of the principles and processes that underpin sustainability and illustrates these concepts with examples from four continents. Because of its broad scope, logical organisation, and detailed description of key components, *Tropical Forages* should enjoy a long and useful life.

After an introductory chapter that defines sustainable agriculture, *Tropical Forages* consists of two parts. Part 1 deals with the benefits from mixed farming, or literally, the objectives of crop–pasture and animal interactions. Two relatively long chapters on maintaining soil fertility, one with a focus on soil nitrogen and organic matter and the other on soil structure and erosion, are supported by shorter chapters on efficiency of resource use, crop protection systems, outputs from animal production and diversification of income. Part 2 describes the management of four crop–pasture systems in separate chapters: plantation crops under the title of tree crops and pastures; alley farming under the title of shrub legumes with annual crops; ley farming under the title of pastures with annual crops; and intercropping and relay cropping under the title of annual crops with forage crops. Each chapter in Part 2 reviews the objectives or rationale of a system, describes management principles and biological processes that enhance sustainability, and concludes with comments on the current status of a system. The last chapter mentions the critical requirements for developing and adopting technologies that foster sustainable farming. The text is illustrated by numerous tables and figures, along with a few black and white plates and 16 colour plates arranged together in the middle of the book.

In practice, a book on such a broad and complex subject must set boundaries to the subject matter and explanations it includes. Rightly, key topics such as maintenance of soil fertility and evaluation of the types of farming systems receive more attention than topics such as pest management, risk analysis or global warming. Overall, there is stronger emphasis on describing biological processes than on decision making and whole farm management, but there is no obvious omission of important topics. However, economic viability, whilst acknowledged in the definition of sustainable agriculture as an important topic, is handled superficially in comparison with system biology. This approach is justified because of the wide variation in local economic policies and range of 'useful products' from tropical farming systems (e.g. meat, fibre, milk, draught animals, dung for fuel, timber, grain, rubber etc.). Under these circumstances, economic viability is an obscure topic, but the advantage of diversification of income is a common theme in the book. In short, *Tropical Forages* thoroughly describes physical, biological and managerial elements of tropical farming systems and is a useful introduction to socio-economic elements of the systems.

Tropical Forages assumes that a reader has prior knowledge of the terminology and processes pertaining to components of farming systems. With few exceptions, it avoids mathematical descriptions of the processes, and understanding these exceptions requires only a knowledge of basic algebra. Whilst this non-mathematical approach might disappoint computer modellers who seek to describe systems in mathematical terms, it is an approach that could benefit modellers. In essence, *Tropical Forages* contains a wide and rich array of 'word models' for components in tropical farming systems, and word models are common starting points for building computer models.

Finally the book is 'reader friendly', consisting of 414 pages in hard cover, with a bibliography that exceeds 800 entries and includes publications from 1993, a subject index, and another index of

scientific names. Also, cross referencing within the text helps a reader to explore a theme across chapters. Although the price is rather high, this publication is a quality product and overall good value. *Tropical Forages* is clearly suited to

students, agronomists, resource managers, and others interested in tropical farming systems. It is highly recommended.

Ken Rickert