

Project Document 1551.6

WORKSHOPS IN ENVIRONMENTAL INVESTIGATION

TECHNIQUES AND PROCEDURES
FOR PROJECT DEVELOPMENT

Resource Paper No. 1

Resource Materials and
Information Systems For
Assessment of Local
Environmental Impact



PROGRAM FOR INTERNATIONAL DEVELOPMENT
CLARK UNIVERSITY
WORCESTER, MASSACHUSETTS 01610

BIBLIOGRAPHIC DATA SHEET

1. CONTROL NUMBER

PN 77AK-804

2. SUBJECT CLASSIFICATION (035)

DAC 0-0000-0000

3. TITLE AND SUBTITLE (240)

Workshops in environmental investigation /
resource paper no. 1: Resource materials and information
for assessment of local environmental impact

4. PERSONAL AUTHORS (100)

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5. CORPORATE AUTHORS (101)

Clark Univ. Program for Int. Development

6. DOCUMENT DATE (110)

1978

7. NUMBER OF PAGES (120)

27 p.

8. ARC NUMBER (170)

9. REFERENCE ORGANIZATION (130)

Clark

10. SUPPLEMENTARY NOTES (500)

(In project document 1551.6)
(Prepared for workshops in February and May, 1978)

11. ABSTRACT (950)

12. DESCRIPTORS (920)

Environmental impact Bibliographies
Project evaluation; regional Development
Information systems

13. PROJECT NUMBER (150)

14. CONTRACT NO. (140)

DHS/CTR-C-1351

15. CONTRA
TYPE (13)

16. TYPE OF DOCUMENT (180)

Resource Materials and Information Systems
for Assessment of Local Environmental Impact:
A Guide for Project Managers
in International Development

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A Resource Guide

Training Course for Preparing
Initial Environmental Examinations

Conducted on Behalf of
AID Training Contract RFP/50106

and

Prepared for Workshops in
Febuary and May, 1978

Clark University

Febuary, 1978

FOREWORD

This guide has developed through a joint effort involving Clark University and the Mohonk Trust. It has five goals:

- . . . to summarize literature which would be useful to project officers concerned with environmental quality in small-scale development projects;
- . . . to describe information systems which specialize in environmental literature, studies, or projects;
- . . . to include references only if the sources are practical, brief, and readily accessible;
- . . . to summarize checklists of environmental procedures to be used in project planning and implementation;
- . . . to identify areas where sources are inadequate and consider ways in which such voids may be corrected.

We plan to revise this guide every year. Thus, we invite any suggestions or recommendations which, in your judgment, would improve its usefulness.

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Resource Materials and Information Systems
for Assessment of Local Environmental Impact:
A Guide for Project Managers
in International Development

This guide is prepared as an aid to project review committees and project officers engaged in assessing environmental impact of development projects, especially small scale efforts. The first portion (topical listings) suggests sources for particular topics or themes. The second section (annotated listings) presents a brief summary description of individual pamphlets or books. Sections III and IV describe resources other than printed materials which are available and of interest to project officers concerned with environmental questions.

Following each topical listing, coded information appears in parenthesis. The letters G and T indicate whether the listing is of a general and/or of a technical nature. Roman numerals and letters refer to the annotated listing location for the reference.

I. TOPICAL LISTINGS

A. Water Resource Use

1. Feachem, Water, Wastes, and Health (G-T, II-S)
2. IIED, Large Dams and the Environment (G, II-H)
3. MAB Report #29, Semi-Arid Lands/Irrigation (T, II-J)
4. Saunders and Warford, Village Water Supply (G-T, II-Q)
5. SCOPE #10, 1976, Environmental Issues (G, II-N)
6. SCOPE #2, 1972, Man-Made Lakes as Modified Ecosystems (G-T, II-N)
7. Stein, Water: Life or Death (G, II-H)
8. AID/Smithsonian, The Ghana/Volta Dam Study (T, II-A)
9. White, Bradley, and White, Drawers of Water (G-T, II-S)
10. Wiener, Role of Water (T, II-S)
11. World Bank, Water Supply and Sewerage (T, II-Q)

*Full titles, annotations, and addresses for availability are contained in Section II, beginning on page 5

B. Mining and Mineral Resource Use

1. AID/Smithsonian, Indonesia/Coastal Zone Pollution Case Study (T, II.)

C. Forest Resource Use

1. Hamilton, Tropical Rainforest Use and Preservation (T, II-O)
2. MAB Report #35, South Asia Tropical Forest Ecosystems (T, II-J)
3. MAB Report #16, Ecological Effects on Tropical and Sub-Tropical Ecosystems (T, II-J)
4. MAB, Technical Notes #2, Mediterranean Forests and Maquis (shrubs) (T, II-J)
5. Goodland, Amazon Jungle: Green Hell to Red Desert? (G-T, II-D)
6. VITA/ACTION, Reforestation in Arid Lands (T, III-H)

D. Arid and Semi-Arid Grassland Resource Use

1. MAB Report #6, Impact on Grazing Lands (T, II-J)
2. MAB Technical Note #1, The Sahel (G-T, II-J)
3. AID, Desert Encroachment on Arable Lands (T, II-A)
4. MAB Report #29, Impact of Human Activities on Arid and Semi-Arid Ecosystems (T, II-J)
5. NAS, Products from Jojoba (G-T, II-L)
6. World Watch Paper #13, Spreading Deserts: The Hand of Man (G-T, II-F)
7. SCOPE 1974, Environment and Development (G, II-N)

E. Agricultural Resource Use

1. National Academy of Sciences, More Water for Arid Lands (G-T, II-L)
2. SCOPE 1976, Environmental Issues (G, II-N)
3. MAB Report #15, Ecological Assessment of Pest Management and Fertilizer (T, II-J)
4. NAS-Leucaena (G-T, II-L)

F. Special Environmental Problems of Coastal Zones

1. MAP Report #24, Ecological Effects on Coastal Zones (T, II-J)
2. AID/Smithsonian, Coastal Zone Pollution in Indonesia (T, II-A)
3. NAS, Making Aquatic Weeds Useful (focus of this is primarily lake and river water development) (G-T, II-L)
4. NAS, Assessing Potential Ocean Pollutants (G-T, II-L)

G. Urbanization

1. IIED, Human Settlements National Report (G, II-H)

H. Health and Nutrition

1. Feachem, Water, Wastes, and Health (G-T, II-S)
2. NAS, World Food and Nutrition Study (G, II-L)
3. Saunders and Warford, Village Water Supply (G-T, II-Q)
4. Stein, Water: Life or Death (G, II-N)
5. AID, Vol. I, Food Production and Nutrition (G, II-A)
6. AID/TAB, Water, Engineers, Development, and the Tropics (T, II-A)
7. WHO, Water Supply for Rural Areas and Small Communities (T, II-P)
8. WHO, Excreta Disposal for Rural Areas and Small Communities (T, II-P)
9. Eekholm, Picture of Health (G-T, II-R)

I. Energy Needs

1. NAS, Energy for Rural Development (G-T, II-L)
2. NAS, Firewood Crops (F, II-L)
3. World Watch Paper #1, The Other Energy Crisis: Firewood (G-T, II-R)
4. World Watch Paper #11, Energy: The Solar Prospect (G-T, II-R)

5. Hayes, Rays of Hope (G-T)
6. Makhijani, Energy Policy for the Rural Third World (G, II-H)
7. Cary Arboretum, Guatemala National Energy Master Plan (G-T, II-D)
8. Cary Arboretum, National Power Study Prefeasibility Investigation (T, II-D)

J. Technology Needs

1. NAS, Energy for Rural Development (G-T, II-L)
2. MAB #37, Effects of Major Engineering Works (T, II-J)
3. AID/TAB, Environmental Assessment Guidelines (T, II-A)
4. VITA, Village Technology Handbook (G-T, III-H)

K. Guidelines and Checklists

1. AID /TAB, Environmental Assessment Guidelines (T, II-A)
2. IED, Large Dams and the Environment (G, II-H)
3. SCOPE, Environmental Sciences in Developing Countries (G, II-N)
4. SCOPE #5, Environmental Impact Assessment (G-T, II-N)
5. World Bank, Environmental, Health, and Human Ecologic Considerations in Economic Development Projects (G-T, II-Q)
6. National Audubon Society, The Natural Environment: A Dimension of Development (G, II- 1)
7. ReVelle and ReVelle, Source Book on the Environment. (T, II-S)

II. ANNOTATED LISTINGS: by Organizations or Sponsoring Institutions

- A. Agency for International Development (US-AID)
Department of State, Washington, D.C.

T Desert Encroachment on Arable Lands: Significance, Causes, and Control, Office of Science and Technology, August, 1972. 55 pages, Bibliography, Resources.

Report focuses on experimental methods of desert stabilization including sections on artificial sealants, artificial physical barriers, and vegetative controls. Water management technologies also explored.

T Environmental Assessment Guidelines Manual, Engineering Department, June, 1974. 107 pages plus Bibliography.

The document is a guide prepared for AID Project officers, particularly from an engineering perspective, and contains a series of check-lists as well as tables of air quality standards, etc. Appendices include legislation and procedures for undertaking environmental assessments. Document is dated and would benefit from inclusion of emphasis on small scale projects.

G Research Literature for Development, Volume 1: Food Production and Nutrition, Technical Assistance, December, 1976. 427 pages.

A comprehensive volume which lists AID research projects from 1962-1976 on issues of food and nutrition. Document very helpful for research oriented activities although perhaps not directly pertinent to project design and assessment.

(-T) Techniques for Assessing Hydrological Potentials in Developing Countries, Technical Assistance, January, 1973. 66 pages.

A helpful document for questions of stream flow, erosion and sediment transport, water movement, ground water, precipitation, evaporation, and and remote sensing as they relate to development.

T Water, Engineers, Development, and Disease in the Tropics, (prepared by Frederick Eugene McJunkin), July, 1975. 182 pages, includes photographs, charts, and tables.

A helpful document for those planning irrigation projects of all sizes in terms of design, construction, operation, and evaluation of water projects as they relate to schistosomiasis.

In conjunction with AID, the Smithsonian Institution has sponsored three projects which are pertinent here. They are:

T Freeman, Peter H., Coastal Zone Pollution by Oil and Other Contaminants: Guidelines for Policy, Assessment, and Monitoring in Tropical Regions; Based Upon a Case Study in Indonesia in 1973, 67 pages, Annotated Bibliography.

The report is a condensation of a larger case study done on the same topic. Particular strengths are the listing of specific techniques for obtaining background information and existing pollution sources. It also suggests techniques for monitoring and enforcing regulations and standards.

T Freeman, Peter H., The Environmental Impact of a Large Tropical Reservoir: Guidelines for Policy and Planning; Based Upon a Case Study of Lake Volta, Ghana, in 1973 and 1974, 85 pages.

A summary of work and environmental impact at Lake Volta. Sections include impact on aquatic plants, fish and plankton, minerals, water supply, and sewage. Disease control is also considered. Guidelines included.

T Freeman, Peter H., The Environmental Impact of Rapid Urbanization: Guidelines for Policy and Planning; Based Upon a Case Study of Seoul, Korea, in 1972 and 1973, 1974. 88 pages.

Similar to the above two case studies, this document is also a condensation of a larger effort. Study places particular emphasis on environmental guidelines for rapidly expanding urban areas. An interesting concluding section cites lessons including growth rates, satellite city, water pollution, human wastes, solid wastes, squatters, and relationships with socioeconomic data.

B. Agricultural Development Council
630 Fifth Avenue, New York, New York 10020

G The Agricultural Development Council has published a number of books such as: "Getting Agriculture

Moving," or "Creating a Progressive Rural Structure," "Research on Agricultural Development in Selected Middle East Countries." In addition, ADC publishes a series of key studies related to agricultural considerations in development. Publications are well respected and are of interest as they relate to environmental perspective.

- C. American Council of Voluntary Agencies for Foreign Service, Incorporated.
200 Park Avenue South, New York, New York 10003

T The American Council maintains a Technical Assistance Information Clearing House which publishes documents such as "Water Resource Development: The Experience of U.S. Non-Profit Organizations: Programs, Issues and Recommendations." These papers describe technical information (e.g. a Peace Corps Wells Manual) and describe projects underway in conjunction with various PVC activities.

- D. Cary Arboretum of the New York Botanical Garden
Box AB, Millbrook, New York 12545

The Cary Arboretum undertakes environmental impact assessments on behalf of sponsoring institutions such as the World Bank. To date, upwards of 25 such projects have been conducted, primarily in Latin America but including Asia as well. A complete publications list is available from the Arboretum. Four titles are of particular interest:

G-T Goodland, Robert and R. Tillman, Amazon Jungle: Green Hell to Red Desert? An Ecological Discussion of the Environmental Impact of the Highway Construction Program in the Amazon Basin. New York, Elsevier Scientific Publishing Company, 1975. 150 pages.

The sub-title explains the focus of the book.

Goodland, Robert and R. Tillman, Guatemala National Energy Master Plan Environmental Assessment, December, 1975. 125 pages, includes pictures, tables, and maps.

G-T A very helpful study which considers hydroelectric, geothermal, and solar sources for energy and the environmental impact of each. Excellent on potential problems to watch for resulting from these several approaches as they relate to specific sites and actual proposals under consideration in Guatemala. Document is a very helpful guide for any projects relating to environmental impact of similar energy investments.

- T Goodland, Robert and R. Tillman, National Power Study Prefeasibility Investigation: Environmental Impact Reconnaissance, 1975. 56 pages.

Similar to the Guatemala study cited above, this short booklet sets out the several questions and areas which an environmental impact study should consider in determining environmental impact of a river development project. The document is very helpful.

- G-T Rapoport, Amos, "The Ecology of Housing" as found in Robert Goodland, Buildings and the Environment, 1976.

This chapter, contained in a larger book, is of particular interest in that it considers social and physical impacts of housing development. A section on the inadequacy of current approaches, followed by a consideration of cultural definitions of environmental quality provide helpful integration of physical and social environmental factors.

- G E. Center for International Environmental Information
300 East 42nd Street, New York, New York 10017

The Center ... through its network of correspondants reporting from more than 50 countries ... can be a useful source of information on environmental developments in the developing world. This information is published in a bi-weekly publication, World Environment Report which is indexed semi-annually.

- F. Environmental Protection Agency (EPA)
Office of International Activity
Washington, D.C. 20460

EPA publishes two helpful sources for PVO's. They are:

- G EPA Counterpart Agencies Abroad

The document lists, country by country, relevant institutions and government agencies which would be helpful contacts for environment work within any of the developing nations. Although many of the developing nations do not yet have formal environmental institutions, those which do are found in this directory.

- G International Environmental Issues: A Preliminary Guid to Organizations that are Engaged in Current Internatio

This summary report describes work of a number of environmental organizations in the United States which are working on overseas projects or questions of environment and development. Summaries include people to contact as well as existing publications.

- G. Environmental Training Program (ENDA)
BP 3370
Dakar, Senegal

G-T ENDA publishes a journal called African Environment as well as an extensive list of position papers which deal with questions of environment and development. Their work includes research, training, and consultation on questions of environment and development in Africa.

- H. International Institute for Environment and Development (IIED)
1302 18th Street, N.W., Washington, D.C. 20036

- G Freeman, Peter H., Large Dams and the Environment: Recommendations for Development Planning, March, 1977. 55 pages, helpful bibliography.

This short but extremely helpful pamphlet focuses on watershed management. Various sections of the report include a checklist of development impacts and recommendations for comprehensive planning. References include specific experiences in Thailand, Ghana, Argentina, and Brazil. An argument is made for smaller projects which do not flood fertile land and which may not create problems of salinization, water related disease, and toxic pesticide problems.

- G Makhijani, Arjun, Energy Policy for the Rural Third World, 1976. 58 pages.

This practical guide considers energy use for agriculture, cooking, eating, and keeping clean. Although not a definitive exploration of alternative sources, the document contains a number of helpful suggestions, diagrams, and approaches to rural energy needs.

- G Stein, Jane, Water: Life or Death, 1977. 45 pages.

The report prepared for the United Nations Water Conference and directed to policy makers in the field of water, health and development. Sub-section of pamphlets deal with disease, technology, and lessons to be learned from a number of specific experiences. Includes a very helpful bibliography.

G Human Settlements National Report: Summaries and Reference Guide, Pergamon Press, 1976.

Contains summaries of national reports submitted to the Habitat Conference.

Multilateral Aid and the Environment: A Study of the Environmental Procedures and Practices of Nine Development Financing Agencies.

G A study, financed by the United Nations Environment Program and the Canadian International Development Agency, investigates procedures which major international lending organizations (i.g. World Bank) are following to protect or improve the human environment. The current version (1977) is a progress report photo project. Four areas of need are identified: (a) several major agencies still do not have environmental procedures in place; (b) generally accepted criteria for assessing environmental impact are not yet agreed upon; (c) methodologies for assessing longer term environmental costs and benefits are not yet in place; (d) officials are not yet trained or available to carry out the mandate of the 1972 Stockholm Conference on the Human Environment.

I. International Research Center on Environment and Development
54, Boulevard Raspail, Bureau 309, 75270 PARIS CEDEX 06, France

G CIRED publishes a newsletter called Ecodevelopment News which contains timely and extremely provocative articles on questions of environment and development. Supported in part by the United Nations Environment Program, CIRED maintains close linkages with a number of environmental institutions in Asia, Africa, and Latin America.

J. Man and the Biosphere (MAB)
Available from United States MAB Committee,
United States National Commission for UNESCO
Department of State, Washington, D.C. 20520

MAB is an international research effort concerned with environment and development. Its publications,

although designed primarily for research use, contain helpful data related to specific technical questions. Reports are divided into two sets of papers: (a) MAB Technical Notes; and (b) Reports of Expert Panels and Working Groups.

MAB Technical Notes

G-T

Technical Note #1, The Sahel: Ecological Approaches to Land Use.

Technical Note #2, Mediterranean Forests and Maquis.

Technical Note #5, A Field Guide for Measuring Environmental Perception (forthcoming).

The Technical Notes contain papers and guides for research and planning. In particular, the Sahelian paper identifies ecological regions and analyzes appropriate development strategies. The book makes a case for the role of environmental perception in development planning and argues that environmental perception should be an integral part of resource management. It presents a convincing argument to link environmental, technological, and social systems in the design of all development processes.

Reports of Working Groups

T MAB Report #16, 1974; International Working Group on Project #1. Ecological effects and increasing human activities on tropical and subtropical forest ecosystems. Considers tropical forest management, human ecology, and research methodologies. Subsections deal with cultivation and land use impacts on soil structure and fertility.

T MAB Report #6, 1972; and #25 1974; International Working Group on Project #3. The Impact of human activities and land use practices on grazing lands. The 1972 document (Expert panel) focuses on research needs for grazing lands, management strategies, and uses of grazing lands. It includes an interesting section on grazing land user attitudes and relationships to land and animals. Four case studies are documented with basic soil, rainfall, crop, and livestock information.

T The 1974 document (Working group) focuses on Savanna and grassland regions in Asia, Central America, and Africa. Considers basic ecological relationships for these regions and suggests impacts resulting from on-going and proposed activities.

- T MAB Report #29, 1975; Expert panel on Project 4. Impact of human activities on the dynamics of arid and semi-arid zone ecosystems, with particular attention to the effects of irrigation. Report considers hydrological modifications and human repercussions resulting from irrigation. A very good document.
- T MAB Report #21, 1974; International Working Group on Project 5. Ecological effects of human activities on the value and resources of lakes, marshes, rivers, deltas, estuaries, and coastal zones. The title contains the several sub-categories. Within each of these categories there is useful information on environmental impact.
- T MAB Report #15, 1974; Ecological assessment of pest management and fertilizer used on terrestrial and aquatic ecosystems. Report on fertilizers (MAB document #15) summarizes available information on the topic and suggests gaps which should be considered.
- T Report on pesticides (MAB document #24) summarizes current information on pesticide pollution including the emergence of resistant pest strains. New research areas are suggested.
- T MAB Report #35, 1975; Regional meeting on integrated ecological research and training needs in tropical deciduous and semi-deciduous forest ecosystems of South Asia. Contains good description of the physical environment and suggests establishment of biosphere reserves.
- T MAB Report #37, 1976; Expert consultation on Project 10. Effects on man and his environment of major engineering works. This report suggests methods of pre and post construction evaluation of engineering works. Techniques of assessment and prediction are described.
- T MAB Report #14, 1973; Working Group on Project 6. Impact of human activities on mountain and tundra ecosystems. Human settlement activity is examined as it relates to resource development in high tropical, temperate, and high tundra mountain regions.

- K. Monitoring and Assessment Research Center (MARC)
Chelsea College, University of London,
London, England.

G Monitoring Tropical Forests: A Review with Special Reference to Africa, 1977. 45 pages.

Although the document is directed largely toward needed research efforts, a list of 156 references of previous studies on ecological surveillance, forest regeneration, and inventories of forest resources make this an extremely useful pamphlet.

G The Utility of the Nigerian Peasant Farmer's Knowledge in the Monitoring of Agricultural Resources, 1977. 55 pages.

The pamphlet is based on the assumption that peasant farmers see environmental problems in a different perspective from experts. As a result, their adaptation strategies and responses will differ. The booklet presents two case studies and draws upon examples of monitoring and information gathering in order to link development strategies more directly with peasant perceptions of the environment.

- L. National Academy of Sciences (NAS)
2101 Constitution Avenue, N.W., Washington, D.C. 20418

G-1 Assessing Potential Ocean Pollutants, 1975.

G-1 Energy for Rural Development: Renewable Resources and Alternative Technologies for Developing Countries, 1976.

G-1 Jojoba: Feasibility for Cultivation on Indian Reservations in the Sonoran Desert Region, 1977.

G-1 Leucaena: Promising Forage and Tree Crop for the Tropics, 1977.

G-1 Making Aquatic Weeds Useful: Some Perspectives for Developing Countries, 1976.

G-1 More Water for Arid Lands: Promising Technologies and Research Opportunities, 1974.

G-1 Under Exploited Tropical Plants with Promising Economic Value, 1975.

These several reports provide extremely helpful and concrete recommendations on ways in which new

approaches, alternative approaches, or little known methodologies may be of considerable value in increasing productivity, nutrition, and the quality of life in developing portions of the world. Because a number of these suggestions are compatible with the local environment, they are of considerable interest to groups with concern for environment and development.

G World Food and Nutrition Study: The Potential Contributions of Research, 1977.

This book identifies four major tasks in alleviating world hunger and malnutrition: (a) increase the food supply; (b) reduce poverty; (c) stabilize food supply; (d) decrease population growth. Although geared more for research audiences than project planning organizations, the information is current, comprehensive, and detailed. Any group working in the broad area of food would find the booklet helpful.

T Methane Generation from Human, Animal, and Agricultural Wastes. (forthcoming)

T Underexploited Tropical Legumes with Promising Economic Value. (forthcoming)

T Firewood Crops: Bush and Tree Species for Energy Production. (forthcoming)

T Underexploited Microorganisms with Promising Economic Value. (forthcoming)

M. National Audubon Society
950 3rd Avenue, New York, New York 10022

G Layne, Elizabeth N., The Natural Environment: A Dimension of Development, 1976.

A general statement which considers environmental problems for streams, ground water, inland wetlands, woodlands, hillsides and steep slopes, coastal wetlands, and erosion and run-off controls. Although the references are drawn largely from the United States, some of the principles have applicability to development projects.

N. Scientific Committee on Problems of the Environment (SCOPE)
51, Boulevard de Montmorency
75016 Paris, FRANCE

SCOPE Working Group on Man-made Lakes.

6. 7. Man-Made Lakes as Modified Ecosystems, Scope Report #2, 1972, 76 pages.

Very helpful document for consideration of water management, sediment problems, seismic movements, micro climates, water quality, waste discharges, fluctuation regulation, and other hydrological considerations. Particular attention is given to public policy and ways in which the scientific community can provide assistance.

6. SCOPE/UNEP Symposium on Environmental Sciences in Developing Countries, Collected Papers, Summary Reports, and Recommendations, 1974, 295 pages.

The volume consists of a collection of papers presented in a 1974 conference. Topics include agricultural development, human settlement, national parks, demography, and environmental education.

SCOPE Workshop on Impact Studies in the Environment, Environmental Impact Assessment: Principles and Procedures, 1975, 173 pages.

6. 7. A technical manual containing very helpful guides, checklists, and topics to consider in conducting an environmental assessment. Although the information may be somewhat more technical than a small project would want, it is an extremely helpful publication for anyone undertaking major environmental assessment.

6. SCOPE Report #10, Environmental Issues, 1976, 296 pages.

Several summary papers present up to date information on current environmental issues. Topics range from crop production, water efficiency and water balance to questions of man's impact on climate.

6. SCOPE Report #4, Environmental Sciences in Developing Countries, 1974, 69 pages.

The report summarizes recommendations presented at a symposium in Nairobi. Brief and succinct reviews consider needed action in agriculture, pest control, river basin development, industrial planning, housing population, and education. Its brevity is welcome.

- O. Sierra Club
800 2nd. Avenue
New York, New York 10022

- T Hamilton, Lawrence S., Tropical Rainforests Use and Preservation: A Study of Problems and Practices in Venezuela, 1976

The study links technical, social, and economic considerations in rainforest conservation. Author considers the effects of logging, mining, reservoir agriculture, and grazing. Issues of deforestation are also included. Includes portfolio of maps showing areas of deforestation.

- P. World Health Organization (WHO)
Geneva, Switzerland

- T Water Supply for Rural Areas and Small Communities

- T Excreta Disposal for Rural Areas and Small Communities

Although WHO has publishes many documents on health and development, these two are of particular value for planning rural water supplies and sanitation systems.

- Q. World Bank
1818 H Street, N.W.
Washington, D.C. 20433

- ∴ T Environmental, Health, and Human Ecologic Considerations in Economic Development Projects, 1974, 104 pages.

This document is a handbook, prepared for the identification and measurement of environmental and related human ecological effects upon development projects. Primary emphasis is on larger scale projects. However, a separate chapter on public health considers the direct and indirect adverse health effects of development projects. Because the document is one of the few comprehensive checklists available for a wide scale and broad variety of development projects, it should be given review.

- G Saunders, Robert J. and Jeremy J. Warford, Village Water Supply: Economics and Policy in the Developing World, Johns Hopkins University Press for the World Bank, 1976.

Although this book is published separately, the authors are World Bank staff members and it is published in association with the World Bank. It provides an excellent summary of the interface of technology with economic, social, financial, and administrative considerations. It concludes that the complex of environmental, social, and cultural realities must be considered in planning for village water supplies. Appendices include twenty-eight studies of improved water supply in sanitation with their impacts on health. A very helpful bibliography is also included.

It is also interesting to know that World Bank publishes a shortened version of the book as a World Bank paper entitled, "Village Water Supply," March, 1976, 96 pages.

- R. Worldwatch
1776 Massachusetts Avenue, N.W.
Washington, D.C. 20036

- G. T Eckholm, Erik, The Other Energy Crisis: Firewood (Worldwatch paper #1), 1975.

The paper is adapted from the author's book, Losing Ground: Environmental Stress and World Food Prospects.

Rising prices of petroleum creates special problems for third world energy needs. As a result, pressures have been increasing recently on firewood and other forest resources. The pamphlet considers possibilities and problems in large scale reforestation policies from political, cultural, and administrative perspectives

- G. T Hayes, Denis, Energy: The Solar Prospect, Worldwatch paper #11, 1977.

This booklet complements Eckholm's discussion of firewood problems. It explores possibilities for adaptation of solar energy. For those interested in more information on the topic, the author has also published a book entitled Rays of Hope.

- G. T Eckholm, Erik and Lester R. Brown, Spreading Deserts: The Hand of Man, Worldwatch papers #13, 1977.

This booklet was prepared for the United Nations conference on desertification and presents an overview of the global nature of the desertification problem as well as food prospects in semi-arid regions.

- ↳ T Eckholm, Erik, The Picture of Health: Environmental Sources of Disease, W.W. Norton, 1977.

To be published in November, 1977, the book describes problems of malnutrition, poor sanitation, and the resultant problems in public health. Chapters explore relationships between water pollution, air pollution, and other environmental problems in both the industrialized and developing world and their relationships to health problems.

S. Assorted Books and Papers

- ↳ Dasman, Raymond R., John Milton, and Peter Freeman, The Ecological Principles for Economic Development, John Wiley and Sons, Ltd, 1973.

One of the basic books in the field of environment and development.

- ↳ T Feachem, Richard, Michel McGarry, and Duncan Mara, Water, Wastes, and Health in Hot Climates, John Wiley and Sons, 1977.

Twenty papers are subsumed under titles of Health and Water Quality, Water Supplies for Low Income Communities, Institutional Development, Sanitation, and Effluent Re-use and Reclamation. The volume is full of specific references to technologies, approaches, and social implications and is a very helpful basic source in the area of water and health.

- T International Institute of Rural Reconstruction and the Philippine Rural Reconstruction Movement, Rural Reconstruction and Development, Frederick A. Praeger Publishers, 1967.

The book recommends guidelines for field workers and focuses particularly on agricultural problems and environmental questions, including sanitation.

- T ReVelle, Charles and Penelope ReVelle, Source Book on the Environment: The Scientific Perspective, Houghton Mifflin, 1974.

Organized alphabetically by environmental problems, the book presents information on strip mining, water pollution, pesticides, etc. Although focussed largely on problems of industrial and urban development, sections also include helpful material for developing countries. It is of particular interest because of its topical approach and serves as an excellent handbook for people in need of specific environmental advice. Strongly recommended.

G-T White, Gilbert F., David Bradley, and Anne White, Drawers of Water: Domestic Water Use in East Africa, the University of Chicago Press, 1972.

The volume is addressed to decision makers in water development. Two concerns are expressed: (a) the quantity and quality of water supplies and, (b) the social desirability and political feasibility of water supplies. A variety of study locations are considered including both rural and industrialized portions of East Africa. Detailed information includes maps, tables, and photographs. The book is also concerned with the process of development and urges that improved water supplies require user participation in the design, construction, and operation of the system.

T Wiener, Aaron, The Role of Water in Development: An Analysis of Principles of Comprehensive Planning, McGraw-Hill, 1972.

The book is about both planning and water. Topics treated include basic planning, methodologies, water resources management, and case histories of special problems drawn from Israel, and other semi-arid regions. Emphasis tends to be on capital intensive activities but does not preclude smaller scale technology.

III. INFORMATION SYSTEMS

In recent years, large amounts of data have been summarized and placed in forms accessible by computer search techniques. Because these several systems are quite new, and in many cases little known outside the circle of immediate specialized users, brief descriptions are provided here for information systems which are of direct pertinence to environmental assessment.

A. United States Agency for International Development

Contact person: Maury D. Brown, Acting Director
Development Information Service
Department of State
Agency for International Development
Washington, D.C. 20523

Probably the most satisfactory information system available to AID is AID's own Development Information Service. DIS is equipped to provide AID project abstracts as well as to assist in preparing Project Identification Documents for more accurate and more thorough information system use. AID information packages are described below:
(1) "quick response," containing descriptions and evaluations of past-related AID projects by issues and problems, and other possible information sources, or (2) "full package," containing the "quick response" with current literature and evaluation summaries, technical background materials, as well as contact individuals and institutions.

B. Department of Energy Information System

Contact person: Dora Maneyhun
Technical Information Center,
Science & Technology Branch
Department of Energy
P.O. Box 62
Oak Ridge, Tennessee 37830

DOE-RECON is the information system of the newly formed Department of Energy. As a service to users RECON also contains the Department of Interior's Water Resources Scientific Information Center data base (WRSIC). Both RECON and WRSIC make available titles, authors, summary abstracts of professional literature, and project evaluations on energy and water.

- C. National Technical Information Service
5285 Port Royal Road, Springfield, Virginia 22161

NTIS is the dissemination agency for all federally generated data from government sponsored research, development, and engineering projects as well as materials prepared by contractors or grantees. Nearly two dozen federal agencies, other national state and local government organizations and private entities are registered with NTIS. A catalogue describing NTIS and user charges is available from the Springfield, Virginia address.

- D. United States International Environmental Referral Center
United States Environmental Protection Agency
402 M Street, S.W.(Room 2902 WSM), Washington, D.C. 20411

UNEP/IRS is the information system of the United Nations Environment Program (Nairobi), with the EPA acting as local contact for the United States. Written requests will elicit names of institutions and other types of resources, but UNEP/IRS does not supply actual project data or analyses.

- E. AGRICOLA
National Agricultural Library
Beltsville, Maryland 20705

AGRICOLA is the cataloguing and data base of the National Agricultural Library. International journals and monographs on agricultural subjects are on file. AID users have access to AGRICOLA via the AID Development Information Service.

- F. Commonwealth Agricultural Bureaus
Farnham House, Farnham Royal
Slough, SL2, 3BN, ENGLAND

CAB abstracts is based on the Commonwealth Agriculture Bureau's collection which includes more than 8500 journals in 37 languages. CAB includes significant papers, abstracts and extensive bibliographies dealing with biological and agricultural information. Accessed through computer searchers and research libraries.

- G. Food and Agricultural Organization
Library and Documentation Division
Rome

FAO maintains a bibliographic search service for food and environment - related questions. There is a modest user charge.

- H. Volunteers in Technical Assistance, Inc.
3706 Rhode Island Avenue
Mt. Ranier, Maryland 20822

VITA provides technical information and development projects to anyone who writes. Although environmental considerations are not a primary concern for them, they have considerable experience in small-scale and intermediate technology and can put individuals in touch with an impressive number of resource persons, many of whom have substantial field experience in Asia, Africa and Latin America. Moreover, VITA publishes a large number of technical manuals for small-scale technology projects

- I. International Union for Conservation of Nations
and Natural Resources
1110, Morges, Switzerland

IUCN is an organization of sovereign states, government agencies and non-governmental organizations. Its purpose is to determine scientific priorities for conservation action by maintaining a global network of scientists concerned with threatened species, protected areas, ecology, environmental planning, environmental policy, law and administration, and environmental education. The IUCN publications program includes titles in ecological guidelines for development, regional conservation, as well as environmental law and policy. A publications catalogue is available by writing to the address above.

IV. UTILIZING LOCAL RESOURCES

A guide to resources is incomplete without some reference to the very considerable data base that already exists for environmental considerations for almost any part of the developing world. The problem is most often knowing where to obtain the information and how to assess its value. This check list is presented as an initial attempt to generalize what is often very particular to each country. The premise for each of our suggested five data categories is that some environmental information likely exists in the country in map or air photo form, in statistical form, and in people's minds. Each of these sub-sets of data could usefully be tapped to provide a background picture for a particular project as well as the larger social/physical setting within which individual projects reside.

| <u>Type of Information</u> | <u>Source</u> | <u>Where Usually Obtained</u> |
|--|---|--|
| General topography and drainage | 1:50,000 or 1:63,360 maps; 100,000 maps less effectively from smaller scales. | Department of Surveys, Map Sales Office, Department of Lands, Department of Natural Resources, University library. |
| Water supplies and climate patterns | Weather data, surface water, flow data, ground water, local recollections and experience. | Meteorological Office - Central Statistical Bureau, Hydrology Division of Ministry of Water and Power, Geological Survey, Ministry of Natural Resources, interview and discussion. |
| Vegetation and land use | Land use maps, vegetation maps, air photos, LANDSAT or other imagery. | Department of Surveys, Department of Natural Resources, university (Dept. of Geography), Department of Surveys NASA. |
| Soils and agricultural productivity | General soil maps, local soil maps, research station data. | Department of Surveys, Department of Natural Resources, Regional/Provincial agricultural office, local or regional extension station. |
| | Local people. | Local agricultural officer, interview and discussion. |
| Environmental problems such as health, soil erosion, devegetation, pests, air/water pollution, salinization. | National or regional overview reports, health data, local or regional technical officers. | Environmental Secretariat or similar body, university, national and regional health statistical offices, in regional and district headquarters, by papers, and by interview. |
| | Local people. | Interview and discussion. |