



AUSTRALIAN RESOURCES AND ENVIRONMENTAL ASSESSMENT (AREA) MODEL

A study by the Department of Science and the Environment in consultation with Commonwealth departments and agencies

A BIBLIOGRAPHICAL SURVEY
OF BOOKS, JOURNALS AND BIBLIOGRAPHIES
ON WORLD MODELLING AND FUTURE STUDIES

by

K. Phung Tran

and

Joseph M. Mula

*The views expressed in this paper do
not necessarily reflect the opinions
of the Department of Science and the
Environment, nor of the
Australian Government.*

SARUM is a world econometric model developed by the System Analysis Research Unit of the UK's Department of the Environment, in which prices do not adjust to equilibrate supply and demand in each period, but rather recognise the many factors that inhibit instantaneous clearing of markets. The world can be regionalised into twelve regions and a number of industrial and agricultural activities.

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AREAM is the Australian version of SARUM for the analysis of Australian Resources and Environmental Assessment. The project was formulated in the light of a need to assess the impact of world change on the development of the Australian environment and its natural resources. In order to be able to look at environmental factors, SARUM is extended by the addition of an environment sector and the demographic sector is endogenised.

Environmental Studies Paper, AREA-5, Canberra, March, 1979

ACKNOWLEDGEMENTS

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AIM AND SCOPE OF SURVEY

Our main purpose for preparing this bibliographical survey was to gather together reference material for the AREA Project. A secondary aim was to bring together in one place reference material on world models, world modelling projects and future studies.

It is not the intention of this survey that it should be comprehensive. This would be a mammoth task best left to professional librarians. Nor is it the intention of this survey that it should be a review of research work in this area. This is the topic of another AREA paper. Some critical reviews of world models have been included in this bibliography.

1. BOOKS

ANDERTON, D.A. (Ed.) (1977)

Mounting Pressures on Planet Earth - A four-part bicentennial symposium series.

Maryland State Dept. of Education, Baltimore;
National Aeronautic and Space Administration,
New York, Goddard Inst. for Space Studies

This volume details the proceedings of the 1976 bicentennial symposium series held under the general title of mounting pressures on planet earth. This event, co-sponsored by the Maryland State Department of Education and the NASA Goddard Space Flight Center, brought together researchers and educators to discuss solutions to the earth's problems. The symposium was broken into four sessions: each session took a detailed look at a fundamental question about the earth's future. The questions investigated were: can the earth feed its people (Forum I); can the earth provide the energy and other resources for the next generation (Forum II); can science and technology solve the earth problems (Forum III); and can existing economic, political, and value systems cope with the problems of the earth (Forum IV).

ARCHER, A. (Ed.) (1976)

Scanning Our Future - A report from the NGO forum on the World Economic Order in support of the seventh special session of the UN general assembly on Development and International Economic Cooperation (September 1-12, 1975).

United Nations Non-Governmental Organisations, New York.

This report of the seventh special session at the conference of Non-Governmental Organisations (NGO) presents an account of the forum on World Economic Order. Its purpose is to gain public awareness of the issues debated. The report comprises an exchange of over 50 opinions which provide a compendium of ideas and judgements in the field of economic and social development and international co-operation. Issues discussed in the forum were (1) human values in the economic order, (2) trade and commodity problems, (3) finance and monetary problems, (4) science and technology, (5) employment and industrialization, (6) food and marine resources, (7) internal development strategies, (8) global structures, and (9) shaping the future.

General concerns expressed by participants focused on how to deal with the poorest sector of the developing world and with future problems of population and environment.

BIRCH, C. (1975)

Confronting the Future - Australia and the World : The Next Hundred Years.

Penguin Book, Australia

In this book the author showed that the present world crisis in population, resources and environmental deterioration is unprecedented in urgency, complexity and scale. The earth can no longer sustain an intensely industrialized urban society. Catastrophe is predicted if present trends in population growth and economic development continue.

The author's solution to the problems is that we must attack causes and not merely symptoms of the disorder. The disorder is too many people demanding too much. The prescription is fewer people demanding less. It requires zero population growth across the board for rich and poor alike. However, it is not one of zero economic growth but reduced growth in consumer goods by rich countries and increased growth in services of health, education and welfare in both rich and poor countries alike.

BOUCHER, W.I. (Ed.), (1977)

Study of the Future - An Agenda for Research,
US Department of Commerce, National Technological
Information Service.

This document addresses itself to the research goals that must be pursued in order to: anticipate and cope with the future; perceive, evaluate and control the effects of our actions; and imagine and create more desirable futures. The report is concerned with the various beliefs, methods, practices and results associated with a kind of forecasting that is now referred to as "future research".

Part one presents a new perspective on forecasting methodology, the validity of forecasting systems, and the nature of unforeseen developments.

Part two discusses attitudes towards forecasting in political science and sociology, technological forecasting, forecasting in economics, forecasting and its impact on policy making, problems in future research, and forecasting when the future is known, such as in the Soviet Union.

Part three presents the futures field: functions, forms and critical issues, communications in futures research and the monitoring of the future.

Part four addresses itself to an agenda for future research and a statement of research needs.

An appendix presents results from a survey of current forecasting efforts.

A bibliography of Research on Future Research is also included.

BROWN, L.R. (1978)

The Twenty-Ninth Day : Accommodating Human Needs and Numbers to the Earth's Resources.

World Watch Institute, Washington, D.C.

The purpose of this book is to examine the interaction of the world's ecological, economic, and social systems. It assesses the dimensions of the ecological stresses being put on the environment, specifically, the world's oceans, forests, grasslands, and croplands and points out some of the consequences of these stresses. It considers the trends and dangers of population growth, the energy situation, and world food shortages. It studies the economic stresses of inflation, unemployment, capital scarcity, labor production, and the slowing of economic growth around the world. It discusses the accommodations to the earth's natural systems and resources that must take place, how these accommodations will be accomplished, and who will be involved in the process.

CABINET OFFICE (1976)

Future World Trends
Her Majesty's Stationery Office, London.

This report is a discussion paper on long-term world trends in population, economic growth, resources and environmental effects. The study was conducted by an inter-departmental committee which had been set up in response to public debate on the world future, and a growing awareness of the interdependence of nations.

The purpose of the paper, however, is not to project or predict the precise position of the world over the next 30 or more years, but rather to analyse present trends and practices and draw out the implications for the future in terms of general trends and likely interactions. The paper does not therefore, set out any answer nor does it define present or future Government policies; it poses a series of questions which merit consideration when Government and governed are seeking to define the future policies for the United Kingdom and their relations to other countries.

CHURCHMAN, C.W. and MASON, R.O. (Ed.) (1976)

World Modelling : A. Dialogue.
North Holland/TIMS Studies in the Management Sciences -
Volume 2

North Holland/American Elsevier, Amsterdam

This manuscript is the second volume in The Management Sciences Series. The book consists of 18 articles with contributions from 21 authors. It is a debate on world modelling on the predicament of mankind as predicted in *The Limits to Growth* (Meadows et al, 1972).

It provides a forum for World Modellers - and people interested in this subject - to describe the approach they would use in modelling the world. A number of articles were mainly concerned with criticisms of *The Limits to Growth* - including one by Forrester to counter these critics. Other articles emphasised different aspects of world modelling : political structures, social, motivation and behavioural modification, and methodological.

The papers can be considered as though they were a conversation about useful ways of thinking about and modelling world issues.

CLARK, J. and COLE, S. (1975)
(with Curnow, R. and Hopkins, M.)
Global Simulation Models - A comparative study.
John Wiley & Sons, London

The book describes all major world modelling programs, ie research involving exploration of the long-term future of the world with the use of a computer, already completed or underway. It compares the different approaches and goals of the respective research teams and programs, several of which are funded through the Club of Rome. The social role of the relatively new "discipline" of large-scale computer modelling is discussed and related to more traditional methods of research and decision-making, and the technical and institutional problems involved in constructing such models are considered.

COLE, Sam (1977)

Global Models and the International Economic Order.
Pergamon Press, New York

The paper was prepared for the United Nations Institute for Training and Research (UNITAR) as part of its program of "Futures Studies".

The paper includes a comparative description of the structure and results and an evaluation of the World Models. The aim of the paper was to help governments and concerned citizens in their appraisal of the present "State of the art" in a complex discipline. The study may also be useful in highlighting the areas in which further investigation should be rapidly undertaken if global modelling is to become an increasingly useful instrument for the pursuance of United Nations objectives as expressed in the New International Economic Order (NIEO).

COLE, H.S.D., FREEMAN, C., JAKODA, M., and PAVITT, K.L.R. (1973)

Thinking About the Future - A Critique of *The Limits to Growth*.
Chatto & Windus Ltd, London for Sussex University Press.

This book is an examination of the World Models developed at the Massachusetts Institute of Technology (MIT), in particular that described in *The Limits to Growth* by Dennis L. Meadows and co-workers.

The book was written by an inter-disciplinary team at the Science Policy Research Unit at Sussex University, which includes biologists, physicists, engineers, economists, political scientists and social psychologists. The first part examines both the structure and the assumptions of the MIT world models. Based on carefully planned and extensive computer runs, it shows that forecasts of the world's future are very sensitive to a few key assumptions, and suggests that the assumptions made at MIT may be unduly pessimistic.

The second part attempts to assess the models and their assumptions in the context of historical forecasts about economics (including Malthus and Keynes), population, the environment and technology. The conclusion stresses that, even if there need not be anxiety about foreseeable physical limits, there is no room for complacency, since dealing with these limits and distributing the fruits of growth equitably will require radical political and social, as well as technological, change.

CYRIAX, G. (Ed.) (1978)

World Index of Economic Forecasts
Gower Press, Farnborough, England

This reference book details the activities, techniques and published output of the world's leading economic forecasters and forecasting institutions. The 175 entries represent the very large majority of units in the world who regularly produce and publish quantitative economic forecasts.

Each participant has provided comprehensive details of forecasts on their own domestic economies as well as their international coverage. Methods of forecasting, time-scales, special areas of expertise, quality checks (such as the extent to which forecasts are post-assessed), are included.

The information has been presented in a convenient format which allows the reader to quickly check which forecasters make projections about which economies or specialist areas such as exchange rates or commodity prices.

EDISON Electric Institute (1976)

Economic Growth in the Future.

The Growth Debate in National and Global Perspective.
McGraw-Hill Book Company, New York.

World growth patterns are analysed in terms of alternative futures. There are extended discussions of forecasting and futures research methods including econometric modelling, scenario development, judgemental forecasts, and the second generation of *system dynamics* models.

The arguments comprising the growth debate are carefully dissected and analysed. Specific conclusions are drawn on an issue-by-issue basis. The primary questions addressed and resolved are:

1. Is continued economic growth sustainable?
2. Is it desirable?
3. Is it necessary?
4. Is zero economic growth a workable alternative?

Next, the authors provide positive recommendations for public policy consideration in such areas as:

- * Macro-problem solving
- * Economic policy
- * Energy policy
- * Materials policy
- * Population
- * Agriculture
- * Environment
- * Finance
- * The pricing of energy

FALK, R. (1975)

A Study of Future Worlds
North-Holland Publishing Company, Amsterdam

"A Study of Future Worlds" is one book in the series of volumes entitled "Preferred Worlds for the 1990's" resulting from a transnational research enterprise, the World Order Models Project. The project was sponsored by the Institute for World Order, an international group of researchers and scholars established in 1968 to explore alternative futures.

The main argument of this book is that the current despair about our future is unfounded, because, as the author states in his prescript "a new world order based on peace and justice is not only desirable and necessary but possible, although by no means probable".

The author considered that the present world system, consisting of sovereign states, cannot deal effectively or equitably with the larger and more urgent problems facing mankind today. Nation states tend to act nationally rather than globally. What is needed therefore is some form of global integration which will influence the shaping of policy and implement the sharing of resources.

The book proposes a framework for a reformed and integrated world polity or political unit. It attempts to formulate appropriate ways of thinking about the political prospects of a truly world-wide society comprising people rather than states. It also suggests models of new world organisations that will be necessary to achieve the elimination of global poverty, injustice, war, and environmental imbalances by the end of the 20th century.

FORRESTER, J.W. (1971)

World Dynamics
Wright-Allen Press, Cambridge, Mass

World Dynamics interrelates population, industrialization, natural resources, food, crowding, and pollution to present an explanatory theory of man in the world ecology.

The book is the first step toward adapting the principles of system dynamics in determining the transition from growth to world equilibrium.

The model presented in *World Dynamics* (World 2) was the fore-runner of World 3 which formed the basis of the controversial book *The Limits to Growth* (Meadows et al, 1972).

As a text book, *World Dynamics* has been adapted in many colleges and universities for teaching courses in such diverse fields as geology, zoology, life sciences, political science, ecology and cybernetics.

HOUSE, P.W. and WILLIAMS, E.R., (1973)

The Carrying Capacity of a Nation.
Lexington Books, Massachusetts

The system chosen for analysis was the United States from the years 1970 to 2000.

The purpose of the book is to describe a model that will analyse the possible ranges of social and economic growth under conditions of limited available resources and minimal environmental damage.

KAIN, H., BROWN, W. and MARTEL, L. (1976)

(with the assistance of the Staff of the Hudson Institute).
The Next 200 Years - A Scenario for America and the World.

William Morrow & Co., Inc., New York

This book is a partial report of work in progress at the Hudson Institute on the crucial issues of population growth, economic development, energy, raw materials, food and the environment, which currently are the focus of attention all over the world.

The authors disagree with the view that population explosion, coupled with economic growth, could prove catastrophic within a century; therefore, economic growth must be severely limited. They present important facts, assumptions, analyses and conclusions of these studies in each of the major current problem areas - population, energy, mineral resources, food, and environment. From these analyses they evolve an affirmative strategy for the future. Not only will the world's population increase at a slower rate, but the world can afford prosperity. Their studies suggest that economic growth will continue well into the next century, reaching an eventual world-wide plateau characterized by affluence and universally high standard of living.

KOTHARI, R. (1974)

Footstep Into the Future
North - Holland Publishing Company, Amsterdam

The book is one manuscript in the series of volumes entitled "Preferred World for the 1990's" and was sponsored by the Institute for World Order (see Falk, R. (1975) : *A Study of Future Worlds*).

The author discussed some questions which he found to be critical to the future of man and provided answers to them. The author considered that present trends indicate a scenario of growing inequity and violence in the world. It is a scenario of sharp dualism - of over-development and wasteful indulgence on the one hand and extreme deprivation (including starvation and death) on the other. Common to these two worlds - which is also a cause of the sharp divisions between and within them - is an approach to human organisation that is making man a burden on the planet, work a superfluity, and machine the most potent source of life. The structure through which these processes operate have promoted division, domination, injustice and violence. Kothari provided a design for an alternative to the present world, and sketching out practical strategies for moving from the future as it will be if present trends continue to the future as it should be if the proposed alternative is to become real.

The author's view is based essentially on an Indian perspective on man and his future, and on world issues, as it has evolved over time.

McHALE, J. and McHALE, M.C. (1977)

The Futures Directory : An international listing and description of organisations and individuals active in future studies and long-range planning.
IPC Science and Technology Press, Westview Press, Surrey, England

The Directory gives an outline description of organisations and individuals throughout the world concerned with the study of the future in various ways. The listing is not exhaustive as it only includes those who have participated in a series of survey studies carried out at the Centre for Integrative Studies, State University of New York at Binghamton.

The Directory provides detailed information, as far as was possible, of the activities of the entries - what they were doing in the area of future studies, with what kind of objectives and using which approaches and methods.

MEADOWS, D.H., MEADOWS, D.L., RANDERS, J. and BEHRENS III,
W.W., (1972)

The Limits to Growth - A report for the Club of Rome's
Project on the Predicament of Mankind.
Earth Island Ltd, London

In July 1970 an international research team at
the Massachusetts Institute of Technology (MIT) began a study
of the effects and limits of continued world-wide growth -
a study commissioned by the Club of Rome as part of their
Project on the Predicament of Mankind. This non-technical
report of their findings is a survey of mankind's problems
and options.

The MIT team studies the limits to growth in
global population, agriculture, resource use, industry and
pollution, and shows how these factors interact with each
other. They conclude that, even under the most optimistic
assumptions about advances in technology, the world cannot
support present rates of economic and population growth for
more than a few decades from now. By formulating the behaviour
of the world in a large scale computer model, the MIT
researchers also show that only by a concerted attack on
all the major problems at once can man achieve the state of
equilibrium necessary to his survival.

MEADOWS, D.L., BEHRENS, W.W. III., MEADOWS, D.H., NAILL, R.F.,
RANDERS, J. and ZAHN, E.K.O. (1974)

Dynamics of Growth in a Finite World
Wright-Allen Press, Inc., Cambridge, Massachusetts

This book presents a detailed description of
World 3, the computer model that was constructed to investigate
growth in global population and material output. The model
provides a dynamic theory of the long-term, complex changes
arising from physical growth at an "exponential rate" in a
finite environment. It is the basis on which the authors'
already controversial book - *The Limits to Growth*, was
composed.

As a text book, it serves as a basis on which
other modellers' can extend or construct their own large-
scale simulation models. It also provides a technical
basis for multi-disciplinary courses on population, the
environment, and economic development.

Mankind at the Turning Point - The Second Report to the Club of Rome
Hutchinson of London

The book describes an analysis of alternative patterns of long-term world development using a multi-level regionalised computer model of the world system.

The model recognises the diversity that exists in the world and also represents the world as a system - that is, as a collection of mutually interacting and interdependent parts.

Several critical problem areas have been investigated, in particular the world food shortage, energy crises, population growth, and disparity in economic development. The study was aimed at an understanding of the two gaps which appear to be at the heart of mankind's present crises: the gap between man and nature, and the gap between "North" and "South", rich and poor.

This report differs markedly from *The Limits to Growth* (Meadows et al., 1972). Although recognising the challenges confronting mankind, it is far from a doomsday prophecy. It offers alternative "scenarios" which the authors claim can avert potential catastrophe.

The authors hoped to furnish political and economic decision-makers in various parts of the world with a comprehensive planning tool, which could help them to act in anticipation of the crises which are occurring presently and those which loom increasingly large in the distance, instead of reacting in the spirit of short-term pragmatism.

Solar Australia - Australia at the Crossroads.
Foundation for Australian Resources, Sydney, Australia

The study was carried out by the Foundation for Australian Resources, using extensive computer simulations. "Club of Rome" programs were extensively modified for Australia and its role with the rest of the world and provision made to incorporate Australia's solar energy potential. The results provide quantitative information to assist Government planners and give a basis for informed public debate.

Alternative scenarios are evaluated in each of which solar energy is given a different emphasis and degree of urgency ranging from apathy to rescue from an energy crisis. The seeds of destruction inherent in "Club of Rome" work, and which caused considerable criticism have been overcome.

NORDHAUS, W.D. (1975)

World Modelling from the Bottom Up
IIASA Research Memorandum
Schloss Laxenburg, Austria.

The paper discusses the Bariloche model which was a project prepared by the *Fundacion Bariloche*, a multi-disciplinary group of scholars from Argentina. It is a model about the world economy built from the bottom of the economic ladder looking up, rather than an elitist model built from the pinnacles of the Cambridges - Massachusetts or England - looking down (or into the future) at world problems.

The paper describes the model in terms of five aspects : the philosophy, the techniques, the objective function, the constraints and the results. Particular attention was given to the problems of techniques and methodology.

ROBERTS, P.C. (1978)

Modelling Large Systems - Limits to Growth Revisited
Taylor and Francis Ltd., London

This book deals with the fundamental principles of systems modelling. It is a book about world models although less than half of it deals directly with past or potential world models.

The book sets world modelling in the context of scientific activity - approaching the methodology, the accuracy and the potential through the eyes of a scientist.

The author discussed the philosophical underpinning of world modelling. He showed that the natural sciences are replete with models of all sorts and argued that world modellers should not forget their origin in the more traditional sciences. He also showed the constraints and conditions necessary for the development of a satisfactory model.

The Next 25 Years : Crisis and Opportunity
World Future Society, Washington DC

This volume contains a selection of 43 papers submitted in advance to the World Future Society's second general assembly. Papers were selected for their general interest and relevance to the theme of the meeting - a look at the prospects for mankind during the final quarter of the 20th century. Authors include Roy Amara, Lester Brown, Jay W. Forrester, Willis Harman, Herman Kahn, John Platt, Robert Theobald, and others. Articles present and examine new dimensions of the future and problems that the world is facing; goals for the global society; the world community and its future; problems and possible consequences of politics, democracy, and economic alternatives; social inventions, women as futurists, and future studies; intimate relationships, sex and the future; the future of art and design; criminal justice and the law, and its relation to the future; and forecasting and possible new policies.

SARUM 76 Global Modelling Project
United Kingdom Departments of the Environment and Transport
HMSO, London.

The System Analysis Research Unit (SARU) is a multi-disciplinary team which has been concerned with studies of the world-wide long-term availability of resources, particularly world food supplies, and the effects of market pressures and pollution control. SARU placed particular emphasis on attitudes towards modelling and special requirements of decision makers.

Structurally, the SARU Model is disaggregated geographically into 12 regions. Within each region, 11 production and consumption sectors are identified. SARUM is an econometric model in which prices do not adjust to equilibrate supply and demand in each period, but rather recognize the many factors that inhibit instantaneous clearing of markets. The model can also be used to throw light on problems concerning the way regions interact with each other. This is accomplished by modelling the trade between them by defining a matrix of "trade biases" for each commodity traded.

Although the model is designed as a "testing bed" for policy options, it is one of limited aspirations. The authors of SARUM recognized that "at this phase of development, it is unwise to lay much emphasis on the character of the 'futures' which are simulated. Of more importance is establishing the validity of the data base and the relationships. Not until there is some confidence in the soundness of the basic work is it appropriate to draw conclusions and make recommendations".

TAYLOR, G.R. (1975)

How to Avoid the Future
Secker and Warburg, London

In this book the author surveyed a wide range of predictions on the future world; problems such as inflation, energy and resource shortage, climatic change, food supply and population growth. His conclusion was that the urgent problem of the immediate future World is overlooked; growth of social turbulence and decay of social cohesion as shown by increasing frequency and savagery of terrorism, kidnapping, hijacking, torture and other forms of anti-social behaviour which are daily reported.

The author examined the sociological and psychological factors underlying and causing these trends, and concluded that the structure of our society must be changed and our patterns of social behaviour must be modified to avert collapse. He called for major shifts in official policy, proposed radical steps to improve the quality of government and warned that if the present course of action is continued, some kind of totalitarianism will emerge as a forcible attempt to hold society together.

TENNISON, P. (Ed.) (1977)

Heyday or Doomsday? Australia 2000
Hill of Content, Melbourne

This book is a collection of what a specially selected group of experts see Australia's future over the next twenty-five years. It includes the predictions of sixteen forward thinking Australian writers, scientists, educationalists, sociologists and administrators. Some of the topics discussed were : science, politics, education, economics, agriculture, trade unions, religion and human relations.

The book is both entertaining and thought provoking. Through a set of scenarios the authors hope to forewarn Australia and Australians of possible major changes which they will have to deal with over the next twenty-five years.

OTHER MAJOR PUBLICATIONS ON WORLD MODELLING

BALL, R.S. (Ed.) (1973)

The International Linkage of National Economic Models.
North-Holland Publishing Co.

BOSSEL, H. (Ed.) (1977)

Concepts and Tools of Computer Assisted Policy Analysis.
Birkhauser, Basel, Stuttgart.

DEUTSCH, et al. (Ed.) (1977)

Problems of World Modelling : Political and Social
Implications.
Ballinger, Cambridge, Mass.

FREEMAN, C. and JAHODA, M. (1977)

World Futures : The Great Debate.
Martin Robertson, London

HERERA, A. et al. (1976)

Catastrophe or New Society : A Latin American
World Model.
International Development Research Center,
Ottawa, Canada.

INTERNATIONAL INSTITUTE FOR APPLIED SYSTEMS ANALYSIS

Proceedings of the IIASA Symposium (I-V) on Global
Modelling.

IIASA Publications, Laxenburg, Austria.

KAYA, Y. et al. (1973)

On the Future Japan and the World - A Model Approach.
Japan Techno-Economics Society.

LAZLO, E. (Ed.) (1973)

The World System Models : Norms, Variations.
Brazillier, New York.

LEONTIEFF, W., CARTER, A.P. and PETRI, P. (1976)

The Future of the World Economy.
United Nations, New York.

MADDOX, J. (1972)

The Domsday Syndrome : An Attack on Pessimism.
McGraw-Hill, New York.

MEADOWS, D.L. et al. (1975)

Towards Global Equilibrium.
Wright-Allen Press, Cambridge, Mass.

WAELEBROECK, J. (Ed.) (1976)

The Models of Project LINK.
North-Holland, Amsterdam.

ZACHARY, D.H. (1975)

Global Planning in the Light of World Modelling
Experience and a Review of Some Planning Models.
Scientific Control Systems Limited, London.

The Journal is futuristic in orientation and is actively concerned with shaping and designing the future along preferred lines on the basis of the values outlined above.

The Journal encourages an integrated view of dimensions from the point of view of realizing values, and particularly the interdependencies among them, in the specific setting of world future in the next two or three decades.

Paper-writers for the Journal are encouraged to provide alternative scenarios and policy prescriptions with a view to the promotion of wide-ranging debates on the means of achieving a better future.

Publication Schedule : The Journal is published in volumes of approximately 500 pages in June, September and December of one year and March of the next year, each issue consisting of about 125 pages.

Publisher : Institute for World Order, Inc., 1140 Avenue of the Americas, New York, N.Y. 10036, USA.

2. JOURNALS

ALTERNATIVES

A Journal of World Policy

Aims and Scope : The main purpose of the Journal is to promote wide-ranging discussion and debate on the future of the world from the perspective of a set of values. Principal among these values are autonomy and dignity of the individual and of people, equality and justice as principles of social organisation, participation in political and economic decision-making structures and in the productive process, elimination of oppression and coercion in human and international affairs, and harmony between man, nature and technology.

The Journal is normative and policy oriented and not merely confined to presentation of empirical findings. The perspective of the Journal is not confined to foreign or domestic policies of individual nations, but deals with issues that are global, and with problems and policies which have world-wide relevance. It hopes to promote understanding and learning on how to think, write and act in global terms.

FUTURES

The Journal of Forecasting and Planning

Aim and Scope : Futures is an international journal on the developing methods and practice of long-term forecasting for decision making on the future of man, society, economy, technology and politics. It provides opportunities for the publication of material which may represent divergent ideas and opinions.

Contributors are asked to relate to the development and application of forecasting techniques, or to subjects appropriate to long-term policy making. The Journal also publishes news and reports, covering industrial, governmental or educational activities in this field, and information on forthcoming events and publications.

Publication Schedule : The Journal is published six times a year, in February, April, June, August, October and December, each issue consisting of approximately eighty five pages.

Publisher : I.P.C. Science and Technology Press Ltd., I.P.C. House, 32 High Street, Guildford, Surrey, England, G.U.1. 3EW.

THE FUTURIST

A Journal of Forecasts, Trends and Ideas About the Future.

Aim and Scope

The *Futurist* is published by The World Future Society; An Association for the Study of Alternative Futures. The journal's - as well as the Society's - objectives, as stated in the charter, are as follows:-

1. To contribute to a reasoned awareness of the future and of the importance of its study, without advocating particular ideologies or engaging in political activities.
2. To advance responsible and serious investigation of the future.
3. To promote the development and improvement of methodologies for the study of the future.
4. To increase public understanding of future-oriented activities and studies.
5. To facilitate communication and cooperation among organisations and individuals interested in studying or planning for the future.

Publication Schedules : The Journal is published every other month since February, 1974, each issue consisting of about 50 pages.

Publisher : World Future Society, PO Box 19285, Twentieth Street Station, Washington, DC 20036.

MAZINGIRA

The World Forum for Environment and Development

Aim and Scope : The word *mazingira* means environment in Swahili, a Bantu language originally spoken only by one million native speakers in East Africa and the Congo.

The Editor of Mazingira explained that the title has been chosen for two reasons. Firstly, because it is so far removed, Mazingira suggests to the reader that environment can not be and should not be seen only as his or her immediate surroundings but it can influence human communities throughout the planet. Mazingira intends to look at the world, analyse its doing and inform its actions from this holistic viewpoint.

Secondly, Mazingira has been chosen because Swahili-speaking Nairobi is hosting the world headquarters of environmental thinking and action, the secretariat of the United Nations Environment Programme (UNEP). It is the youngest UN agency, and the first in history to be located in a Third World Country, suggesting a more horizontal type of co-operation among nations.

Development is the second objective of the Journal. It is a term which encompasses all human activities intended to better man's fate. In doing so man has always encroached upon his natural environment. As human knowledge has advanced and distances have shrunk so much, the balance between man and nature has been upset. It appears that developments in societies, both developed and developing, carry some in-built detrimental characteristics, which can threaten the very meaning of development. Thus Mazingira intends to examine the different styles and models of development, to pinpoint their detrimental, sometimes suicidal, effects and suggest alternatives.

Publication schedule : Mazingira is published quarterly in English, French and Spanish. Each issue consists of approximately one hundred pages.

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JOURNALS WHICH HAVE PUBLISHED ARTICLES ON WORLD MODELLING

American Economic Review
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IEEE Transactions on Systems Man and Cybernetics
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Comprehensive lists of references in the fields of Futures Studies and Forecasting can be obtained from the data bases of the National Library of Australia. In the compilation of this bibliography, computer searches were made of the following data bases of the Australian National Social Sciences Library (ANSOL):

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