This substantial volume is a collection of papers resulting from a six year research programme in India into the complex area of Rural Livelihood Systems (RLS). The study was part-financed by the Swiss National Science Foundation and much of the work was conducted jointly by Indian and Swiss academics from four institutions (two in Bangalore, one in Gujarat and one in Zurich).

The aim of the study was to generate knowledge and understanding of the systems practised by rural households and communities in three semi-arid areas of India. In addition to highlighting the great variety of strategies adopted by different rural people, the study has developed and promoted the RLS approach. It starts from the premise that, despite all the emphasis given to the management of natural resources, many other factors influence the livelihoods of rural dwellers. Socio-economists working in the field have long recognised that conserving and managing natural resources is only part of the problem of poor rural livelihoods and that other factors such as urban development, outside opportunities and non-physical aspects may be just as important to the sustained well-being of rural people. But the achievement of this volume is the bringing together of basic concepts and a large amount of empirical case material into five stand-alone sections covering: the concept of rural livelihoods, risks and opportunities, gender issues, livelihood systems in transition and applications of RLS research.

Within each section there are between two and five chapters (termed ‘essays’ by the editors) – 16 in all, written by 15 authors. Each is relatively self-contained and clearly titled so that the reader can easily focus on particular chapters rather than read the whole book from start to finish. Such selective reading is also facilitated by a useful introduction to each section including a brief précis of each chapter.

The book is an unusual mixture of concepts and empirical findings. The conceptual approaches are thought-provoking attempts to recognise the wide range of characteristics affecting village and household lives and which should be understood by all agents of change. Although some of the terminology will be strange to many rural development practitioners (e.g. ‘inner human space’ or ‘emotional base’ in the RLS Mandala approach), their meaning is clearer and more familiar when discussed and illustrated through case studies.

The book advocates a number of approaches and tools for analysing rural situations but it does not identify a clear methodology. Rather, it throws new ideas at the reader and it may well succeed in modifying some attitudes in the development professions.

The empirical material is based on participative studies of specific issues such as: rural–urban linkages, non-economic motivation at village level, the importance of indigenous technology and the impact of modern market economies on traditional values and roles. By contrast, for those interested in the changes in the Indian economy since the 1991 reforms, there is a useful résumé at Chapter 2, whilst Chapter 3 focuses on the economy and natural resources of Gujarat.

The book, which is amply illustrated, well-referenced and indexed, is wide-ranging and crosses many disciplines – to be expected in a volume devoted to sustainable livelihoods. Most readers with development interests will find parts of the book challenging and useful. But they should take note of the words, ‘In search of…’ in the title; there are few solutions. The case studies could provide good material for students and especially for discussion groups. With its wide range of topics, careful signposting and discrete chapters, the book would be a valuable library addition and a possible personal acquisition for those interested in Indian rural development.

M. E. DAW
similar strategies of nutrient management, which does not provide optimal returns to external inputs, amongst which nutrients play a key role. Thus, site specific nutrient management strategies become vital to ensure optimal returns to investment. In this context, this book on site specific nutrient management of intensive rice systems, published by the International Rice Research Institute is timely, to make the national agricultural research centers (NARs) of the rice producing countries aware of the importance of this technology.

The book, which is a collection of papers from eminent regional and international rice scientists, has been divided into three sections, with the abbreviations clearly cited at the beginning. These sections cover the problems and importance of site specific nutrient management, case studies of site specific nutrient management systems undertaken within a project primarily in Asia and finally the concepts and adoption strategies. The papers, based on scientific studies or reviews are well written and edited, and hence offer the readers valuable information on this emerging technology for optimal use of added nutrients to maintain and possibly enhance rice productivity. The data is of very recent origin and is well presented with clear tables and figures, especially in the case studies, which highlight the situations in the selected countries. It also brings to light the economics of fertilizer use in rice systems of Asia, a factor that has not been addressed earlier, when the material was available for use at lower cost, and today at a much higher price and hence a scarce and precious commodity. The most valuable contribution made to the literature was the last section, which clearly presents the problems of nutrient management for intensive rice production and possible solutions. This section was a pleasure to read and review. Furthermore, the editors in the final chapter have highlighted the technology of how this strategy could be achieved. This was very interesting reading. The book is therefore recommended for all interested in sustainable rice production, and especially to rice scientists and administrators of NARs, and staff and students of agriculture in rice producing nations.

Reading through the chapters, it was felt that rice is being cultivated only in Asia, and that the problems exist only in the larger rice producing countries of Asia. The case studies presented are from these large rice producing nations of the Asian region, with one from West Africa. All other countries producing rice in Asia and from other continents such as the Americas and many other African countries and even in Europe have not been included. This may be due to the scope of the project that preceded the publication of this book, although site specific nutrient management has a significant role to play in these nations as well. Furthermore, severe problems of nutrient management in rice do exist in the other nations of Asia West African all having diverse ecosystems and which import either all or most of their fertilizers. They also have a diversity of economic situations. Hence some case studies and examples from these nations would have been a valuable inclusion, although in most instances such information may be lacking in these countries. A list of the authors and their contacts either at the beginning or end of the book would also have been more useful, rather than being listed at the end of each paper.

In overall terms, the book offers new and valuable information to the rice growing nations. It contributes significantly to the understanding of nutrient management in intensive rice systems, which need to maintain and possibly increase productivity, and where fertilizer is fast becoming a very expensive commodity. As site specific nutrient management, based on nutrient removal of rice crops is a very cost effective and efficient method of using expensive nutrient inputs, the book is a valuable contribution by the International Rice Research Institute to the available and ever growing literature on rice culture. It is hoped that the next edition will cover a greater range of case studies from other rice growing nations as well.

U. R. SANGAKKARA


The seed is a beginning and an end. For the scientist, seeds have always been a convenient unit to research: they are compact and easy to count and so experiments are easy to conduct. That is not the same as conducting well-designed experiments with seeds so that useful information is obtained. Allegedly it is easy to assess when germination has occurred. The purchaser of seeds needs to know the likely crop establishment resulting from sowing the seeds (s)he buys and so much research has focussed on how we can measure and predict the future germination of seeds when sown in field soils. Our knowledge and understanding of the processes in the parent plant which lead to successful production of seeds, has grown considerably in recent decades. Similarly the processes within seeds that enhance storage or lead to deterioration in germination ability, as well as those which lead to germination and seedling establishment are now better documented. This book focuses on the
applications of our expanding knowledge of seed physiology to agricultural problems.

There are thirteen chapters, each dealing with a different aspect of seed physiology, grouped into four main sections. The first section deals with germination and stand establishment, with chapters on seedbed preparation and the soil physical environment, threshold models to predict germination and seedling emergence, seed and agronomic factors associated with temperature and water stress, and methods to improve seed performance. The second section deals with dormancy and germination and has chapters on the genetics and environmental control of dormancy, the adverse effects of germination in pre-harvest sprouting of cereal grains, the physiology of the induction of germination and on modelling dormancy changes to predict weed seedling emergence.

In most cropping systems, seeds have to be stored for some time and seed longevity and storage is the subject of the third section. Here there are chapters on deterioration and repair in orthodox seeds and on recalcitrant seeds. The final section deals with seeds as commodities and thus the industrial quality of seeds and the chapters deal with quality requirements for cereals, with seed quality in oil crops and with malting quality of barley. Each chapter represents a distillation of the current knowledge on a topic, is well structured, easily readable and has a comprehensive list of references.

The authors are well-known and well-respected scientists who pursue problem-based research and so are able to identify the utility of the knowledge and understanding which they summarise in the chapters. Although there have been other books published recently on the general topic of seed physiology, it is the clear applications for the knowledge that sets this book apart. Throughout the book there is an interesting mix of approaches from molecular science, through biochemical and genetic approaches, to understanding and modelling the effects of the environment. There is a wealth of knowledge in these chapters, set in the context of the realities of growing arable crops.

One could make minor criticisms of the overall content. I note there are few examples of gymnosperms, even though forestry is an important commercial activity and user of seeds. In ensuring that the international trade in seeds purveys high quality seeds, the work of the International Seed Testing Organisation is important. The testing of seeds to internationally agreed protocols might have deserved a chapter. Nevertheless, these are my personal minor criticisms, and other readers will have their own.

The chapters do provide a useful and high-level entry to the subject for senior undergraduates and graduate students concerned with seed physiology, seed performance and seed quality for the end-user. It will certainly be on my recommended reading list. I believe all who work with seeds will find some new elucidation and interest here.

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