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Book Reviews

Pastoral and Social Problems in a Semi Arid Environment: A Simulation Model

Freeman, T. G., and Benyon, P. R. (Eds), C.S.I.R.O.—U.N.E.S.C.O., 1983.

In the 1960's, as part of the International Biological Programme (I.B.P.), a number of research projects undertook to describe the processes and functioning of major world ecosystems, such as desert and grassland biomes. A major feature of this research effort was the use of models, especially simulation models, to pull together the relevant information obtained and interpret it. It was found that these models were useful in answering biological questions but were generally unsuitable for answering management questions.

Following I.B.P., the programme—Man and the Biosphere (M.A.B.)—recognized that biological research programmes needed to be more closely geared to the management aspects of resource use, and S.C.O.P.E., the International Scientific Committee on Problems of the Environment, fostered a number of projects to investigate the building of multi-disciplinary simulation models that gave proper weight to social as well as technical factors. In Australia, under the auspices of S.C.O.P.E. and the Australian Academy of Sciences, a simulation project of the semi-arid grazing lands was commenced in 1975. A one-week workshop was held in November, 1975, with a follow-up meeting in February, 1976. It was at this second meeting when the initial steps to produce this report were taken.

Running to over 500 pages, this "book of the model" contains four introductory chapters on the project, its objectives, the problem areas, and an overview of the complete model, followed by fourteen chapters that describe in detail the various sub-models involved. Four of these sub-models are concerned with paddock, biological and economic management, and a simplified pastoral model. The remaining sub-models are concerned with regional features; namely, the saleyard, labour, transport, medical services, education, general business, government services, tourism, demography and society. Three final chapters are concerned with data co-ordination, output from the whole model, and further development of the model. In addition, there are six appendices, including references.

Many written accounts of biological models, especially those appearing in journals, only describe the final product, and then often only in an abbreviated form. In this report, the authors have room not only to describe the models in detail but also the modelling process—"warts and all". Thus, as well as listing the computer programme, a glossary for each sub-model, and the assumptions made, the authors also detail what has been left out to avoid excessive complexity: for instance, the exclusion of paddock architecture and the location of water holes in the pasture management models. On this particular subject, the authors make an interesting comparison between the output of a simplified pasture model (for use in regional level analysis) and the more detailed (property level) model. They find that very little seems to be lost in simplification.

This particular example illustrates that the "micro level" problem has been to cut out complexity. By contrast, the difficulties encountered in modelling regional level features have been concerned with obtaining inputs of appropriate data and with finding appropriate specialists. As the authors disarmingly put it, ". . . the assumptions and numbers in the social sub-model are largely conjectural, and the model should be seen as a first attempt made by amateurs.".

Thus, the main value of this book lies in the specific details it gives of how the technical problems of modelling have been handled and in pointing up the difficulties and messiness that is usually encountered in modelling.

However, I suspect there is more to be learnt in the more detailed, pasture modelling chapters than from the social sub-models. Where the book fails, and this is implied by some of the authors themselves, is in developing a procedure for such a modelling exercise.

An overall aim of the model was to illustrate how decision making at the state and regional level interacted with decision making at the paddock level. That only weak links exist in the model does not mean that strong links do not occur. The authors themselves (Freeman and Benyon) suggest that this ". . . is due in part to the fact that, in the primary phase of the project, the different modellers developing the various sub-models had little chance to obtain the bird's-eye view that would help them to perceive such links; . . .". One important (negative) lesson from this experience is that the relevant system and questions being asked of it need to be mapped out before detailed modelling starts. Without this, another aim of the project is also brought into question; ". . . to produce a model quickly that would satisfactorily demonstrate the effectiveness of an interdisciplinary team working together on the problem".

Despite, or partly because of, these criticisms, there is a lot to be learnt from this book. Apart from the technical details of modelling, which are useful in themselves, the honest way in which the authors have described their modelling experiences could be particularly valuable for research scientists and administrators setting out on similar, multi-disciplinary projects.

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