

Malthus with a computer

Malthus with a computer is the provocative title of a critical series of essays on the computer models described in the much-publicized book *The Limits to Growth*¹ that *Europhysics News* reported upon in July 1972². First published³ as the February 1973 issue of *Futures*, *Malthus with a computer* is the response of the professional Science Policy Research Unit (SPRU) at the University of Sussex, UK, to what they consider to be over-exaggerated claims and a less than rigorous approach to forecasting. The series is introduced by C. Freeman, Director of SPRU, who, from the outset, makes it clear that he is in complete agreement with the urgency of many of the social problems studied by Meadows et al at MIT and formulated by the sponsors, the Club of Rome, as the World Problematique.

However, the SPRU team believe that computer model-building techniques and systems dynamics have serious limitations and are in danger of misuse. Each of the sub-systems of the MIT model (resources, population, agriculture, capital and pollution) are critically analyzed and, apart from the pollution sub-system, are unsatisfactory. Also, the model as a whole has sensitivity to a few key assumptions that is difficult to justify. Apparently, the MIT models do not even match real world data for 1900-1970, the theoretical structure is over-elaborate, and the assumptions do not pay sufficient attention to economics and sociology. A major criticism is that computer modelling gives the impression of being neutral, whereas it has a distinct political bias and has cer-

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tain implicit values. The SPRU team maintain that the MIT assumptions are heavily influenced by contemporary social theories and values to which the computer modellers have been exposed.

The Sussex University physicist, R. Golub, reflects the disquiet that many other physicists have expressed concerning the self-delusions arising from the MIT computer model-building:

- (a) spurious appearance of precise knowledge of quantities and relationships which are unknown and in many cases unknowable;
- (b) neglect of factors which are difficult to quantify such as policy changes or value changes;
- (c) gross over-simplification because of the problem of aggregation and comparative simplicity of computers and mathematical techniques;
- (d) tendency to treat some features of the model as rigid and immutable;
- (e) difficulty for non-numerate or those lacking computer access to rebut essentially tendentious and rather naive political assumptions.

In a more positive vein, the SPRU team acknowledge the importance of the Meadows' book as a stimulus to future work. Also, as Freeman writes 'the MIT work has done a great deal in compelling social scientists to re-examine some of their assumptions and in exposing the limitations both of data and of satisfactory explanatory theories for some of the most important social mechanisms'. Freeman also states that he personally believes that the open public debate surrounding the MIT work is their most important achievement, and he agrees with their important emphasis on delays in governmental responses to the urgent problems of deployment of scientific resources today.

Despite the technical criticisms and the exposed political bias of *The Limits to Growth*, it remains a turning-point in the field of socio-economic theory which has now captured public attention.

References

¹ Meadows, D., et al, *Technical Report and The Limits to Growth* (Universe Books, New York, and Earth Island, London, 1972)

² World Problematique, *Europhysics News*, 3 6 (July 1972) 4,5

³ *Malthus with a computer* (Series of critical essays in *Futures* (February 1973) (IPC Science and Technology Press, Guildford, UK, 1973)

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