

TRAINING IN ENVIRONMENTAL PLANNING AND MANAGEMENT FOCUS ON INLAND WATERS

Report and Summary of
the UNCRD/ILEC/UNEP Joint Expert Group Workshop on
Environmental Planning and Management for
Local and Regional Development: Focus on Training Aspects
Derived from Studies of Inland Water Management

Otsu and Nagoya, Japan, 10-21 November 1986



UNITED NATIONS
CENTRE FOR
REGIONAL DEVELOPMENT



INTERNATIONAL
LAKE ENVIRONMENT
COMMITTEE



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PREFACE

This report presents the results of the Expert Group Workshop on Environmental Planning and Management for Local and Regional Development: Focus on Training Aspects Derived from Studies of Inland Waters, held in Otsu and Nagoya, Japan from 10 to 21 November 1986 under the joint sponsorship of the United Nations Centre for Regional Development (UNCRD), the International Lake Environment Committee (ILEC), and the United Nations Environment Programme (UNEP).

The workshop was convened with a view to providing an interdisciplinary basis for discussion on key issues of environmental planning and management (EPM) in the context of local and regional development as well as providing a forum for delineation of guidelines for developing training programme on EPM.

This report summarizes a variety of expert opinion and analysis providing a survey of the concepts as well as the current practices of EPM with special focus on management of inland water resources and river/lake basins. The report also establishes the need for strengthening manpower capability for EPM in developing countries and provides suggestions as to appropriate approaches for organizing training programmes on EPM.

We wish to acknowledge with deep gratitude the contributions of all those who have been involved in the workshop, whether in presenting and discussing the resource papers and case studies, serving as chairpersons and rapporteurs, or providing other support, without whom the workshop could not have been successful.

It is clear that we have succeeded in bringing together experts representing diverse disciplines and professions who generated new ideas and debate, and advanced the frontiers of our understanding of the problems in training planners and administrators in EPM. Much however remains to be done and we hope that the work initiated at the workshop will be continued. In particular, decision makers and planners in developing countries need technical support to help them overcome the problems and issues in promoting integration of environmental considerations in the process of local and regional development.

We hope that this report will serve as a useful reference, especially for those involved in environmental planning and management.

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Director, UNCRD

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Chairperson, ILEC

April 1987

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PART I:

GUIDELINES FOR DEVELOPING TRAINING PROGRAMMES ON
ENVIRONMENTAL PLANNING AND MANAGEMENT FOR LOCAL AND
REGIONAL DEVELOPMENT: FOCUS ON INLAND WATERS

Expert Group Workshop on Environmental Planning and Management for Local
and Regional Development: Focus on Training Aspects Derived from Studies
on Inland Waters

Otsu and Nagoya, Japan
UNCRD/ILEC/UNEP
10-21 November 1986

FOREWORD

An Expert Group Workshop on Environmental Planning and Management (EPM) for Local and Regional Development: Focus on Training Aspects Derived from Studies of Inland Water Management was held in Otsu and Nagoya, Japan from 10 to 21 November 1986 under the joint sponsorship of the United Nations Centre for Regional Development (UNCRD), the International Lake Environment Committee (ILEC), and the United Nations Environment Programme (UNEP).

The workshop was attended by thirty-four participants representing diverse disciplines and professions from sixteen countries from Africa, North and South America, Asia, and Europe.

The general purposes of the workshop were:

- (1) Examine the major issues involved in current practices in environmental planning and management for local and regional development;
- (2) Discuss and explore alternative methods and approaches that will facilitate improved integration of environmental considerations into the development process at the local and regional levels;
- (3) Identify the role of development planners and environmental managers in promoting environmentally sound development and work out guidelines for developing training programmes on environmental planning and management for local and regional development which can be initiated not only by international organizations like UNCRD, ILEC, and UNEP, but can also be implemented by the concerned developing countries; and
- (4) Deliberate on issues related to the development of international and national training courses in the field of environmental planning and management for local and regional development.

This Guidelines is an immediate result of the workshop. It is the synthesis of the deliberations and reports of three working groups organized at the Nagoya portion of the two-week workshop.

We hope that the Guidelines will prove useful to those engaged in this new and important field of strengthening manpower capability for EPM in developing countries and we welcome comments and suggestions for its improvement.

GUIDELINES FOR DEVELOPING TRAINING PROGRAMMES ON ENVIRONMENTAL
PLANNING AND MANAGEMENT FOR LOCAL AND REGIONAL DEVELOPMENT:
FOCUS ON INLAND WATERS

I. INTRODUCTION

A. Why EPM?

1. Due to population pressure and the onset of industrialization, a number of developing countries are at present experiencing serious environmental degradation in terms both of depletion of natural resources and pollution.
2. The impact of such environmental degradation is felt most severely at local and regional levels.
3. Developing countries experiencing serious environmental degradation should, therefore, give priority attention to preparing and implementing regional and local level development plans that systematically provide for the improvement of their environmental situation, along with immediate and sustained improvements in levels of living in the concerned areas.

B. What is EPM?

1. Ecosystems often have to be deliberately transformed in order to bring about improvements in the quality of life of the people. Environmental planning and management of regional and local development ensures that irresponsible damage to the environment is avoided and that the gains in living standards remain sustainable.
2. In the context of the regional development planning process, EPM may be viewed as a programme of activities designed to (1) assess environmental consequences of different development alternatives with adequate representation of costs and benefits; (2) resolve conflicts and allocate the use of environmental and natural resources between sectors and over space and time; and (3) direct, control and manage development activities in ways appropriate to the environment.
3. Typically, EPM consists of four stages:
 - (1) Diagnosis and prognosis -- diagnosis of existing problems and prognosis of potential future concerns, and formulation of environmental management goals and objectives;

- (2) Plan formulation -- formulation of environmental management policies and measures that have long-term perspective, consider spatial and sectoral interrelationships, and that are coordinated among major actors in the development processes;
- (3) Plan implementation -- implementation of environmental management policies and measures through government intervention; and
- (4) Monitoring and evaluation -- monitoring of environmental consequences of policy implementation, evaluation of results against established objectives, and feedback to any of the above stages, if the evaluation indicates the need for corrective action.

C. How is EPM Carried Out?

1. Any strategy of integrating environmental considerations into regional development has to address three major tasks:
 - (1) Control and abatement of environmental degradation caused by past development, or lack of it;
 - (2) Optimal use of environmental resources to achieve specific development goals; and
 - (3) Restoration and enhancement of the environment to ensure sustainability of development.
2. Action for environmental planning and management of regional development has to be supported first and foremost by a system of interrelated laws dealing with aspects of:
 - (1) Conservation of natural resources;
 - (2) Land use planning;
 - (3) Environmental pollution control and compensation responsibility;
 - (4) Institutional and administrative management for integration of environmental considerations into development planning at various levels; and
 - (5) Financial framework to facilitate other processes.
3. At the same time, traditional approaches to gathering and analysing environmental information at local and regional levels have to be strengthened in order to make regional development more environment conscious. Data on natural resource endowments and changing states of the environment need to be collected and analysed in detail. The processing, interpretation, and presentation of data should be

done in such a manner as would facilitate decision making among alternative courses of regional development. Here, universities and research institutions need to be actively involved.

4. Establishment of information systems, legislation, institutions and administrative procedures themselves do not guarantee that environmental considerations will be integrated in regional development in the developing countries. A third and perhaps most important ingredient is still necessary and must be secured; namely, there has to emerge a coalition of interests at local, regional, and national levels to pursue, in unity, development goals for the benefit of all.
5. An appreciation of societal dynamics of the government (national, regional, and local) and the private sector is crucial to optimize the use of EPM in the development process.

D. Why Focus on Inland Waters?

1. Comprehensive analysis of environmental implications of development alternatives at the regional level, while desirable, may not yet be feasible in the developing countries. This is mainly because relatively few countries have adequate manpower in terms of trained professionals, planners, and administrators who can analyse, plan, initiate, implement, and manage programmes and projects which aim to establish environmentally sound development.
2. A gradual approach may be appropriate, which should, for example, encompass in specific areas:
 - (1) Coordination of management of major environmental problems as they have arisen in the course of development; and
 - (2) Coordination in the use of environmental resources entailed by development initiatives in various sectors.

Systematic consideration of the environment in this process will be facilitated by analysing the issues and implications involved in relation to the relevant ecosystem as well, e.g., a river basin or a watershed.

3. Water is not only one of the most indispensable resources for human life, but also performs multiple functions for as many conflicting uses. It is logical and appropriate that any major effort to strengthen the capacity in promotion of EPM should start with this resource. Indeed, a major challenge we face today is how to secure the concerted efforts of experts from a wide variety of disciplines to ensure the long-term benefits of water-related ecosystems.

4. Water-related issues and problems, moreover, differ from one locality to another as they emerge through the interactions among the whole range of human activities in the region-specific socioeconomic context. Thus, the issues of water resources development and management, being multi-dimensional in character, can provide a powerful and empirical basis for determining what can be done to strengthen the capacity for promotion of EPM in a broad-based manner.

II. NEED ASSESSMENT PARAMETERS CHECKLIST FOR MANPOWER DEVELOPMENT PROGRAMMES FOR EPM

A. Introduction

1. Manpower development is the most important essential issue to establish the institutional mechanisms with administrative, technical, scientific competence for EPM. Ideally, manpower development programmes for EPM are an integral part of the national human resource development plan. Nowadays, however, only a few countries have a plan for human resource development to complement the national economic plan. This is a problem which can only be successfully met with the full assistance of technical cooperation agencies -- international, regional, or bilateral.
2. In instituting a national manpower development programme for EPM for any particular country, the following points must constantly be kept in mind:
 - (1) The structure, pattern, and distribution of environmental problems are influenced by those complex interrelations among population, resources, development and environment.
 - (2) There is a wide spectrum of human environmental problems which provide the definition of scope, goal, objective, and target for environmental planning and management in the given time, place, and occasion.
 - (3) The priority of the policy direction depends on needs, urgency, and demand with public awareness in the scope of development.

While these factors highlight variability of environmental problems and variability in priorities among countries, nonetheless, a common frame for analysis could be utilized in recommending country-specific manpower development programmes for EPM.

3. It is in this context and in order to achieve a systematic and comprehensive approach in formulating a manpower development programme for EPM, that this Needs Assessment Para-

meters Checklist has been prepared. It is envisioned that the Checklist will be of assistance to national planners and technical cooperation agencies.

4. Caveat! While the headings have been arranged from the general to the specific, there is no intention to rank or give more importance to any factor in relation to the others. Nor is there an intention to suggest where to begin, i.e., which factor should be considered first. The checklist will not necessarily yield a manpower development programme for EPM. In short, the checklist should be viewed, which it is, as only an aid to designing a national manpower development programme for EPM.
5. The checklist covers six broad headings, namely:
 - (1) Sociopolitical aspects;
 - (2) Legal and institutional framework;
 - (3) Available national resources with respect to EPM;
 - (4) State of available environmental management instruments;
 - (5) State of environmental technologies; and
 - (6) State of available human resources for EPM.

B. Need Assessment Parameters

1. Sociopolitical aspects:
 - * Political climate
 - * Government priorities:
 - national development plan
 - priority structure of government programmes
 - organizational dynamics of the local, regional, and national agencies and institutions
 - * State of local and regional development
 - * Level of environmental awareness of the public - NGO - media - industry
2. Legal and institutional framework:
 - * Environmental legislation -- laws, rules, regulations
 - * Legal enforcement and regulation
 - * Institutional set-up

- * Procedures for planning and implementation
 - * Available means of conflict resolution
3. Available national resources with respect to EPM:
- * Institutions responsible for integration of EPM in development
 - * National and local financial resources available at:
 - Environment agency
 - Natural resources agencies
 - Economic/development planning agency
 - * Data generation and handling capabilities
 - * Monitoring/assessment capabilities
4. State of available environmental management instruments:
- * EIA procedures
 - * Land use planning and land use control measures
 - * Economic incentives and disincentives, etc.
5. State of environmental management technologies:
- * Pollution control
 - * Excreta and solid waste disposal
 - * Reforestation techniques
 - * Land management technologies, etc.
6. State of available human resources for EPM:
- * Educational system -- universities, research, and technical institutes, etc.
 - * Public personnel system and practices -- recruitment, placement, promotion, in-service training, etc.
 - * Professional bodies
 - * Existing training schemes under international/regional/bilateral cooperation.

III. STRATEGIES FOR DEVELOPING TRAINING PROGRAMMES

A. Introduction

1. Training is considered as a deliberately planned learning process for improving people's job performance. Hence, EPM training can never be separated from the occupational context in which planners and administrators work. The social, economic, political and administrative conditions which determine the occupational context in developing countries must be taken into account when formulating and implementing training programmes in EPM.
2. In establishing training programmes, the objectives should be clear, practical and attainable:
 - (1) Clear - vague objectives leave excessive discretion to administration and management;
 - (2) Practical - the objectives should be based on actual, not assumed training needs; and
 - (3) Attainable - the objectives should be attainable, not ideal given the limited availability of manpower, technical, institutional, and information resources.
3. The content and method of, and approach to training cannot be overemphasized. The success of a training programme can only be gauged by its relevance to existing and future needs.
4. Active learning ("learning by doing") is a must for action-oriented training, because a mastery of skills essential for problem solving cannot be acquired without "sweat."
5. EPM training programmes should be designed to achieve multiplier effects in ways that with the information, knowledge, and skills acquired, training participants themselves become agents of change as well as trainers.
6. Institutions engaged in activities like teaching, research and/or consultancy, conduct training as well. Considering costs, and the receptiveness and readiness to carry out training programmes, these existing institutions should be tapped.

B. Target Groups

1. Framework
 - (1) A general framework on meeting the training needs for EPM for local and regional development is shown in Table 1. The framework consists of a matrix with

columns denoting the training target groups (more of loosely setting limits to roles which in reality encompass a range of influence within the spectrum of functions).

- (2) The framework recognizes the importance of understanding dynamic inter-relationships among population, resources, development, and environment.
 - (3) It also recognizes the interfacing of roles within the spectrum of administrative functions for planning and coordination in order to integrate EPM in local and regional development.
2. Target groups of EPM training in developing countries principally range from technical staff, through mid-career planners and administrators, to policymakers and even politicians responsible for formulating and implementing policies and programmes aimed at environmentally sound development.
 3. The principal target groups of training programmes in EPM should be those groups which serve as the essential multipliers within their countries and institutions, such as environmental managers, development planners, and administrators, who, in many cases, are to serve as trainers in imparting the necessary skills, knowledge, and attitude to their staff in promoting environmentally sound development at the local and regional levels.
4. Interfacing
 - (1) EPM training should be addressed to the whole range of groups from government policymakers down to technical staff. These are the target groups which in different capacities interface in varied degrees with other groups from universities, R&D institutes, industries, and local communities.
 - (2) Participation of various other interfacing sectors in some or all portions of the training are desirable. These sectors include the NGOs (including PVOs), professional organizations and societies, media and communication groups, and popular movement groups.
5. Role, Orientation, and Project Involvement
 - (1) Potential training participants will come from many disciplines and educational backgrounds. They also will come from different institutions which may have mainly sectoral concerns on one hand and relatively well-integrated environmental functions on the other.
 - (2) The role of the different target groups must be realized in terms of providing each group with a defined

TABLE 1. A GENERAL FRAMEWORK FOR IDENTIFYING THE SCOPE AND TARGET GROUPS OF TRAINING IN ENVIRONMENTAL PLANNING AND MANAGEMENT FOR LOCAL AND REGIONAL DEVELOPMENT

Scope of Training	Policy	Policy Administration	Administration	Administration Sectoral Programme	Sectoral Programme- Technical Programme	Technical Programme- Science	Science
Orientation Stage Phase Role	Policy Maker - - - - - --Senior Administrator- - - Development Planner - - Administrator - - - - - - - - Technical Officer - - - - - - - - Technical Staff - - - - -						
Demography: Social Change Environmental Burden							
Background: Geography Ecology Culture							
Resources: Demand/Supply Quantity/Quality Distribution Sustainability							
Development: Methodology Risk/Cost/Benefit Environmental Implications							
Technology: Physical Chemical Biological							
Environment: Infrastructure Assessment Conservation Programme Management							
Administration: Law, Jurisdiction, Budget, Finance, National/Regional/Local Information Data System Instrument Institutional Mechanisms							
Sectoral Programme with Environmental Implications: Urban/Rural Community Development Agriculture, Forestry, Fishery, Mining, Manufacturing, Energy, Water, Dam, Transport, Tourism, etc.							
Development Process & Dynamics: Information Media, Education, Decision Process, Procedures, Publics/Government/ Industry Relations, Technology/Perception							

Source: Adopted from M. Hashimoto, "Manpower Development for Environmental Planning and Management in Developing Countries" (Paper presented at the Expert Group Workshop on Environmental Planning and Management for Local and Regional Development: Focus on Training Aspects Derived from Studies on Inland Water Management, Otsu and Nagoya, Japan, 10-21 November 1986: UNCRD, ILEC, and UNEP).

scope of training. Role and orientation of the individual training participant must be appreciated.

- (3) The experiential background is also definable in terms of the individual training participant's involvements in development programmes/projects at different stages/phases or over the entire planning cycle.
- (4) At least one training participant should come from the national environmental/pollution control agency, and the national development planning agency, initially. Subsequently, training participants should come from regional offices of these agencies and the government sectoral ministries/departments, always in groups of two or three from each country.

C. Training Contents

1. Determination of the Desirable Level of Exposure to EPM

- (1) This will depend on the disciplinary background of the participants as well as the level of advancement in the integration of EPM by the countries represented by the participants.
- (2) The priority structure of the government programmes is a good indicator of the gap between what the country is doing with EPM and what it ought to aim to achieve for the integration of EPM into its development plans.
- (3) Examination of the alternative environmental management approaches, including adoption of EIA procedures and other administrative and legal opportunities for environmental management, will also indicate the necessary level of exposure.
- (4) Analysis of the regional as well as national characteristics of the priority environmental concerns will indicate the major areas of concentration necessary, e.g., public health, forest management, water resource management, disaster control, pollution control including wastes management, etc.

2. Scope and Orientation

- (1) The development of training content in the interest of improving management skills and building on available human resources and institution capability should address, among others, the following issues:
 - (a) Enhancing ability to integrate EPM in the development planning cycle

- (b) Need for incorporating scientific bases for EPM
- (c) EPM implementation
- (d) Touching on human quality aspects and other intangible considerations.

In the EPM training concept, all target groups need to be exposed to the block of information and knowledge embodied in the training content.

(2) Orientation of Training

- (a) Development and environment in a regional context;
- (b) Problem-solving;
- (c) Oriented to action and practice;
- (d) Oriented to improve management skills;
 - Technical management
 - Social interaction management (conflict resolution)
 - Training management
- (e) Social dynamics (i.e., appreciation of the incessant interactions among administrators, scientists, and the people as these weigh on responsibility-laden public decisions) and value of public participation (or local community participation);
- (f) Appreciation of available national resources for manpower development (e.g., initiating joint programme between government and educational institutions for scientific and technical problems in EPM) and aiming for institution-building;
- (g) Decision making with an appreciation of the scientific bases given the limits in data availability and capability of data generation;
- (h) Ecosystem approach, with focus on inland waters.

(3) The next four sections include priority training areas, statements clarifying the intentions mentioned above, and recommend decision tools relevant to EPM training. Figure 1 shows the scheme for training content.

Figure 1. Training Content Scheme



3. Enhancement of Ability to Integrate EPM in the Development Planning Cycle
 - (1) Introduction/review/instruction of policy analysis methods including some of the basic MIS techniques and elaboration on the planning cycle
 - (2) Resource assessment methodologies and procedures
 - (3) Overview of EIA methodologies and applications
 - (4) Decision-making process, decision-making criteria, decision analysis methods
 - (5) Prioritization of resource allocation and programme execution arrangements
 - (6) Development of alternative options and assessment of their possible consequences
 - (7) Feasibility assessment methodologies and procedures
 - (8) Examination of resource mobilization possibilities
 - (9) Cost implications, cost analysis methods, and other aspects of costing
 - (10) Benefit assessment methods
 - (11) Risk assessment and management considerations

- (12) Incorporation of accountability into execution of projects as well as evaluation of the degree of accountability achievement
 - (13) Assignment of tasks to agencies and individuals as well as associated responsibilities
 - (14) Methods of coordination interface with academic and research institutions, NGOs, industry, media, and citizen groups
 - (15) Monitoring, evaluation and assessment activities in relation to EPM integration into development programmes including infrastructure development
 - (16) Public participation and education methods
 - (17) Proper management of data, skillful use, analysis, and presentation of available data to different types of audiences
 - (18) Policy instruments for environmental management
4. Emphasizing the Need for Incorporation of Scientific Basis for EPM
- (1) The message should be the "ecosystem approach"
 - (2) The presentation of this subject must aim at convincing the need as well as the usefulness of the ecosystem approach by taking an actual case and taking the participants through the entire sequence of analysis. It must be shown that scientific management strategies can be developed by properly reflecting the analysis results and their implications for policy development and implementation activities.
 - (3) Proper management of the data pertaining to the physical system is the first step for the development of EPM strategies. These data are mainly for the purpose of describing the functional relationships between the anthropogenic alterations and the ecosystem (Annex 1).
 - (4) EPM is a complex process involving assessment not only of natural science data but also data pertaining to social, economic, and cultural aspects of human activities interacting with the system under consideration. Together with physical system data, socioeconomic and sociocultural data fulfill part of the inputs for decision analysis.

- (5) Data evaluation and interpretation are very subject-specific and require understanding of the particular situation. Useful tools as well as basic principles applicable to data evaluation and interpretation are discussed elsewhere (e.g., Global Environmental Monitoring System (GEMS) documents).
- (6) Data and information management considerations consist of the following:
 - (a) The usefulness of scientific data increases with the duration of data collection. The implementation of appropriate time frame of data collection must be assured.
 - (b) Generation of reliable data consists of standardization and intercalibration of techniques, as well as analytical quality control.
 - (c) Storage, retrieval and dissemination of data are important steps leading to utilization that must be given important consideration.
 - (d) The importance of devising a system balancing the protection of the original sources of data and information with maximum utilization, particularly when they are generated/collected using public funds.
- (7) The logistical aspects of managing an applied inland water survey or study should be emphasized. The aspects are staffing, financing, institutional development and coordination. Various positive and negative experiences in sectoral limnological or water quality projects may be introduced most usefully in the training course.
- (8) Observation techniques suited to incorporate grassroots level realities which may have a deep bearing on the development planning process.

5. Examination of EPM Implementation Issues

- (1) Implementation of EPM programmes face many difficult obstacles, some of which are common to all and yet others are not. Many of the major issues will have to be reviewed and successes and failures examined.
- (2) Specific attention may be directed to the role of the public (local community), its mode of involvement, methods of facilitation including coordination, education, and communication strategies successfully adopted.

- (3) National situation reports on EPM (country reports) ought to be included as part of the course material. They may be prepared and distributed to resource persons and participating members before the workshop to minimize reduction of presentation time during the workshop. One or two of the country cases may be used for further elaboration by the resource persons as well as participating members during the courses.
 - (4) Similarly a regional EPM status report could be prepared to show the status of resource exploitation, development status, status of apparent as well as hidden adverse impacts, etc., to be used for further elaboration during the course.
 - (5) Gaps in policy decisions and science in many societies make implementation difficult. In principle, environmental issues may be resolved by the skillful utilization of scientific study, administrative decision making and popular movements (ideally, popular support).
6. Touching on Aspects of Human Quality and Other Intangible Considerations
- (1) The message should be "we all have the same objective -- human welfare in proper balance with nature" and in that sense development and environment do not conflict. It is the mutual understanding and collective commitment, which rest much on basic human qualities of those involved.
 - (2) Many of the intangible considerations may be brought up in the light of human interactions (social dynamics) rather than in procedural and/or methodological contexts.
 - (3) Some of the issues which may come under this subject category may include attainment of sense of balance, use of common sense, influencing individuals and organizations, motivating the less-endowed.
 - (4) Strengthening of political will may be introduced in this context also.
 - (5) Sociocultural considerations may play an important role in development projects with environmental repercussions and therefore due attention to this matter is important.
 - (6) In order to obtain the desired efficacy of policies related to the environment as any type of policy, these policies must be well-reasoned and well-articulated.

- (7) Public decisions may fail due to:
 - (a) decisions being made without full analysis;
 - (b) the decision-making process being hidden from the public.

- 7. The above highlights of training content may be incorporated in training modules that could be used to put the training into operation. Depending on a number of factors already mentioned, the training modules may be adjusted accordingly. Sample modular topics are given in Annex 2.
- 8. Possible training techniques or instructional methods that can be used in combination are the following:
 - (1) Group discussions
 - (2) Project case work
 - (3) Problem-solving exercises
 - (4) Study tours
 - (5) Workshops
 - (6) Group dynamics
 - (7) Formal lectures by resource persons

D. Training Approach and Methods

- 1. The quality of training depends on the relevance of training inputs and outputs. The following may be considered as criteria for relevance:
 - (1) Relevant knowledge and skills for problem solving

The field where knowledge and skills for problem solving (understood in the widest sense of the words) is required is not the laboratory or university but the local community with the accompanying circumstances.
 - (2) Adjustment to local/regional conditions

The local/regional setting must be appreciated. Cultural sensibilities are heightened in a foreign setting on one hand. On the other hand, local and in-service training can facilitate suitable training procedures that reflect local conditions acquiring an indigenous character.

(3) Articulation of constraints

Whereas opportunities must definitely be recognized, conditions that tend to pull down planned changes must be clearly realized and work started thereon.

(4) Predisposition to project management

Project management suits most planning situations in LDCs. Project management is the pulling together:

- of investments of scarce resources
- in temporary organizations (organizational settings)
- for specified goals
- within specified time
- under constraints.

2. In view of the above, and considering that active learning is desirable, "learning by doing" is a relevant approach to EPM training. This approach is considered particularly suitable for training the middle to senior level planners and administrators, who are found capable of doing follow-ups and becoming trainers themselves. To this end, the project case work method (PCW)^{1/} is suggested. Underlying theme and main features of the PCW method are given below:

(1) Theme: transforming problem assessment into action for problem solving.

(2) Features:

- (a) Based on or structured along intensive PCW in small groups.
- (b) PCW forms a dominant and central part.
- (c) As PCW progresses, the needs dictate the direction, location, and sequence of inputs.
- (d) Requires active participation.

^{1/} Adopted from G. Tharun, "Approaches and Methods of Training in Environmental Planning and management" (Paper presented at the Expert Group Workshop on Environmental Planning and Management for Local and Regional Development: Focus on Training Aspects Derived from Studies on Inland Water Management, Otsu and Nagoya, Japan, 10-21 November 1986: UNCRD, ILEC, and UNEP).

(e) Exercises prepare training participants mentally for real action.

(f) Oriented towards practice and problem-solving.

A model training package using the PCW method/approach is given in Annex 3.

3. Training-the-trainer Component

This is another way of seeking the multiplier effect. Additional training hours may be seen as appropriate. Being basically a kind of management training, EPM-oriented training must also include human interaction measures as a supportive function. Such measures include:

(a) Negotiating

(b) Coordinating

(c) Motivating

(d) Neutralizing (adverse impacts)

(e) Leading

4. Preparation of Case Studies

(1) Case studies will mentally attune training participants to recurring themes in EPM and will provide springboards for discussion.

(2) It is a must for training participants to exert efforts in being able to understand their own administratively-related environmental problems before attempting to solve them.

(3) It is a must for training participants to invest some time towards doing brief case studies with concise and synthesized information appropriate for a forum on EPM for local and regional development.

(4) A key point during presentations is to put emphasis on being able to communicate facts and data covering a wide perspective of EPM in the local/regional situation.

E. Institutional Network

1. Several advantages can be achieved by utilizing existing institutions dealing in one way or another, partially or fully, with the environment. On-going and future programmes of these institutions may be related to projected activities in connexion with the training programme for EPM.

2. The institutional network is in three levels, structurally:
 - (1) United Nations Environment Programme (UNEP) and the emerging subregional programmes
 - (2) National institutions
 - (3) Other international organizations

3. The UNEP, implementing the recommendations of the 1977 Tbilisi Intergovernmental Conference on Environmental Education, which was organized with the collaboration of UNESCO, has three subregional programmes. The programmes are one for the Southeast Asian countries (ASEAN Environment Programme or ASEP), another for the South Asian countries (South Asia Co-operative Environment Programme or SACEP) and a third for the South Pacific countries (South Pacific Regional Environment Programme or SPREP).
 - (1) At the subregional level, a network of universities, training and other tertiary level institutions has been made operational, particularly for the Southeast Asian countries. Recognizing the similarity and commonality of problems, efforts can be coordinated within the subregion and cost-effective solutions implemented. (Note: A Directory of Tertiary Level Institutions Offering Environmental Education and Training Courses in Asia and the Pacific has been compiled by the UNEP Regional Office in Bangkok.)
 - (2) Resources of these subregional networks lay as a basis for assessing needs and tailoring training programmes accordingly.
 - (3) UNEP's support is very important to lend effectiveness to EPM training.

4. Administrative and technical personnel of national institutions of the central government make up the prime target groups of a training programme on EPM. Essentially, the national government institutions may be classified into:
 - development planning agency
 - environmental and/or pollution control agency
 - sectoral departments (ministries)Linkage with these government institutions make way for an accurate assessment of needs and the judicious selection of training participants
 - counterpart

5. Other international organizations provide the ever-needed link for financial, organizational, and institutional support. These organizations fulfill much related tasks encompassing development. Among these are:
 - the other agencies of the UN system (FAO, WHO, etc.)
 - development banks (ADB, WB, etc.)
 - international scientifically-oriented federations or committees (International Lake Environment Committee, World Federations of Engineers, etc.)
6. Allied activities of the UN system agencies provide opportunities for economy of action.
7. Development banks are agents of development. Their resources include economic-cum-environmental researches that have influenced most project analysis pervading the development scene in the developing countries.
8. The international federations or committees provide professional support through resource persons with broad perspectives who can be tapped to do training. The respective institutions of these professionals can also provide the updating of the state-of-the-art as well as S&T infrastructure support (equipment, know-how, human resource support, etc.).

IV. RECOMMENDATIONS

A. General

1. Two themes emerged as a suitable strategy for international technical cooperation agencies in programmes to strengthen national capabilities in EPM. These are labelled as "packaged approach" and "multiplier effect approach."
2. The "packaged approach" suggests three things, namely:
 - (1) That the programme encompass the trilogy of research, training, and advisory services;
 - (2) That the components of the programme be undertaken on a "phased approach";
 - (3) That the programme be jointly funded and carried out on a collaborative basis for at least five years to ensure lasting impact.
3. To achieve "multiplier effect" existing structures should be used wherever possible -- vital to utilize the experience and existing institutions in the country -- to encourage continuity and build up skills for the longer term. As part

of institution-building, for example, universities or research institutes may be given assistance in core teaching and provided facilities such as computer hardware and software.

4. The "multiplier effect" may also be achieved through individual change agents, e.g., via training for trainers' courses, echo seminars, etc.

B. Suggested Agenda for 1987

1. Conduct a two to three week training workshop for middle-level administrators and planners, university and research staff, and select representatives from NGOs and media in promoting EPM in Asian countries.
2. Use their good offices to secure sponsorship of a two to four month training programme on data-base for EPM in inland waters, in collaboration with appropriate Japanese institutions, based on the Functional Framework, Annex 1.
3. Serve as clearing house for studies, guidelines, laws, regulations, standards, and training materials for EPM.
4. Develop and circulate guidelines on establishing policies and strategies for EPM for consideration in two to three day policy conferences at subregional venues, e.g., ASEAN, SAARC, etc.

- 1.2 In the process of fulfilling its responsibilities it will have to receive external (societal) inputs at each respective stage of the management cycle, i.e.,
 - (1) Expression of social objectives;
 - (2) Communication on public awareness;
 - (3) Provision of long-term research funds; and
 - (4) Technology for implementation of management options.
- 1.3 There has to be clear recognition both on the part of the society as a whole and on the part of the scientific community of the role of the scientific community and the responsibilities associated with the provision of scientific inputs.
- 1.4 EPM is a complex process involving assessment not only of natural science data but also data pertaining to social, economic and cultural aspects of the human activities interacting with the ecosystem under consideration. In many developing countries the complexity is often amplified by the weakness in social and economic infrastructure development.
- 1.5 Human resources development in EPM with specific reference to developing countries, therefore, needs to give due considerations to the assessment of data pertaining not only to the physical system but also to the socioeconomic as well as sociocultural systems.
- 1.6 The development and use of socioeconomic and sociocultural data, however, depends much on the subject environmental system under consideration and will be dealt with separately.
- 1.7 Notwithstanding the importance of socioeconomic and sociocultural aspects of EPM, it is quite often serious inadequacy in the analysis of the physical system itself which lead to insufficient understanding of the alternative approaches in EPM. Proper management of the data pertaining to the physical system is the very first step for the development of EPM strategies.
- 1.8 The data pertaining to the physical system may be gathered or collected mainly for the purpose of describing the functional relationships between the anthropogenic alterations and the ecosystem.
- 1.9 There are often gaps between the desirable level of scientific analysis and the achievable level of analysis which depend very much on the resources available and the level of technical competency of the personnel involved. The data collection programme, therefore, needs to be suitably prioritized.

2. Basic Approach to Collection of Data Already Available
 - 2.1 Gathering of the readily available data will have to be the first step. A great deal can be revealed through intelligent analysis of the readily available data.
 - 2.2 Collection of data will have to be purposeful and cost-efficient.
 - 2.3 There may be minimum requirements for the data collection programme depending on the nature of occurrence of the phenomenon (e.g., regular vs. irregular phenomenon), time resolution, space resolution, etc.
 - 2.4 Seasonality is often an important consideration in data collection and interpretation (e.g. precipitation).
 - 2.5 Accessing to unconventional information sources (e.g., satellite information) may prove to be also very useful.
3. Categorization of Data by Problem Areas (Table A-1)
 - 3.1 The basic set of data necessary for the analysis of a physical system may be roughly categorized according to problem areas as follows:
 - (1) Water quality impairment
 - (2) Recreational impairment
 - (3) Fishery impairment
 - (4) Aging and reduced holding capacity and flow
 - (5) Irrigational impairment
 - (6) Salinization
 - (7) Navigational impairment
 - (8) Health hazards to coastal fringe residents.
4. Categorization of Data by Causes of Problems (Table A-1)
 - 4.1 The direct and indirect causes of problems may be categorized as follows:
 - (1) Excessive nutrient discharges resulting in algae blooms and excessive growth of macrophyte
 - (2) Inorganic and organic discharges
 - (3) Acid rain
 - (4) Turbidity and silting

TABLE A-1: PROBLEMS ASSOCIATED WITH LAKES AND RESERVOIRS

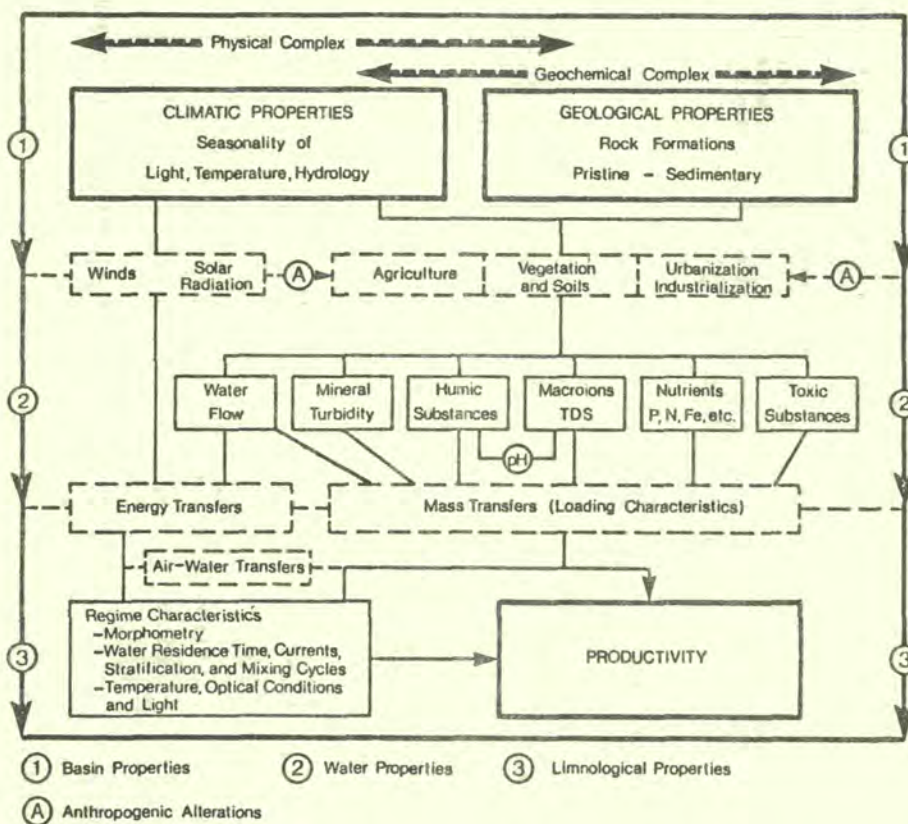
Problem Areas	Caused by, or indirectly depending on					
	Excessive nutrient discharges leading to		Inorganic and organic waste discharges	Acid rain	Others	
	Algal blooms & shifts in species composition	Excessive macrophyte & littoral algal growth			Turbidity and silting	Low dissolved solids and humic substances
(1) <u>Water Quality Impairment</u> - taste & odours, colour, filtration, flocculation, sedimentation and other treatment difficulties - hypolimnetic oxygen depletion, pH changes, Fe, Mn, Co ₂ , CH ₄ , H ₂ S - toxicity - occlusion and corrosion problems in pipes and other man-made structures	xxx	x	x	-	x	-
(2) <u>Recreational Impairment</u> - unsightliness - hazard to bathers - increased health hazards	xxx	xx	xx	x	-	x
(3) <u>Fisheries Impairment</u> - fish mortality - undesirable fish stocks	x	x	x	x	-	-
(4) <u>Aging and reduced holding capacity and flow</u>	xx	xx	xx	-	-	-
(5) Irrigation	-	xx	-	-	-	-
(6) Navigation	x	x	-	-	-	x
(7) Salinization	xx	x	-	xx	-	-
(8) Pests and Diseases Outbreak	x	xx	-	-	xx	-

Frequency and/or importance: xxx very high, xx high, x occasional, -not applicable

Provided by Dr. R. A. Vollenweider and will appear in his article, "Scientific Concepts and Methodologies Pertinent to Lake Research and Lake Restoration," Schweiz Zs. Hydrologie, 1987.

- (5) Low dissolved solids and humic substances
- (6) Thermal discharges
5. Categorization of Data in Connexion to Productivity Assessment (Figure A-2)
- 5.1 The data may be categorized into:
- (1) Physical and geochemical basin properties
 - (2) Basin water properties (soils, vegetation)
 - (3) Limnological properties
 - (4) Anthropogenic alterations

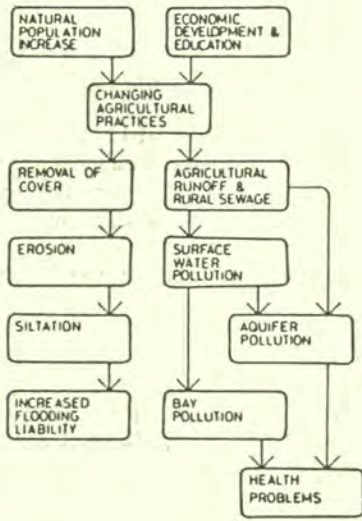
Figure A-2. The Three Levels Determining the Productivity of Bodies of Water



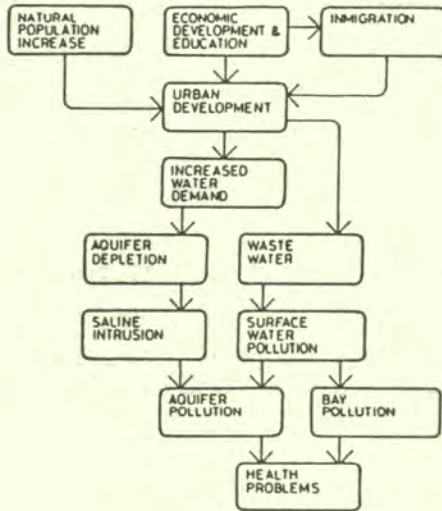
Provided by Dr. R. A. Vollenweider and will appear in his article, "Scientific Concepts and Methodologies Pertinent to Lake Research and Lake Restoration," *Schweiz Zs. Hydrologie*, 1987.

- 5.2 In addition, the following notes may be usefully provided:
- (1) For the assessment of system stability the total direct solar energy input may be computed simply by knowing the lake surface area, solar radiation intensity and the lake water temperature profile.
 - (2) Water flow data include hydrologic regime properties including precipitation.
6. Data on Anthropogenic Alterations
- 6.1 A whole spectrum of data on human activities in the catchment area (including land-use profile) forms the basis of anthropogenic alterations.
 - 6.2 A set of flow charts referred to in figure A-3 may be useful to illustrate the expanded data categories.
7. Measurement of Limnological Properties
- 7.1 Limnological data will have to be obtained through a well-designed sampling programme.
 - 7.2 Data from existing information sources, however, will have to be carefully studied first.
 - 7.3 Sampling will have to be carried out following well-established standard procedures.
 - 7.4 Sampling frequencies and sampling site locations will have to be determined based on scientific guidelines which are already available (refer for example to the manuals produced by the UNEP/WHO Programme on Global Environmental Monitoring System -- GEMS).
 - 7.5 Sampling programme will have to take into account the baseline assessment results so as to achieve comparability of different situations.
 - 7.6 Analysis of the vertical profile of limnological properties is often neglected, but it is in many cases of critical importance for the assessment of the limnological dynamics.
 - 7.7 Analysis of the system based on an ecosystem approach will necessitate the measurements of thermal regime, oxygen regime and nutrient regime in an orderly and systematic way with particular emphasis on seasonal variations.
 - 7.8 Also input-output relationship between external loading and the ecosystem itself must be established taking into account various interactions among the system components (Figure A-4).

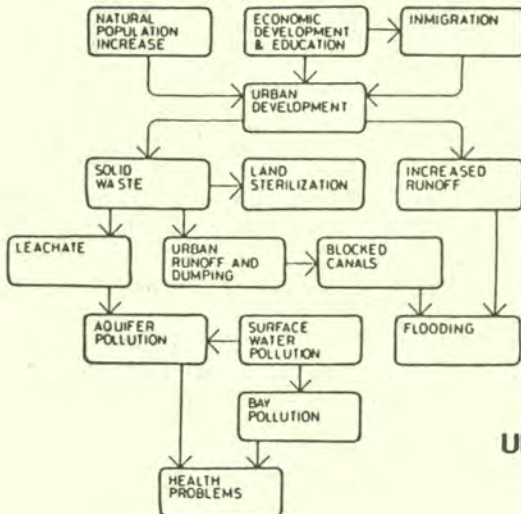
Figure A-3: Part I. Water System Flowchart



AGRICULTURAL WATER CYCLE

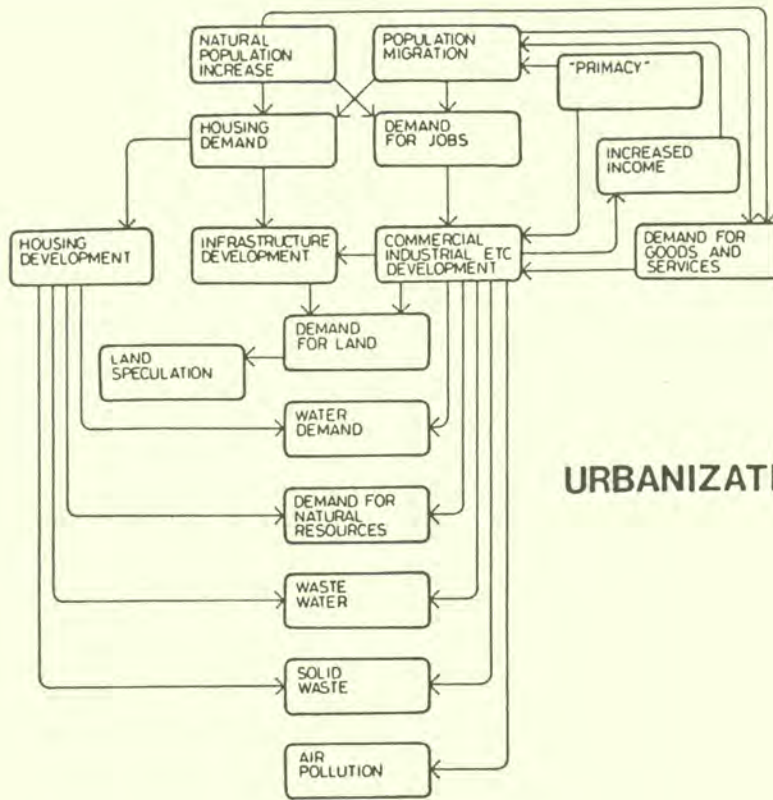


URBAN WATER CYCLE

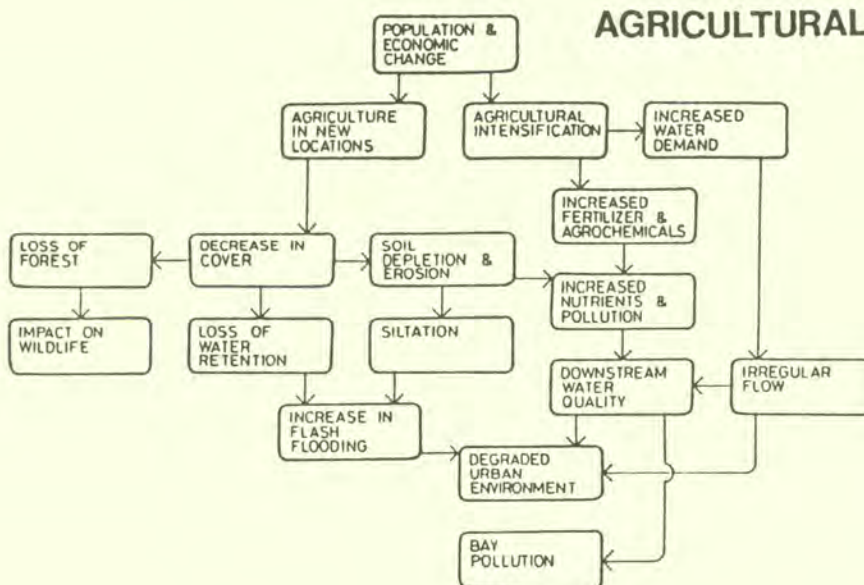


URBAN SOLID WASTE CYCLE

Figure A-3: Part II.



URBANIZATION FLOWCHART

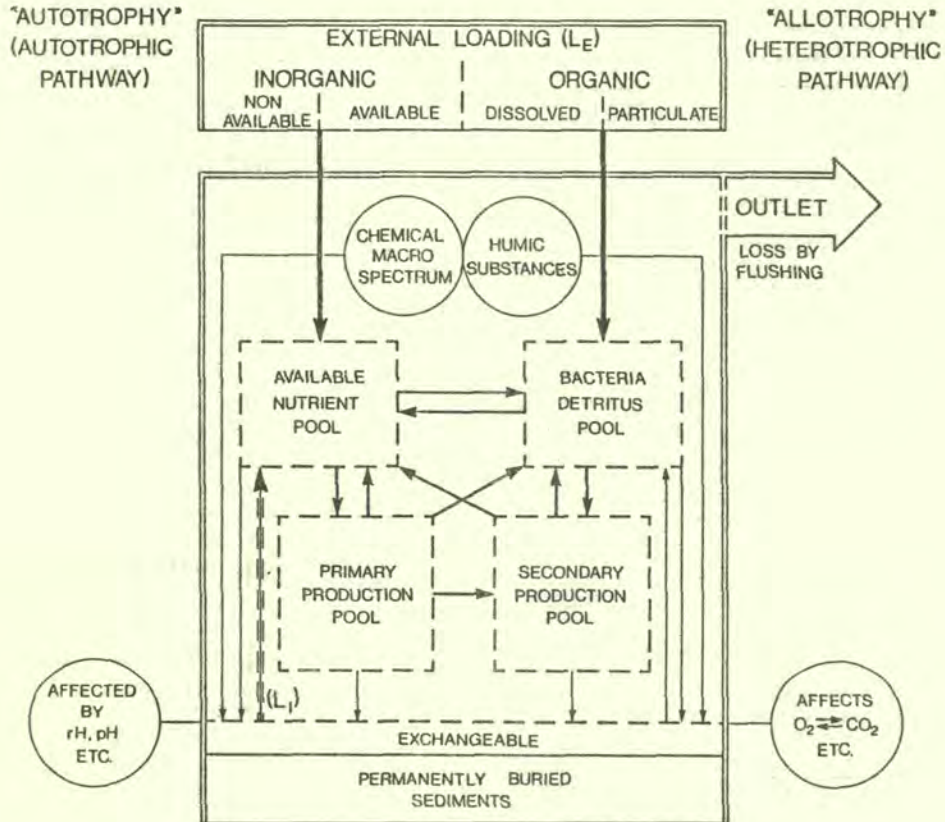


AGRICULTURAL FLOWCHART

Source: M. Ohta, "Regional Development and Training for Planners in Asia and the Pacific" (Paper presented at the Expert Group Workshop on Environmental Planning and Management for Local and Regional Development: Focus on Training Aspects Derived from Studies of Inland Water Management, Otsu and Nagoya, Japan, 10-21 November 1986: UNCRD, ILEC, and UNEP).

7.9 Analysis of the biological component of the ecosystem can provide a background for management and assessment techniques.

Figure A-4.



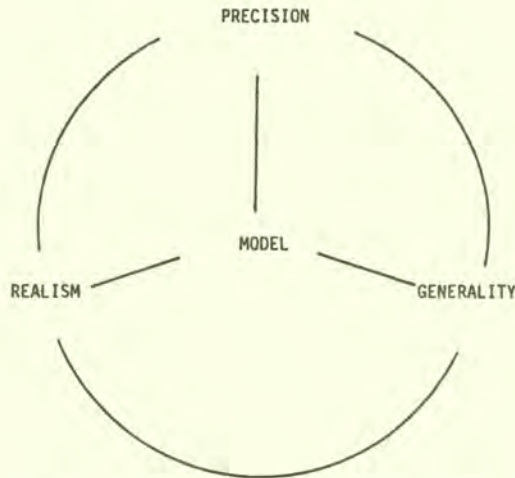
Provided by Dr. R. A. Vollenweider and will appear in his article, "Scientific Concepts and Methodologies Pertinent to Lake Research and Lake Restoration," *Schweiz Zs/ Hydrologie*, 1987.

8. Modeling of the Ecosystem

- 8.1 Conceptualization of the system under consideration is the first important step in the modelling exercise.
- 8.2 At the conceptualization stage, qualitative assessment of the system concept will have to be vigorously carried out.
- 8.3 There is often a need for mathematical description of the physical system because conceptual models may not be able to address specific quantitative questions.

- 8.4 The mathematical models require quantitative data, some of which may have to be collected for that specific purpose.
- 8.5 Three basic criteria for modelling are precision, generality and realism (Figure A-5).

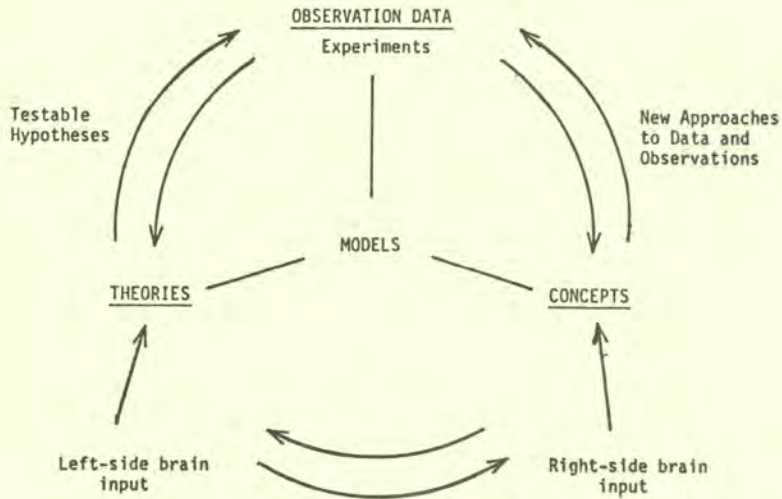
Figure A-5. Model Criteria



Provided by Dr. R. A. Vollenweider and will appear in his article, "Scientific Concepts and Methodologies Pertinent to Lake Research and Lake Restoration," Schweiz Zs/ Hydrologie, 1987.

- 8.6 There are relationships between observations, theories, concepts and models (Figure A-6). To achieve precision, observations are essential. To achieve generality, development of theories is needed. And to introduce realism in models, suitable concepts have to be proposed.
- 8.7 As shown in Table A-2, there are different model categories such as:
- (1) statistical models
 - (2) dynamic models
 - (3) simulation models
- 8.8 Planning models (optimization models, simulation models, etc.) are important for the development of adequate planning and remedial policies can also be very useful for policy analysis.

Figure A-6. Relationships between Observations, Theories, Concepts, and Models



Provided by Dr. R. A. Vollenweider and will appear in his article, "Scientific Concepts and Methodologies Pertinent to Lake Research and Lake Restoration," Schweiz Zs. Hydrologie, 1987.

TABLE A-2. MATHEMATICAL MODELS USED IN LAKE RESEARCH

<u>STATISTICAL MODELS</u>	<u>DYNAMIC MODELS</u>	
Distribution models	Hydrodynamic models	} Single process
Regression models --bivariate --multivariate --covariate (linear; non-linear)	Hydrochemical models	
Powerspectra models	Ecological models	
	Mass and energy models --one-box - multibox --horizontal - vertical	
	<u>SIMULATION MODELS</u>	
	Single process submodels	
	Integrated interactive models of increasing complexity	

Provided by Dr. R. A. Vollenweider and will appear in his article, "Scientific Concepts and Methodologies Pertinent to Lake Research and Lake Restoration," Schweiz Zs. Hydrologie, 1987.

9. Data and Information Management

- 9.1 The usefulness of scientific data increases as the duration of collection of data increases. Some of the most basic observations required, such as trends and impacts, may not be possible without the provisions made for collection and storage of long-term data. For the same reason there is also a need for constant updating of data.
- 9.2 However, it is also very important to have the data which are reliable. Standardization and intercalibration of techniques and analytical quality control are essential components of data generation activities.
- 9.3 Data generation/collection exercises are carried out according to specific objectives. For example, routine monitoring usually generates data on a limited number of parameters for a long period of time, while research measurements generally produce data to elucidate the subject phenomenon, perhaps on a greater number of parameters for a shorter period of time. There should not be a confusion on the purpose of data generation/collection.
- 9.4 As much data and information as possible in their original forms should be made available and utilized not only by the generator/collector but also by other qualified individuals or institutions. Storage, retrieval and dissemination of data and information are important steps leading to utilization but they are often seriously neglected because of difficulties in devising acceptable institutional mechanisms and in mobilizing adequate resources.
- 9.5 Even if the above difficulties are overcome, sometimes secondary users may face the difficulty of making the proper use of such data and information when there is not enough background information provided in association with their generation/collection.
- 9.6 Further, proprietary considerations should be given to the generator/collector of data and information. It is important to devise a system balancing the protection of the original sources of data and information with maximum utilization of data and information, particularly when they are generated/collected using public funds.

10. Data Evaluation and Interpretation

- 10.1 Data evaluation and interpretation are very subject-specific and require an understanding of the subject under investigation.
- 10.2 However, there are useful tools as well as basic principles applicable to data evaluation and interpretation which are available elsewhere (e.g., GEMS documents).

- 10.3 Scientific interpretation of data and management interpretation of data are different. Basically, the former implies scientific explanation of a phenomenon or a set of phenomena while the latter implies extrapolation of scientific findings to managerial actions. Development of scientific criteria requires scientific interpretation of data while setting of standards requires managerial interpretation including social, economic and political considerations.

11. Training in Scientific Approach for EPM

- 11.1 Different kinds of training programmes may be developed for different purposes. The development and use of scientific knowledge may be highlighted differently according to different training needs.

However, the basic principles of a scientific approach remain the same though different aspects may be emphasized as necessary and appropriate.

- 11.2 Most preferably training should be conducted in close association with an ongoing active project dealing with an actual field subjected to EPM. This is particularly true when training is aimed at technical personnel.
- 11.3 There are various means by which the perceived objectives of training may be accomplished. Within the context of the current elaboration, one of the most efficient and effective means to enhance the level of competency in scientific approach for EPM may be the exchanging of suitable personnel for various durations.
- 11.4 With respect to the prospective undertaking by UNCRD on the training of senior government officials, the design of the training course will depend very much on the kinds of backgrounds the participants may have. Nonetheless, it is to be emphasized that they must be exposed to basic principles of scientific approach for EPM so that they may be convinced of the need for such an approach. The course should place particular emphasis on the analysis of a physical system, i.e., a body of water, be it a lake or a reservoir.
- 11.5 In addition, such a course may emphasize logistical aspects of managing an applied scientific study of a body of water including staffing, financing, institutional development and coordination. Various positive as well as negative experiences of actual limnological project stations engaged in such studies may be introduced most usefully in training course.

12. Additional Observations

- 12.1 Aside from the lack of appreciation for a scientific approach for EPM, there may be many other reasons for the

failure of promoting such an approach in developing countries (as well as developed countries).

- 12.2 One of the common difficulties is that of coordination of parties with vested interest in the subject site for scientific studies, particularly with respect to sharing of data and information. International efforts such as those made by ILEC and UNCRD would be instrumental in many instances in promoting collaborative efforts in conducting joint scientific studies and in establishing a common scheme of collection of data in the form of a data bank.
- 12.3 Further, establishment of a global network of institutions which share a common view of the need to promote scientific approach for EPM as well as to engage in the development of well-qualified human resources.
- 12.4 The last but not least of the important considerations is the political will to mobilize the necessary resources and to achieve a balanced blend of scientific and sociopolitical considerations. Influencing the political institution would of course be difficult but particular attention may be drawn to the policy statement produced by the Japanese Science Council with respect to the commitment made by the national government on the promotion of science.

ANNEX 2

SAMPLE MODULAR TOPICS FOR TRAINING COURSE ON ENVIRONMENTAL PLANNING AND MANAGEMENT FOR LOCAL AND REGIONAL DEVELOPMENT

Sample 1

The training materials may be broadly divided into:

- (1) Scope
- (2) Work Plan.

Scope (S)

- S-1 Approaches to and Concepts of EPM
- S-2 Institutional Framework for EPM
- S-3 Policy Instruments for Environmental Management:
 - Regulations
 - Economic measures (tax incentives, etc.)
 - Standards
 - Public investment
 - Information and education
 - Etc.
- S-4 Local Community Participation in EPM
- S-5 Planning Process (Regional Development Planning, EIA System)

Work Plan (WP)

- WP-1 Scientific Bases of Environmental Management (Inland waters -- lakes, rivers, streams, lagoons)
- WP-2 Surveys, Data Base/Information Systems
- WP-3 Planning Tools and Techniques (Decision Aids)
- WP-4 Monitoring and Evaluation (Appraisal)
- WP-5 Methods for Coordination

Sample 2

The following corresponds to the Project Case Work Method/Approach (PCW) of which an example is given in Annex 3.

Topics:

Water Resources Planning and Management

Technology Options

Institutional/Legal/Socioeconomic Aspects

Regional Development Planning/Environmental Master Planning/Public Participation

Sample 3

The rationale of the following is being able to realize a workable partnership among administrators, the science community and the people.

Topics:

Ecosystem Management and Pollution Control
(Including Resource Utilization and Conservation)

Data and Information Management and Utilization
(Generation, Storage, Retrieval, Interpretation, Presentation)

Legal/Institutional Sociopolitical Framework

Regional Development Planning Process
(Environmental Considerations in the Planning Process)

Public Participation and Education/Sociocultural Aspects

ANNEX 3

A PROJECT CASE WORK (PCW) APPROACH TO ENVIRONMENTAL PLANNING AND MANAGEMENT (EPM) ((SAMPLE))

1. Introduction:

Based on the training needs and respective target groups of developing countries' three main levels of training were considered as focal points for future training activities. These are to be carried out in cooperation with other institutions, agencies, professional groups, etc.

Efforts should be focused on primary target groups of government officials at policymaking (high), planning/operational (middle), and technical staff levels interfacing with other groups such as those from universities, R&D institutions, industries, and local communities. Potential participants should have a multidisciplinary educational background and come from different institutions with responsibility/concern for environmental resources utilization and development, including protection and preventive measures, etc.

Utilizing a step-by-step approach, the middle to senior administrative staff and their respective environmental management training needs should be addressed first in courses of two-to-three weeks. The results could and should form the basis for 'exposure' training for policymakers of two-three days.

2. Proposed Course Outline (prime target group)

2.1 Programme Objectives

- (a) To familiarize middle to senior level administrators and planners with responsibility for regional policy development and implementation focused on the planning and management of inland water, especially with regard to increasing pressures on existing bodies of water due to competing uses, etc.
- (b) To enable these decision makers to make better use of information (not only the options available for inland water management, but also on techniques for identifying the problem), setting EPM objectives based on available resources, constraints, and opportunities, assessing the different options and selecting the most appropriate alternative(s) for development of a cost-effective action programme.

2.2 Target Group

Senior government officials and heads of regional government agencies with the responsibility for inland water development, pollution control, watershed management and other sectoral water-related project planning. The participants should primarily be drawn from the following types of agencies:

- environmental administration and pollution control agencies;
- department (ministry) of public works;
- local government;
- water supply, sewerage, and public health authorities (national and regional);
- development planning agencies (national and regional);
- other departments (ministries) such as agriculture, fisheries, forestry, land resources, energy, etc.

Opportunities for interfacing with concerned industries, R&D institutes/universities, local mass media, NGOs, etc. should be provided by including suitable representatives, where- and whenever possible.

2.3 Programme Contents

It is considered that at least four subject areas will have to be covered:

- (a) Developing a water resources development and management programme: assessing the problems, establishing objectives, etc.
- (b) Reviewing technology options (appropriate technology and water pollution control treatment systems) as well as appurtenant preparatory groundwork measures.
- (c) Administrative, inter-institutional, legal socioeconomic, and sociocultural aspects of options (management, legal, and financial requirements, public participation, etc.).
- (d) Regional development planning, environmental master planning, natural resources assessment, etc.

2.4 Training Methods

- (1) The programme will be based on and structured along an intensive project casework (PCW) based training approach.

Participants of different academic backgrounds and coming from different institutions in different countries will form groups of approximately seven for each group work assignment.

- (2) Paper presentations will be arranged according to the needs of the subject matter, including casework. The same applies to field visits, sampling station techniques, etc. and/or demonstration of processes and equipment for control, treatment, etc.

- (3) For purposes of tuning in prospective participants, especially structured background material consisting of selected literature will be assembled and distributed beforehand. (Refer to Annex 2 for references.)

The addition of an implementation simulation game is a desirable aspect of the training.

2.5 Technical Arrangements

Duration will be for approximately two weeks. An additional week could be used for concise train-the-trainer components.

Details on programme language, organizers, international funding institutions, and host country may be included here.

2.6 An Example and Conceptual Model of the Approach

For illustrative purposes, an actual PCW training course that has been made operational in one Southeast Asian country is summarized. It is a course oriented towards water quality management through development of a water pollution control plan.*

The purpose is stated as follows:

"To enable the participants to take part in the development of a water pollution control plan."

Using a hypothetical case with relevant reports and maps supposedly prepared by agencies making up a regional authority, participants go through three (3) sessions with the following aims:

Session 1: Examine background information

Develop water pollution control objectives

Rank objectives given political background and development plans

Session 2: Develop technical/administrative options to achieve objectives

Session 3: Cost options

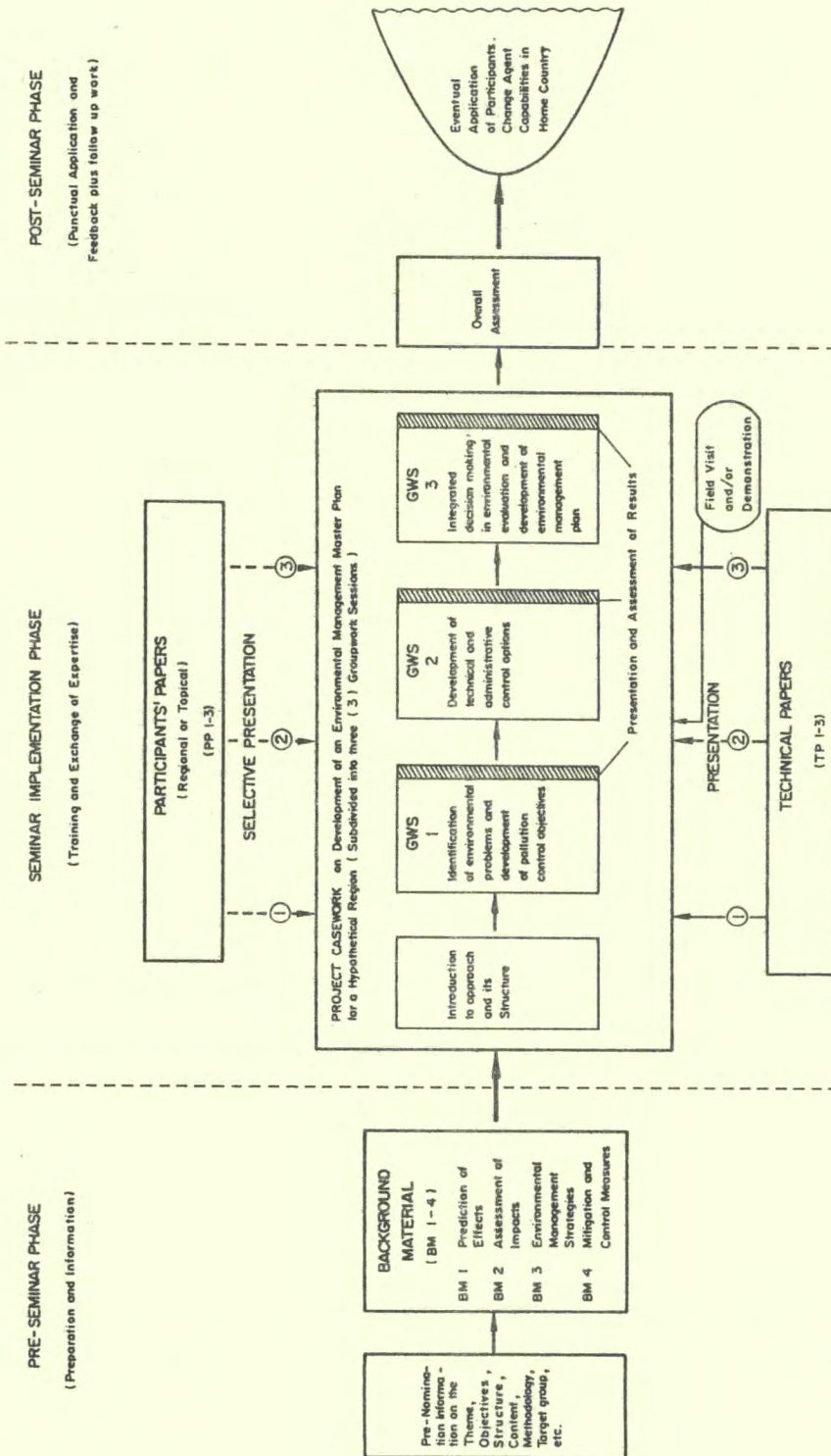
Develop proposed plan taking account of benefits, costs, political priorities, constraints, and various impacts.

* There is also another oriented towards solid waste management. Source: G. Tharun, N. C. Thanh, and R. Bidwell, eds., Environmental Management for Developing Countries (2 volumes), (Bangkok: Continuing Education Centre, Asian Institute of Technology, 1983).

The plan consists mainly of control schemes, administrative measures and the timetable. Stress is placed on the fact that there is no single solution but the choice has to be well-reasoned based on informed judgement and realization of further need for monitoring.

Each session is characterized by a clear and attainable purpose as well as concretely identified steps to operationalize the approach for the session. A decision matrix (analysis sheet) is developed in Session 3 to indicate how an option achieves the requirements agreed upon. The conceptual model is schematically shown in Figure A-7.

Figure A-7: Conceptual Model of Project Case Work Based Seminar Training Approach
Showing the Interrelationship of Different Programme Inputs



Source: Gunter Tharun, "Approaches and Methods of Training in Environmental Planning and Management for Local and Regional Development" (Paper presented at the Expert Group Workshop on Environmental Planning and Management for Local and Regional Development: Focus on Training Aspects Derived from Studies of Inland Water Management, Otsu and Nagoya, Japan, 10-21 November 1986: UNCRD, ILEC, and UNEP).

PART II:

SUMMARY OF PROCEEDINGS

I. WELCOME AND OPENING ADDRESSES

10 November 1986

Hidehiko Sazanami, Director, UNCRD

The Honourable Governor of Shiga Prefecture, Mr. Inaba,
Dr. Kira, Distinguished Experts, Colleagues, Ladies and Gentlemen:

On behalf of the United Nations Centre for Regional Development (UNCRD), I would like to extend a very warm welcome to all of you to Japan and to the Expert Group Workshop on Environmental Planning and Management for Local and Regional Development: Focus on Training Aspects Derived from Studies of Inland Water Management. We are most grateful that despite your very busy schedules, you have kindly accepted our invitation to participate in this Workshop, by preparing the papers to be presented here, and by sharing your devoted efforts and experiences with us in the common concerns. We sincerely hope that the dialogue among all of us during this Workshop will be productive, and we await the results of this Workshop with great expectations.

I would like to take this opportunity to express our sincere thanks to Dr. Kira, who, in addition to being Chairman of the International Lake Environment Committee (ILEC) is also Director of this Lake Biwa Research Institute (LBRI), and his colleagues for making the necessary collaborative efforts with our Centre in the task of organizing this event. I would also like to express our gratitude to the United Nations Environment Programme (UNEP) for its most valuable cosponsorship. Furthermore, our special thanks is due to the Shiga Prefectural Government for all the encouraging support and the warm hospitality accorded to us.

Background of the Workshop

Please allow me to briefly explain the background to this Workshop. In 1983, our Centre launched an environmental management research programme in response to a perceived growing need to incorporate environmental concerns into the process of local and regional development in the developing countries. The first activity we initiated under this programme was the UNEP-UNCRD joint project, which was embarked upon in 1984, and which involved two sets of studies. They were (1) a case study to document how Japan, following a succession of serious environmental crises up to the 1960s, has sustained efforts aimed at managing and directing development programmes and projects in an environmentally appropriate manner; and (2) country case studies which were designed to review and examine the state of the art of environmental planning and management for local and regional development in some selected third world countries.

The results of these studies were presented and discussed at an international workshop held in June last year under the joint sponsorship of UNEP and UNCRD. The workshop noted, among many other things, that:

- (1) The regional (or subnational) approach to planning and development with its attendant challenge of addressing economic, social, and environmental objectives in a coordinated fashion, should offer a concrete avenue of bringing closer to reality the ideal of environmentally sound development;
- (2) Understanding of the importance of managing the development process in environmentally compatible ways has been growing in many countries, at the national centres of development planning and research, since the early 1970s. Such an understanding however has not yet found appropriate institutional and organizational structures to find expression at the level of local and regional planning in most developing countries; and
- (3) While many countries have established ministries, departments, and other institutional arrangements to cope with, and properly respond to, the emerging environmental issues and problems, relatively few countries have adequate manpower in terms of trained professionals, planners, and administrators who can analyse, plan, initiate, implement, and manage programmes and projects which aim to establish environmentally sound development.

It was in line with these observations that the international workshop recommended that UNCRD and UNEP should promote further research and training activities with a view to assisting the developing countries to strengthen their national capabilities in the field of environmental planning and management for local and regional development.

Purposes and Organization of the Workshop

The Workshop which we are commencing this morning is therefore a follow-up to this UNEP-UNCRD joint project. It was in February of this year that the inaugural meeting of the International Lake Environment Committee (ILEC) was convened, and it was in this conference hall that we, UNCRD, ILEC, and UNEP agreed to cooperate with each other to organize an expert group workshop by contributing the expertise of our respective organizations in a complementary manner to further the common areas of concern.

Ladies and Gentlemen,

As mentioned in the aide-memoire, the principal idea behind the theme of this Workshop is that there is a need to devise appropriate training in order to harness national capabilities in environmental planning and management for local and regional development in the

developing countries. With this in mind, we have invited leading scholars, researchers, and practitioners from the field to share their knowledge and experience with us in the furtherance of this idea.

The Workshop has a dual objective. The first objective is to examine the major issues involved in current practices of environmental planning and management, and explore alternative approaches and methods that will facilitate a systematic integration of environmental considerations into local and regional development. The second objective is to identify, on the basis of the results of the workshop deliberation, the role of development planners and environmental managers in promoting environmentally sound local and regional development and work out guidelines for the development of curriculum and training materials with which the international organizations, particularly UNCRD, ILEC, and UNEP can initiate training activities to support the efforts of developing countries in strengthening their environmental management capabilities. We would particularly like to underline the request to distinguished participants in this Workshop that they advise us on how best we can promote our training and research activities to meet the evolving needs of developing countries.

In order to accomplish the tasks before us, this Workshop is designed in two parts. The first part, which is to continue up to Saturday of this week, will discuss and review, on the basis of the concept papers and the case studies prepared specifically for this Workshop, issues and problems in environmental planning and management. The second part of the workshop, which is to take place from Monday next week at UNCRD in Nagoya, will assess the opportunities and limitations of training in environmental planning and management and deal with the practical question of how to devise suitable training in environmental planning and management for local and regional development.

As you are aware, environmental planning and management involve very wide-ranging subject domains, and as such it will not be possible to discuss thoroughly all the issues involved within the limited time duration of this Workshop. Hence, in order to derive maximum benefit from the deliberations, one specific area of environmental concern will be focused on during discussions, specifically, the management of inland water resources and river basins.

You will agree that among the various components of the environment, water is a most indispensable resource for human life, and as such, the problems related to its availability and function should not be overlooked in any exercise concerning environmental planning and management. Furthermore, interests involved in the development and management of water resources are becoming increasingly diversified in the modern world. Accordingly, a major challenge we face today is how to secure the concerted efforts of experts from a wide variety of relevant disciplines in ensuring the long-term benefits of water-related ecosystems. At the same time, water-related issues and problems differ from one region to another as they emerge through the interactions among the whole range of human activities and water-related ecosystems in the region-specific socioeconomic context.

Thus, the issues of water resources development and management, being multidimensional in character, can provide a relevant empirical basis for determining what should and can be done to strengthen the capabilities of developing countries for promotion of environmental planning and management in a broad-based manner.

The papers before us contain extensive information on the concerns, problems, methods, and approaches to environmental planning and management. The challenge before us is to transform the essence of these various contributions into a framework of action which can be of practical relevance to the developing countries today. It is our conviction that this Workshop should not result in a passive assessment of what is going on in this field, but that rather, it should distil and outline: (1) what should and can be done in terms of the strengthening and improvement of national capabilities in environmental planning and management for local and regional development; and (2) what role the international organizations, especially UNCRD, ILEC, and UNEP can play in facilitating the developing countries to strengthen their national capabilities in designing and implementing the necessary programmes and projects of environmentally sound local and regional development. We earnestly hope that through the constructive contributions of each of you and the resulting exchanges of ideas and experiences, this Workshop will be able to accomplish these tasks.

Finally, I would like to respectfully urge the distinguished participants at this Workshop to endeavour to focus deliberations, as far as is possible, on the questions which are contained in both the research proposal and the aide-memoire of this Workshop. Let me, by way of reminder, reiterate these questions:

- (1) How and to what extent should environmental assessment information be made available and utilized in decision making?
- (2) What planning methods and techniques are most effective in facilitating the process of decision making at the various stages of environmental planning and management?
- (3) What policy instruments are effective in directing, controlling, and managing socioeconomic factors and forces along lines that are environmentally sound?
- (4) What institutional arrangements and methods are appropriate for the formulation and implementation of coordinated environmental policies and programmes?
- (5) How and to what extent should local communities be involved in the process of environmental planning and management?

We believe that through the deliberations on these and other related questions, it will be possible to arrive at a common frame of reference for considering the training aspects of environmental planning and management on which we will concentrate next week.

I can assure you that, we, the organizers of the Workshop, will try our best to assist you in achieving these objectives and also to make your stay a constructive and memorable one. Once again I thank you very much for accepting the invitation to work together with us in this Workshop, and wish you all a pleasurable time in Japan. With these words I declare open the Expert Group Workshop.

Thank you, all.

II. WELCOME AND OPENING ADDRESS

10 November 1986

Takao Kira, Chairperson, ILEC

Distinguished Guests, Dear Participants, Ladies and Gentlemen:

It is my greatest pleasure to announce, as the chairperson of the International Lake Environment Committee which is only nine months old, that this workshop is the first official undertaking by the Committee in cooperation with the United Nations Centre for Regional Development (UNCRD) in Nagoya and United Nations Environmental Programme (UNEP) in Nairobi.

The International Lake Environment Committee, ILEC in brief, is a nongovernmental organization established in February this year in order to contribute to improving the management of world lakes with emphasis on environmental aspects.

As you may see, a lake forms in itself a more or less well-defined unit of nature, where such human activities as fishery, water-bound transportation, water use and recreation share the same limited aspect with the natural ecosystems. On land, natural ecosystems and concentrated human activities may be allocated to occupy separate spaces or areas to a certain extent, but it is not possible in lakes, in which natural and human systems are bound to coexist. The conditions for reconciling these two systems are, therefore, more strictly limited in lakes than on land. Once the reconciliation fails, the lake ecosystem may be badly degraded or completely upset to result in the complete loss of the lake's utility value. This is the point which ILEC intends to emphasize.

For this reason, the present workshop that aims at planning and management of inland waters is especially pertinent as the ILEC's first undertaking. I would like to take this opportunity to express the Committee's thanks to the UNCRD and Director Dr. Sazanami for making it possible for ILEC to cosponsor this meeting, and to the ministries and agencies of Japanese National Government concerned, Shiga Prefectural Government and other organizations for their valuable support.

The first proposal for the establishment of an international committee on lake environment issues was made by Dr. M. Tolba, Director General of UNEP, in his keynote address at the first International Lake Environment Conference held here in Otsu in 1984 under the main sponsorship of Shiga Prefectural Government. Fortunately, the appeal from Shiga for an international cooperation to save polluted lakes aroused sympathy of more than 2,000 participants from twenty-nine countries, and the conference resolution pointed out the necessity of periodically holding such conferences and of establishing such a committee. Thus, the second conference was convened in May

this year in Michigan State, USA, and the third one is expected to be held on the shore of Lake Balaton under the auspices of the Hungarian Academy of Science. In parallel with this, concentrated efforts were made to realize Dr. Tolba's proposal, particularly by Shiga Government, leading to the successful inauguration of ILEC early this year.

This committee now consists of fifteen experts in various fields such as limnology, ecology, engineering, planning and management, and has started activity on three lines, viz., (i) preparing guidelines for environmentally sound management of lakes, (ii) deposition and dissemination of information on world lake environments, and (iii) promoting training in rational lake management.

In the last place, ladies and gentlemen, let me add a few words about the Lake Biwa Research Institute in which you are sitting. This Institute is also quite new, established only four years ago in 1982. Lake Biwa, that you can see through the window, is the largest lake in this country, and is also the source of water for nearly 13 million people in three big cities, Kyoto, Osaka, and Kobe, as well as in this Prefecture. Since the lake and its drainage basin are entirely within the administrative boundary of Shiga Prefecture, the residents of Shiga and their government are solely responsible for the management of this enormous water resource and the lake's beautiful environment.

As other lakes in Japan and abroad, Lake Biwa has been subject to serious pollution and eutrophication during the period of rapid economic growth since the 1960s, due to the inflow of waste water from industries and other human activities. You are going to learn on Thursday this week about the efforts made by Shiga Government to stop or at least to moderate the trends of pollution and eutrophication of the lake. Frankly speaking, however, we cannot be optimistic about the future of the lake's water quality.

One of the characteristics of environmental problems is that new alarming situations so far unknown may arise suddenly and demand new basic studies. This was also the case with Lake Biwa, so that the Government felt it necessary to have its own research institute in order to take prompt and effective measures against such unexpected situations. Lake Biwa Research Institute was established to fill the need, and has since been engaged in multidisciplinary studies to clarify the dynamics of environmental change in the lake and its drainage basin. So it is a dual pleasure for me that the staff of this institute can contribute the results of their studies to this important workshop.

Thank you.

III. SUMMARY OF PRESENTATIONS AND DISCUSSIONS, PART I

SESSION 1: SCIENTIFIC BASES OF LAKE ENVIRONMENT MANAGEMENT

Monday, 10 November 1986, 10:30-11:40

Topic: Scientific Approach to Lake Environment Management

Speaker: Hans J. Overbeck

Discussant: Takeshi Goda

Chairperson: Tatsuo Kira

Rapporteur: James F. Goater

The presentation was broadly divided into two sections, the first being a detailed overview of lake ecosystems and the basic principles which planners and managers should be aware of; the second section was concerned with actual lake management, based on ecosystem research, with reference to examples for studies and results.

Overbeck began his paper by introducing the Max Planck Institute for Limnology. Located in a lake region around Plon in north FRG, and founded in 1892, the institute is concerned with issues relating to inland water bodies. A series of slides illustrated various relevant activities in different locations, i.e., Sweden, Greece, and the Amazon Region, which contained lakes with different metabolic features.

The speaker noted that a scientific approach to lake and environmental management concerns studying the structure of aquatic ecosystems. The term "ecosystem" is relatively new, though the concept is broad and old. It denotes the coupling of components to form functional units (living organisms and their environments are inter-related, and interact).

Six major components of the structure of an ecosystem -- the basic functional unit in ecology -- were then shown via slides. Namely, inorganic substances; organic compounds; the climatic region; producers (e.g., green plants); macroconsumers; and microconsumers. (The speaker noted that he, himself is director of the Department of Microbial Ecology in the Max Planck Institute.) Environmentally sound management of lakes is based on ecological research.

The paper then moved on to outline the function of the ecosystem, which is concerned with the dynamics of rates and turnover of dissolved inorganic and organic components and biomass. A slide depicted six functions, namely energy circuits, food chains, diversity pattern in time and space, nutrient cycles, development and evolution, and control (cybernetics). The cycles of these elements (circulation) are of great importance for understanding ecosystems and furthermore for effective management of such systems.

The speaker then moved on to biogeochemical cycles, noting that all essential elements of the protoplasm circulate in the biosphere, from environment to organisms and back to environment (biogeochemical cycles). Each cycle is divided into reservoir pools (known) and exchange/cycling pool (more active/smaller). The understanding of these cycles is important for understanding the production of ecosystems.

One of the most important cycles is the nitrogen cycle -- a detailed diagram of this cycle was utilized to illustrate the process. Reference to an actual lake study was made, to illustrate the importance of understanding the processes at work, and the very complex biochemical relationships. A further slide depicted a comparison of various processes for the reduction of nitrate. The whole ecosystem is thus regulated in a complicated biochemical way -- until now, only sketchily understood. At the speaker's institute these regulation processes are being studied. Two slides were used to show the complexity (samples from Lake Ploessee) of bacterial processes. Understanding the continuous supply of phosphorous is important, to comprehend the growth of the phytoplankton in the lake.

The point is then made that even if scientists were able to understand the myriad physical and chemical process at work, they could not comprehend the lake as a whole. This is true for all ecosystems.

Very little is known about the quantitative aspects of the regulation of microbes in nature. Understanding is almost all qualitative. The laboratory techniques are inadequate and they are only developed in known conditions. Microphotographic slides were then utilized to show bacterial processes and microbial community-building, followed by a diagram showing seasonal distribution of bacterial populations (sampling taken from Lake Ploessee). A further slide depicted the position of bacteria in the aquatic food chain -- detailed description accompanied. The speaker noted that 25 tons of carbon are produced per year, 50 per cent of which is transferred back into the food chain.

The speaker concluded the first section of the paper by observing that gaps in the knowledge of the whole system are large, up to now only the most obvious lines of enquiry can be suggested.

How is this scientific background connected with lake management? The speaker advocated the training of people able to go straight from an academic training to positions in the outside world. Great need for people able to bridge the gap between research and practice was noted, with a problem solving ability essential at all levels.

Professional limnologists must explain to planners and policy-makers the implications of their research to prevent the results remaining behind the walls of research institutions/universities. Training and research should be combined into the framework of restoration projects and lake ecosystem management; thus, broad practical experience is gained by scientists while working in their own specialized field. An example of this combinational approach was cited. The

restoration project of formerly degraded Lake Trummenn in Sweden. This can be considered as a training prototype for the aforementioned type of approach. Slides were utilized to depict this restoration process.

In conclusion, the speaker noted that a combined approach between research and training in basic applied limnology is not new, but reasserted that great progress has been achieved by this approach. Sound lake management will be achieved by continuing this approach in future.

Discussion

Dr. Goda began his discussion by acknowledging the debt of knowledge to the speaker, and opined that the problem should be approached from two viewpoints: (i) land side -- concerning scientific data (social, economical, geological, etc.) -- and phenomena of the watershed. This approach is common for natural lakes, reservoirs and wetlands, and (ii) environmental management in the lake itself, by various countermeasures. In the former case various strategies can be adopted such as forestry, sewerage systems, or diversion of waste water, however, in the latter case, it is not always possible to find such effective measures.

Many lakes exist which are in need of improvement in their environmental conditions, particularly in the developing countries. Policies such as silt-dredging, chemical disposal of phytoplankton, etc., rapidly become ineffective if executed spasmodically, while long-term execution is expensive.

In-lake control technologies are different and involve some kind of change in the lake's ecosystem, food-chain control or introduction of agitators, etc. Introduction of "agitators" may facilitate oxygen dissolution. The dynamics of induced flow and the mechanism of changed water quality are not fully understood.

Goda himself, was a consultant for the Japan Agency of Resources and Energy in its 5-year project to study eutrophication mechanisms in reservoirs being used for hydroelectric power generation. A comprehensive ecological model of such a system was developed in 1985, with a theoretical analysis of the system's hydrodynamic characteristics. The results of the study were not yet published.

Goda then provided a brief outline of this model, including the main variables used, various meteorological, hydrological, hydraulic, and biological factors. Oxygen parameters were also used. These were put into a series of parallel equations. The model was applied to an artificial reservoir system in Yamaguchi Prefecture, Japan, with a high degree of success. The task group is now examining a wider applicability for the model -- further improvement is anticipated. Thus, the installing of this type of "agitator" causes the optimum mixing to destroy the metalimnion and facilitate more uniform distribution of dissolved oxygen.

Thus the discussant concluded his opening comments.

Upon the chairperson opening the proceedings to the floor a question was put forward by Cardenas as to whether a simpler indicative model, to guide understanding, could be formulated for greater use among developing countries. Overbeck's response was to the effect that all models are used as tools to check if scientists are missing something. He provided an example of phosphorous growth in a lake. How has it been produced in such quantities? A given model would thus need revision. Modelling of the real world is extremely difficult.

Baisyet thought that the focus should be more on watershed management, as opposed to simply "lake" management as it is frequently "upstream" vs. "downstream" conflicts, away from the lakes, which are sources of problems. Perhaps the model should take this into account.

The rejoinder here seemed to agree with the viewpoint, and suggested a model be divided into a number of systems which could then be combined into a series.

A further question concerned the transferability of scientific data from temperate zones to tropical zones. How much of the knowledge is applicable. (The history of limnology is so short in most developing countries.) How much can developing countries learn?

Overbeck's answer was that the basic limnological principles by which metabolic processes take place are the same everywhere. They can be documented. In the tropics the processes take place faster, because heat speeds up the process. Results of basic research can be transferred, as had been shown by the Amazon experience of the Max Planck Institute.

Biswas made a point regarding scientific management, i.e., the problem of how to convey the results of the research model to the planner so that the work will be reflected at the national level? By way of referring to his own context, in the Federal Republic of Germany, Overbeck outlined the close connexion between planning/management and research, citing a number of organizations which combine the areas. There can be no real division, it is artificial to draw a distinction. Unity can work well.

In concluding this first part of session 1, the chairperson noted that ILEC was working in the abovementioned area, i.e., combining planning with research.

SESSION 1: (continued)

Monday, 10 November 1986, 13:00-14:10

Topic: Information Systems and Modelling for Environmental Planning and Management: Focus on Lake Environment Management

Speaker: Sven E. Jørgensen
Discussant: R. A. Vollenweider
Chairperson: Tatsuo Kira
Rapporteur: Antonio L. Fernandez

With the lake ecosystem as the basis, Jørgensen presented some basic requirements when attempting to devise an environmental information system in the first half of the paper. The second part dealt with fundamentals of the modelling process.

He began by emphasizing that lakes are complex and interactive. As such, a lake management scheme which proceeds from understanding the problem to data collection leading on to model formulation and validation must also include the planning required before embarking on projects that entail high development costs. He emphasized that some percentage of the effort must go into planning in order to avoid costly errors. A lake management scheme as described will have to take important note of the uses of the lake as well as the several restoration methods intended to solve the problems.

Restoration methods may be classified into two types. One is by how change is created, viz., creating a new and more acceptable equilibrium (or steady state), or increasing the rate to reach equilibrium. Another is that the method may be more environmental technology (wastewater treatment, for instance), or ecotechnology wherein the ecosystem is itself "assisted" for the better. Examples of the latter are the removal of nutrients from nonpoint agricultural sources by use of wetlands, as is being done in Denmark, and aeration of the hypolimnion to counter eutrophication.

Before putting water to different uses, the planning or management strategy must be aided by a database, which is proportionate to the level of accuracy to which the data will be used. Assuming that these are to be used in a model (such as one for eutrophication), four criteria were listed: (i) the type of problem (toxic substances, nutrients); (ii) hydrology; (iii) lake ecology (dominant species, sediment characteristics); and (iv) level of accuracy of model. Sampling frequency, for instance, will depend a lot on these criteria. Is the average being sought or are peaks (maximum points) needed? Therefore at this stage, what to emphasize and what to neglect should be identified.

Before attempting to model, it must be realized that the more one tries to lessen the discrepancy between the model and the reality the

model seeks to duplicate, the higher will be the cost. Also, at a certain level of complexity and at the present state-of-the-art despite almost a 20-year history, the level of knowledge simply plateaus out and declines. In short, our knowledge is limited.

Jørgensen took the sediment-water interaction process model, one of medium complexity, as an illustration, specifically one developed by Vollenweider to predict phosphorus concentration. Phosphorus concentration is translated to chlorophyll (algae) and may be more physically understood as transparency. The influence of pollution loads contributed by population in the catchment area can then be clarified, for example.

In any case, the modelling process essentially consists of:

- (1) defining scope of model
- (2) establishing the framework or the conceptual model (what components and mechanisms are important)
- (3) formulating relevant equations and verification
- (4) performing sensitivity analysis (how close are the results to reality?)
- (5) investigating further
- (6) calibrating the model
- (7) validating the model (how accurate?).

Discussion

Vollenweider, as discussant, further elaborated on the role of modelling in devising management strategies. He stressed the scientific perspective through water body restoration, thus reflecting how social responsibilities are carried out in environmental management.

He distinguished between models for research and models for application. Models for application can be simpler but based on models for research. The other point to be stressed was how to conceptualize a concrete approach that considers the basin (watershed) as part of the system.

He classified models according to their purposes; namely, loading criteria, predicting response patterns, optimization of alternatives, whole basin management, ranking toxicity and fate of pollutants.

He cautioned against the indiscriminate simplification of models by eliminating essential parts. Also, no matter what, basic scientific principles must be adhered to.

In the resulting exchanges two major issues were raised. How transferable are models built on temperate lakes to tropical lakes? Are not data requirements a constraint to using models?

The first issue was raised by Tundisi. Jørgensen admitted that some model equations may not work because a different food web exists in tropical lakes. Constants have no similar values when predominant processes are different. Biswas needed clarification on models meant for research and for application. Jørgensen says the classification is not meant to be rigid. It is only that the complex nature is more considered in depth by models for scientific research. Vollenweider basically agreed adding that from models for research, more varied applications have become possible. Rees voiced his concern about transferability in that certain tropical regimes may not be easily amenable to the use of temperate models, for example, nitrogen and phosphorus relationships.

Cardenas expressed concern about the immensity of data requirements. In lieu of models (ecological and the like), will certain indices or parameters be acceptable to reflect processes in the ecosystem? Jørgensen disagreed that data is a major constraint. He maintained that 1 - 2 years of limnological survey data would be sufficient. Overdoing data collection should be avoided. Vollenweider cautioned against simply adopting statistical equations of morphographic indices from foreign countries. Their usefulness cannot be discounted in regard to the places on which statistical data were based. Overbeck offered information that major lakes of OECD countries have sufficient data. He said also that the present state-of-the-art allows the use of small sets of data as starting points for management.

SESSION 2: ENVIRONMENTAL PLANNING AND MANAGEMENT: MACROPERSPECTIVES

Monday, 10 November 1986, 14:30-15:40

Topic: The Asian Development Bank's Approach to Environmental Planning and Management: Focus on Economic-cum-Environmental Planning Studies

Speaker: Colin P. Rees
Discussant: P. K. Biswas
Chairperson: Hidehiko Sazanami
Rapporteur: James F. Goater

The Paper was designed to address the major features, which in the ADB's experience, were critical to the discharge of its responsibilities to its member developing countries in the Asia/Pacific region.

In noting the dynamic nature of these countries, Rees outlined the importance of environmental planning policies which incorporate continuous and interactive adjustment to unpredictable socioeconomic, political, or cultural changes. However it seemed that these factors receive little or no attention for fear of charges of interference in internal affairs, or because of the inherent difficulty of their measurement. Nevertheless it is important to emphasize policies and approaches to environmental planning and management which will endure in the face of instability or rapid change.

Of further importance is the need for environmental planning to be understood and supported by government and the population at large. Environmental issues must remain in the public eye -- "compete for attention" to maintain them at the head of development and planning agendas. Additionally, activities should take account of the interests of various groups to avoid conflicts over different socio-cultural needs. Rees cited a hydroelectric scheme, which at the same time as being economically viable was a source of conflict in terms of the resettlement programme for displaced communities. There were often great differences in attitude towards environmental resources use and these should always be borne in mind during the planning and management of development programmes or projects.

The weaknesses of institutional mechanisms was another factor touched upon. Institutions in developing countries were frequently poorly staffed with little political "clout." Thus, strengthening of institutions is necessary.

Environmental planning and management offers a framework for economic development which affords opportunities to ensure the optimal use of environmental and natural resources. It can be a useful learning device for "comprehensive" and "predictive" thinking, "advocacy" and "compromise."

Thus if it can be seen that the extent and intensity of environmental problems depend on the very pattern of development; a corollary holds that problems of the environment are developmental; more a result of intergroup or intersectoral competition for natural goods and services. Rees opined that environmental planning is not to be isolated from the developmental process; it cannot be dissociated from local and regional development or long-term plans at the national level, e.g., 5-year plans. Thus it becomes vital to seek mechanisms for integrating environmental considerations into the development planning process.

Despite great difficulties in using environmental planning and management, there are dividends, Rees argued, viz., conflict reduction; a wider view of the planning horizon; providing decision makers with development alternatives; and a longer-term time perspective. A complication existed, however, whereby environmental planning (being incorporated into the development process) was not seen as an opportunity for sustainable and efficient use of natural resources, but more as a mechanism for conflict resolution on a project-specific basis.

The presentation then moved on to reviewing some basic needs, particularly to conducting environmental assessment during the initial phase of the development process. These included:

- (1) Counsel the developers: encourage them to adopt a wider perspective incorporating the environmental dimension. Specify objectives which can provide guidance for environmental input. Stress importance of consulting public interest groups affected by the project, invite participation.
- (2) Initial identification of study needs: confirm the development objectives, define boundaries (the project area per se and its zone of influence). List required expertise/specialists. Set up a recording/management system to facilitate decision making.
- (3) Establish an interdisciplinary team of experts to provide the technical information to decision makers. Team leader appointment is important as this is critical for coordination. Ensure periodic reexamination of expertise so that adjustments may be made. Local experts must be brought in early in the process of project planning.

Effective team participation includes retaining an open mind, and ensuring information exchange. The team should be encouraged to indicate concerns, limitations, alternatives and possible trades-offs.

A "Baconian" approach is to be avoided, i.e., elegant studies with little relevance to decision-making needs. Data collection should be planned carefully to avoid overlap and inefficiency. Finally, Rees observed, the team should have disciplinary strengths reflecting the kind of socioeconomic and biophysical characteristics needed for the execution of the project. This would help ensure a balanced approach.

The last aspect of conducting the initial phase of environmental assessment concerned field analysis, i.e., the need for broad, non-intensive, judgemental analysis of environmental factors in probable zones of impact associated with a proposed project. It was critical to dovetail the acquisition of data with those collected during later phases and to organize team meetings following field visits to iron out problems. This would help achieve compromise and consensus among specialists. Dissent and controversy should also be recorded.

In terms of public involvement, it was asserted that interest groups could contribute to identifying constraints and opportunities of given projects and help find alternatives or solutions. Thus, such groups should be involved during the early stages of the project.

In concluding, it was outlined how the ADB assisted governments in their optimal usage of resources by helping identify potentially significant environmental impacts of its development projects and programmes (particularly over the longer-term) and providing mitigation measures as required. It was important to know whose environment was being threatened and to recognize conflicts which needed to be addressed as early as possible in the planning process.

Discussion

Biswas on being called to make his comments, began by outlining the problems faced by developing countries, viz., population and poverty. Basic needs provision was of prime concern. The environment is, naturally, multidisciplinary -- environmental planning builds on two aspects, viz., environmental information systems and environmental monitoring.

It must be demonstrated that the cost of initial environmental investment is lower than rectifying environmental degradation. All sectors must be involved in environmental planning. Biswas listed some factors in incorporating environmental concerns into the development process: -- Institutionalize the process of integration; involve all levels, from government to public; foster public participation; institute a strong research base; constantly update environmental information systems.

Overall development strategy can evolve; assessment studies essential. A question for Biswas, from the floor, concerned the role of the universities. What role could they play in the development process? How could the gap be bridged between research and practice?

Biswas' response was to outline the situation in India where several high-level committees to advise government during the planning process are called upon, while, at the management level, project teams can involve experts during actual implementation. (Professors can/do advise during this phase.)

A further question centred on the ADB's view of regional planning; was there not a need to emphasize the legal and institutional

framework as a further factor, to be added in the presentation? (Viloria)

Citing case studies, Rees noted that what is often perceived as a technical problem is frequently rooted in legal or institutional factors. This was confirmed particularly when regional development projects were employed by developing countries, e.g., gaps in environmental expertise, inappropriate environmental standards, administrative bottlenecks, etc. However, while a desirable outcome is to encourage modifications to the existing legal and institutional framework, it is not always possible. Thus, it is important that development progresses as projects or "packages of projects" that have been identified as being in harmony with the optimal use of natural resources in any given region. Ideally, account should also be taken of the impact of macropolicies on a nation's natural resources endowment. This could have significant implications for legal and institutional arrangements, particularly for the long term.

Hashimoto wondered whether, in the light of the material presented, any real integration of environmental consideration into the process of development can take place in any country without bitter experience. Initial environmental investigations must be an initial step.

Rees responded by reasserting the ADB's viewpoint concerning the value of environmental planning, including initial environmental examinations (IEEs). It held both operational and educational value for all levels. They have been incorporated in the Bank's Environmental Guidelines a procedure for projects staff during project processing. The Guidelines sought both to explain and involve the project's staff but had the ultimate objective of devolving environmental reviews upon the executing agencies responsible for the processing of economic development projects. The "bitter experience" could be minimized or avoided by this mutually-interactive process.

Rees further observed that an "unravelling" capacity always exists in any environmental planning and management exercise due to its complexity and should be guarded against. Poor environmental planning and management had brought many headaches in this regard.

Again, Hashimoto, voiced concern over who, exactly, has access to the initial environmental assessment document.

Rees responded that access to the Bank's environmental documents is an automatic service to the governments of the Bank's developing member countries. He went on to explain that those projects in any one financial year likely to generate significant environmental impacts are listed and this is conveyed to relevant agencies through the ADB's country department -- though there is sometimes little ability to act on the information. It may be seen as a training process -- a means of sensitizing agencies to potential environmental impacts and encouraging action.

A comment from Biswas centred on the scope of financial institutions to promote environmental research on already implemented

programmes and projects to assess the environmental impacts and determine costs for not involving environment concerns in the development process.

In his reply, Rees sought to project the need for varying perspectives. He emphasized that an environmental audit of a nation's resources could indicate its future usage patterns at both national and regional levels. "Environmental and natural resources profiles," are being drawn up by ADB for selected member countries. He drew attention to a recent publication "1986 World Resources Report" which contained a compendium of current environmental problems -- such as soil loss, deforestation -- broken down by regions and countries. Since it is intended to be an annual publication, it will enable trends of various parameters to be appreciated and perhaps encourage a rare balance mix of programmes and projects. A further relevant publication (from ADB), was "Economic Analysis of the Environmental Impact of Regional Development Projects." This addressed the question of how economic analyses should be conducted at the project level. It is hoped that the experience gained in the creation of this document will be applied in a macroframework (agriculture and forestry sectors, for example).

Rees concluded by observing that environmental audits could one day help ensure that the natural resources element in the development equation held parity with economic and technical considerations. Chairman Sazanami closed the session on this note.

SESSION 2: (continued)

Monday, 10 November 1986, 15:50-17:00

Topic: Policy Analysis Perspectives in Environmental Planning and Management

Speaker: Masahisa Nakamura
Discussant: Leandro A. Viloría
Chairperson: Hidehiko Sazanami
Rapporteur: Antonio L. Fernandez

In his presentation, Nakamura clarified his terms of reference, stating that he meant "perspectives directed to people in civil administration." He tackled the topic by initially citing the gaps between science and policy decisions, and among policy decisions. On the former, it was noted that science encouraged research and descriptive modelling. On the latter, practical implementation and prescriptive modelling were a priority. The latter gaps indicated conflicts between the following:

policy analysis	-----	implementing plans
implementing plans	-----	social welfare
social welfare	-----	ecological balance

In developing countries resource management is the prime issue, while in developed countries pollution is a more immediate concern.

The "main messages" were stated in the following manner: Environmental policymaking is discussed. Policymaking requires policy analysis. Development of human resources needs the capacity of performing policy analysis. Policy analysis has not been perfected; there are pitfalls. In environmental policymaking, there are other aspects to be dealt with:

- incrementalism of decision making
- multiple perspectives
- character of developing countries

The framework assumes the constant interaction among scientists, the popular movements and administration as technology/economic development vs. environment issues arise. He cited the controversial case of a sewage treatment plant sited on a man-made island in Lake Biwa. Many similar controversies have arisen which have posed difficulties to public decision making in Japan.

Apparently, certain essential points can be obtained from environmental policies. These are long-term, characterized by many contingencies, political judgements, and eventually refinements. They need a strategy for implementation. When implementing plans, the administrative and decision making structures, national priorities and

legislation come into play. Mobilization of resources are eventually required and public inputs desirable.

Policy analysis is interactive or cyclical in nature. Political and organizational differences are recognized. Often tools such as operations research, sensitivity analysis, cost benefit analysis, and cost effectiveness analysis are useful. The cycle begins with knowing what the problems is. This requires synthesizing available information, the range of planning methods/techniques, policy instruments and variety of institutional arrangements. Then objectives are identified, alternatives sought. Alternatives are evaluated; time discounting, trade-off, risk and uncertainty, efficiency vs. equity issues apparently will crop up. Data and information to evaluate alternatives may not be enough, costly to gather, replete with errors and/or difficult to interpret.

In the face of all these, policy analysis has emerged. Quade defines policy analysis as "a form of applied research carried out to acquire a deeper understanding of socio-technical issues and to bring about better solution." Of policy analysis, articulation and reasoning are assets to scientists, administrators, and the people.

Human resource development in the context of environmental planning and management must endeavour "to articulate and develop systems with capacity to reason through." Definitely, these skills are acquired and not instituted.

Nakamura went on to point out a classification of methodological tools for articulation and reasoning heretofore associated with systems analysis.

- (1) Organizing thoughts for data collection and data recollection.
- (2) Synthesis of data into meaningful information.
- (3) Reformulation of information into alternative solution approaches.
- (4) Evaluation of alternatives for their merits for decision making.

Policy analysis capabilities are in demand everywhere, Nakamura maintained. Different personal, organizational and technical perspectives had to be appreciated considering the triangle relationship of scientist-administrator-people. He believed that his experience in developing countries had taught him so. Developing countries invariably are characterized by a "culture of poverty," unstable political climate, and gaps in implementation.

Discussion

Viloria saw the problems in environmental planning and management as also ones of public administration. The education and training of

administrators has been seen as an age-old challenge. The task has seemed almost impossible, however the logical and systematic presentation of Nakamura augured well for several professions. Nakamura's presentation indicated a way.

Schools of management and public administration would not have lasted this long. A well-rounded education rather than a particular discipline defined by a job description merited more attention in environmental matters. A balance had to be struck between the ideal (articulated/reasoned) and the requirements of different levels of government.

From this the discussion proceeded to Cardenas who wanted to know how environmentalism and its values affected the quality of environmental management. So far, Nakamura's presentation presented systematic thinking as applied to environmental matters. Nakamura's reply reinforced the original thesis of his paper by emphasizing that administrative personnel, whether they have gone through the process of articulation and reasoning, can be gauged according to how they have considered and understood the environmentalists' values.

Hashimoto was asked by Sazanami, acting as chairman, to give his views. Hashimoto, speaking from his wide experience as an academician, administrator, and government consultant, stated that eventually public administrators and public movements do clash. This occurs of course because of different perceptions. The public administrator has to make a stand. But of course, he has to maintain contact with various groups of different persuasions. Somehow, he should be protected in his efforts to generate a suitable social and political climate. Public support, if won, is not necessarily smooth sailing.

Rees emphasized that articulation (or communication) is necessary at all levels be it concerned with technical, financial or political considerations. A technically-oriented view has to compete for a place in macro-level activities. Scientists, therefore, had a responsibility to express their views in pragmatic and operational terms.

Vollenweider reiterated that indeed in this field, one cannot be independent of politics. Yahya expressed dissatisfaction over lack of attempts to bridge gaps in the decision making process. Institutional values need to be appreciated.

Finally, Nakamura admitted the comments were both instructive and expected. Japan has had a unique way of resolving environmental problems. It has a history of people movements. He pointed out the contrasting ways in which information is held in the U.S. and Japan. In the U.S. public administration are responsible for keeping information from the public. Japan is different. The analyst, not just the scientist needs to know and appreciate the different perspectives.

SESSION 3: COUNTRY CASE STUDY PRESENTATION (I)

Tuesday, 11 November 1986, 9:30-10:40

Topic: Local Community Involvement in Environmental Planning and Management: Focus on River Basin Management - The Lobo-Broa Reservoir Case Study

Speaker: Jose G. Tundisi
Discussant: Michio Hashimoto
Chairperson: C. E. Bauer
Rapporteur: James F. Goater

Tundisi began his presentation utilizing a number of studies to show how:

- A research project in one reservoir and its watershed was developed;
- A comparative research project with other natural lakes and reservoirs with an ecosystem approach was undertaken;
- A management plan for reservoir and watershed was established;
- An environmental education approach which involved the local community was devised; and
- A training system was developed at the same time.

Tundisi then briefly deviated to provide some background to his institution -- the School of Engineering at San Carlos Campus, University of São Paulo. Areas of research include: climatology; sediment transportation; irrigation studies; hydrology; limnology, sanitary engineering; water quality; and modelling.

A specific approach for the watershed under discussion was developed and then applied to other watersheds in other regions of Brazil.

The area of location contained the highest concentration of human activities, therefore the greatest impact, in the whole of Latin America. This high industrialization in the region led to the construction of a system of reservoir construction -- rapid construction, particularly, over the last twenty-five years. Hydroelectric power was the principal reason for the construction of large, shallow reservoirs in the last two decades.

Slides showed (a) population distribution in São Paulo state. (Concentration of human activities entailed high input of nitrogen and phosphorous into reservoirs.) (b) Location of reservoirs, and Broa reservoir in the state. Small reservoirs, less eutrophic, are important for comparative studies, the speaker noted. Important for logistics approach, easy to study, thus limnological/ecological concepts

were developed in Broa reservoir for broader application. (c) Two compartments of the state -- industrial activities and agricultural. Broa reservoir is located in the more agricultural sector. Reservoir construction came at the same time as intensive industrialization/economic development. Thus while the reservoirs were effecting a change in the river system, they were important markers for the changes taking place in other sectors of the state. (d) Some idea of the size of the reservoirs under discussion, several billion cubic meters, some 150 km in length. (e) Broa reservoir, on which Tundisi's campus has been located for the last 15/16 years. Average depth 3 m, climatological centre on lake. The centre is 17 ha in area. Continuous/ongoing research is possible -- demonstration/experimentation, continuous sampling. Vegetation is 'cerrados' (savannah). (f) Climatological map of the region -- continuous mixing pattern observed. (g) Soil system around the reservoir (maps prepared for teaching purposes). Various processes at work can be investigated in the watershed. Cerrados broken up by small rivers creates a heterogeneous system which is very important to maintain, for management purposes. Sampling systems exist in all rivers. These serve as "information systems" for the conservation societies who are working in the watershed. (h) Vegetation map showing permanent and temporary types of vegetation. (i) Pollution spread -- since 1970, in the watershed. (j) Hydrographic net -- main characteristics. (k) Depiction of forest cover around the upper portion of reservoir, important for production/accumulation of organic matter, creating a bank of macrophytes which maintain nutrient input, acting as a filter. Two main feeder rivers into the reservoir supply 80 per cent of the nitrogen/phosphorous input into the river. (l) Further inputs in the watershed's small rivers. (m) Additional detail concerning inputs from the main rivers.

The next series of slides was designed to give some results which have led to the development of some of the concepts discussed.

(a) Seasonal cycle of primary production (yearly pattern of primary production), (b) Precipitation pattern. Two functions effect the reservoir. Summer rain and winter wind, (c) Results of studies on wind velocity, (d) Ways of coping with wind on the reservoir -- a conceptual part of the work, (e) The basic relationship of Broa reservoir -- applicable to a number of reservoirs.

(A mass of technical details followed which substantiated the framework.)

Against this background some management programmes have been constructed -- two main points emerge. (i) The use of enclosures to change the phytoplankton make-up by introducing different species of fish -- biomanipulation. (Satellite picture of a large reservoir was shown, part of a chain operationally connected illustrating the eutrophication process.)

Further slides showed effects of agricultural activities along the lake, producing sediment, and the eutrophication problem; a conceptual slide showing the connecting effects relationship in a chain of reservoirs -- and how this can be dealt with came next, followed by seasonal flushing rates of the reservoir and the inter-

connecting nature of elements. Finally, came a pictorial slide of an Amazon reservoir with fast oxygenation rate -- which can regulated downstream.

These slides, Tundisi declared, showed ideas developed from the study of Broa reservoir and comparative studies with other reservoirs. He now touched on the work with the local community (i) scientific base at university from which research/training is drawn --- service to small communities in Broa watershed for water analysis --- programmes on environmental problems (watershed approach) --- general courses on water quality, conservation, for example. Postgraduate students participate in study programme as monitors. Very active participation of conservation societies -- developing programmes in environmental information.

Training for school teachers in environmental management is also carried out.

Training Aspects -- M.S. and Ph.D-level studies in the Broa watershed -- short-term intensive courses in limnology, watershed management, water quality, conservation, and management of inland systems. ILEC will participate in 1987 for the first-time.

In conclusion, Tundisi highlighted the main points of the programme. (i) Reservoir construction is a very important activity (economic, social, political) tackled through a watershed approach to the problem, (ii) long-term research/training within this framework, (iii) aspects of management problems in dealing with main problems, (iv) community involvement (information supply to public, all users receive weekly information bulletin), and (v) application to other systems.

The importance of continuity of project was noted, and the ideal location of the centre such that it can be used for field, laboratory and demonstration/experiment purposes in training.

(vi) Good financial support from state/national bodies as well as international bodies (OAS).

Tundisi concluded the presentation by announcing plans for a 20-year's anniversary symposium to assess two decades of the project.

Discussion

Hashimoto, in commenting, was greatly impressed by the Broa case study and contrasted it with the dense concentrations of population in Japan. Nevertheless he noted the ecological severity, and wished to raise three points:

- (1) Watershed management is small-scale/localized, with, in Japan, statewide interest and watershed population. What kind of problems/interrelationship are there, in terms of socioeconomics?

- (2) Management programmes require administration involvement. From p.16 of the paper, Hashimoto noted multisectoral involvement in the itemized list of systems/compartments upon which a comprehensive synthesis of activities could be based. What are the interrelations for universities and the sectoral approach?
- (3) In being impressed by the educational/training approach, he noted that ILEC could learn from it, and wondered what kind of real life issues could be the subject of education of the community in terms of the watershed environment. What must they do? (e.g., housewives should not use phosphate detergents).

Tundisi responded that although his work is with a local watershed, it is also a statewide programme -- because the concept can be used in other watersheds. From this example, wider application is attempted. Local people can draw upon the water for comparative purposes.

Watershed management is carried out by two main bodies: firstly, the secretary of the environment, equipped with law enforcement, and secondly, the local county which is similarly equipped. The latter is helped by Tundisi's institute.

The scientific approach attracted the attention of the local community. From that a conservation programme developed, and conservation societies grew up. The reforestation idea developed from the participation of schoolteachers, thus schoolchildren took an active part.

Further discussion came from Vollenweider who made the fundamental point that initial environmental awareness flows out of the academic community, but then, after a period of inertia, when nothing happens, it suddenly comes back, and the community responds back to the academics.

Tundisi concurred, by saying that the initial input comes from scientists -- In many Brazilian cities there are ombudsmen to whom people can go with complaints. (Examples included the possible mining operation on the Broa reservoir, which was happily blocked by legal constraints.)

The community now directed environmental concerns.

Nakamura raised an issue for Hashimoto/Vollenweider regarding the reality of government support for economic development, and therefore against the interests of conservative groups. Tundisi reiterated the legal measures which were, in effect, indicative of the government standing firmly alongside the local community in safeguarding the environment. All ministries, save perhaps the telecommunications ministry are involved. Sometimes there is interministerial conflict.

Nakamura asked whether this was an exceptional case. The response was that specifically "yes" but there was a general statewide increase in awareness of environmental concerns.

Biswas had three questions:

(1) As far as scientific research goes -- how far have these results been taken into considerations at the national level. (Efforts at integration are made in India.)

Tundisi noted, in response that several people trained at his institute are now working in responsible positions. The training they received is now reflected at state level, slowly influencing the process of change. This is one way that scientific research has an impact.

(2) Related question to all-interministerial (centralized) approach to coordination, or is there any feasibility of a decentralized approach with an environment component in each ministry.

The response was that the local county authority is being reinforced by the institutes' research results.

(3) To what extent was remote-sensing being used in Brazil for pollution assessment?

Remote-sensing was being used/just starting, to detect blooms of phytoplankton. This is the first use of such a method.

Goda had a technical question regarding the reservoir and ongoing attempts to prevent siltation. What is the national average siltation rate?

Tundisi answered that the sediment rate was about 1 mm per year, rather fast. Siltation connected with seasonal activities and strong influence on primary production was noted. (Low transparency affected production rates.)

Sazanami had a question regarding p.22 of the paper which contained a diagram of the development of activities relating to environmental planning. He considered whether the activities of other groups in regional planning such as pro-industrial or pro-agricultural groups, in addition to the conservation societies should be included. He opined that regional development is a trade-off in elements between many interest groups and requested Tundisi's observations regarding this.

Tundisi responded that in San Paulo state, with 25 million people, the conservation groups have a strong hold. This is an exception -- in Amazonas, sparse population, there are no environmental groups. The conservation societies play a bigger role than the economic lobbies and industrialists. This is true only for São Paulo state.

Biswas had a final word on the siltation problem:

Should the catchment area be included in programme of reservoir construction or should legal constraints govern river basins, setting them aside for afforestation programmes?

In closing the presentation, Tundisi declared his intention to continue work in the same direction. It is one's own responsibility to formulate specific concepts and objectives, with the close involvement of the local community.

SESSION 3: (continued)

Tuesday, 11 November 1986, 10:50-12:00

Topic: Watershed Management in Nepal

Speaker: Pradip M. Baisyet

Discussant: Augustine Koh

Chairperson: C. E. Bauer

Rapporteur: James F. Goater

The paper is broadly divided into nine sections: introduction; the role of mountain watershed; major problems; origin and evolution of watershed management; policy and legislation; technical basis and institutional arrangements for planning and implementation; constraints in implementation of watershed management programmes; institutional arrangements for coordination; and conclusion.

With close reference to the paper, Baisyet outlined the major areas of each section:

Introduction: Brief physical characteristics of the country, (latitude, longitude, area, geographical location, altitude). Five major physiographic regions. Wide range of climatic regions (monsoon, tropical to arctic), variety of tropical vegetation -- commercial forest, alpine forest, and conifers, detailed account of each of the five physiographic regions, socioeconomic background; population growth in different areas, average per capita income, administrative regions, migration patterns, statistics on cattle population -- (high density indicating fuel, fodder, and cultivable land resources pressure).

(A diagrammatic slide gave a graphic representation of socioeconomic factors responsible for deforestation and soil erosion.)

Role of Mountain Watershed: The country is rich in water resources. Four main river systems, though geologically fragile, entail high potential for hydropower. Very high total water yield from mountain watersheds, with forests playing a vital role in the national economy. Population is 90 per cent dependent on them. Tremendous rate of forest depletion. Graphic slide depicted the watershed conditions in the seventy-five development districts of Nepal. (Fifty are "good" or "fairly good.")

Major Problems of Mountain Watershed Management in Nepal and Their Effect: Very difficult problems due to terrain. Eight major factors, including human/livestock pressures; weak soil conditions: unplanned migration; lack of awareness among rural community, etc.

Origin and Evolution of Watershed Management in Nepal: There followed a detailed exposition of the six National Development Plans so far

launched in Nepal between 1951 and 1985. Each plan was mentioned with reference to its major concerns. (The Seventh Plan gives top priority to water resources and agricultural development.)

The Department of Soil and Water Conservation was established in 1974, with responsibility for protection and sound management of the various watersheds to reduce flood and landslide hazards, and to raise the standard of living of the people. In 1980 it was renamed the Department of Soil Conservation and Watershed Management (DSCWM). The organizational set-up was shown on slide; it was also mentioned how rapidly the staff had expanded. Restructuring to cover all levels of national administration is currently underway.

Policy and Legislation for Watershed Management: Baisyet noted that since 1975 (4th Plan) watershed management has received specific attention -- the 6th and 7th plans specify in particular the conservation of natural resources. The DSCWM, soon after its establishment took short-term measures to tackle soil erosion and watershed management policies.

Technical Basis and Institutional Arrangements for Planning and Implementation of Watershed Programmes: The basic mandate of DSCWM is to promote integrated watershed management in hill and mountain regions of Nepal. There is a long way to go, however. A list of those projects related to the management of natural resources was then presented: Six locations of projects for which the DSCWM is responsible for planning, coordination, project evaluation and monitoring, and five locations of IRDP's where Panchayat and Local Development Ministry is the lead agency. In listing some support projects related to research, planning, resource inventory and informal training to support watershed management, it was noted that remote sensing and impact studies were ongoing. Finally a list of sectoral development projects was provided, chiefly, community forest project, forest survey and research, hill forestry project, Institute of Forestry, and so on. It was observed that all agencies are interrelated in water management.

Constraints in Implementation of Watershed Management Programmes: Major issues: controversy between watershed boundary and political boundary; watershed programmes need special project status, not yet conferred; difficulty of correlating overall objective of project with periodic plan or project annual achievement; large engineering structures consume disproportionate budget; no systematic monitoring; little cost/benefit analysis.

Operational problems: Difficulty of DSCWM to expand its programmes, although manpower expansion has taken place, still a nonavailability of project staff; great need for appropriate technology; difficulty in generating community participation -- only when direct benefits are perceived will there be contributions from the people; absence of clear-cut land-use policy.

Institutional Arrangements for Coordination: Via a slide the schemata for this system was shown. In conclusion, Baisyet noted that frequent changes in the government's policy have resulted in increased deterior-

ration/depletion of natural resources -- little conservation. Land-use policy was needed to generate employment, etc. High cultivation of land, great intensity. Conservation activities, however, are becoming more budget-oriented. Finally noted that conservation of natural resources/rehabilitation of watersheds, etc. is accepted by the local people when it is seen by them that such activities are in their own interests and for their own benefit.

Discussion

Koh expressed interest that rural improvement was an alternative to shifting cultivation and depletion of natural resources. He noted the lack of land-use maps for Nepal and unrestricted land use, thereby. Noted also was the lack of awareness among the people entailing that any government plans could not take place in its absence.

Cardenas had a question on natural resources. Should not downstream countries in a watershed also contribute to safeguarding the watershed quality?

Baisyet agreed, but noted that Nepal received much of its water from China, so that it too is a downstream country. It is a regional problem with political implications.

Haeruman focused questions on coordination in the watershed. There were two interest groups, the owners and benefactors. Do the committees charged with coordination have an overall objective. Coordination adds to the cost. Second, a question on financial procedure -- how is this arranged? Thirdly, on people participation regarding costs, evaluation of returns, etc. He was interested in these questions in the Nepal context.

Baisyet responded that there is a process of consultation, down to individual farmer level. Without this cooperation, implementation is difficult. Mobilization is possible -- with reference to an actual case. In answer to the financial question -- after a detailed description of the various stages of plan approval, it ends up with the district treasury, for funding. People's participation is very difficult, with loans frequently being misspent. The DSCWM is concerned with specific project identification, with farmers, a fifty-fifty (per cent) system operates (half labour costs provided by DSCWM, the other half provided by farmer).

Biswas enquired on the subject of conversion of forest for development purposes -- are there government agencies monitoring this process? and also as to the role of the National Planning Commission (NPC). Does it have any advisory role to the government?

Baisyet indicated that any conversion of forest land must be under the auspices of the Forestry Department, which is vested with the necessary authority. As to the National Planning Commission, it is advisory to the government, and checks whether projects are in accordance with government plans.

Hashimoto referred to page 16/17 (table 3) and page 25 (table 4). Compared with watershed conditions (previous map) it appeared that conditions are getting worse with a greater incidence of death/damage/destruction, etc. Secondly, from the list of achievements of the DSCWM over the last ten years, is the programme focus on these particular areas? The whole list seems to be more disaster control than watershed management, so is it a natural planning process? Can we have effective technology or not?

Baisyet noted there was a kind of correlation between damage sustained and watershed conditions. He noted that the list on p.25, was only a modest list which could have been extended. Appendix I gave a priority list in terms of watershed conditions.

A final rejoinder from Hashimoto, who likened the situation to Japan of the 1950s when national priorities were (1) natural disaster control; (2) food provision; and (3) energy resources.

SESSION 4: COUNTRY CASE STUDY PRESENTATION (II)

Tuesday, 11 November 1986, 13:30-14:40

Topic: Environmental Planning and Management in Thailand with Particular Reference to the Songkhla Lake Basin

Speaker: Surin Setamanit

Discussant: Liu Hongliang

Chairperson: Zubir Yahya

Rapporteur: Antonio L. Fernandez

Setamanit began by giving a brief historical background of environmental planning in Thailand. He first mentioned that development plans are formulated in developing countries normally to combat poverty and reduce inequality in the distribution of wealth (income). But as the Sixth Development Plan (1986) of Thailand shows, specific areas in development planning were included to integrate environmental matters with the economic analysis. With the establishment of the National Environment Board (NEB) in 1975, things got moving with the environmental impact assessment (EIA) requirement put in place. In the process, care was taken not to drastically upset the functional assignments of the already existing government agencies.

Earlier, some kind of environmental assessment implicitly had preceded the planning process, with project proposals, site selection and design, being taken sequentially. Now, the natural resource, socioeconomic and environmental factors are studied in a similar sequence (as above) -- all leading to EIA. The Songkhla Lake Basin provides a good example of economic-cum-environmental planning.

The Songkhla Lake System consists of four zones or connecting ecosystems, each with unique characteristics. The basin population is generally poor and dependent on agriculture, mainly rice farming. The current state at specific localized areas can be described as follows: irrigation potential not realized, lake pollution caused by domestic and industrial wastes; unplanned urban development, high population growth rate, soil erosion, illegal logging. Salinity intrusion can affect three zones during the dry season thus limiting the possibility for drawing out water for irrigation.

With the support of the United Nations Development Programme (UNDP), Asian Development Bank (ADB), the Songkhla Lake Basin Planning Study (SLBPS) was undertaken as Thailand's first environment-cum-economic development project. By rapid assessment method, loadings could be estimated. This made it possible to roughly deduce pollution control needs and to what beneficial uses the lake and its basin could be put.

Mathematical models developed in the UK to simulate the system (its salinity, water quality, hydrology) were used. Though initially, the Asian Institute of Technology (AIT) was developing a model. Data,

particularly referring to sediment-water interactions, proved to be difficult to gather even if available. Data were scattered, "guarded" by agencies which possessed them, or were lacking in quality. The computerization was performed in the UK, and as a result of the study, salinity barriers are being muted for construction across certain parts of the lake. One main objective was to facilitate the use of lake water for irrigation or rice fields on which a number of people depended.

The Thai government is a centralized one. However, a new organizational structure for rural development planning was introduced, which was intended to link the local councils with the higher agencies via regional coordination centres. The NEB also intends to put up regional offices. With this set-up, however, skilled manpower may not be available in the lower or regional levels as a higher level ministerial job is much more attractive.

Setamanit included a familiar tale on community participation about people in the rural areas saying "leave us alone," just when the central government decides to listen to them.

Discussion

Nakamura, as discussant, focused on five points in Setamanit's paper.

(1) Lessons can probably be learned from the traditional Thai way of resolving conflicts as shown by the establishment of the NEB.

(2) The gap between what was supposed to happen and what happened in the planning study needs to be minimized. Besides, a follow-through to pursue desired results must be carried out.

(3) Technical collaboration or cooperation requires more commitment than just involvement on the part of international agencies. These agencies should oversee the project no matter how complex and difficult technical collaboration is.

(4) Modelling as an imported technology has been repeatedly described as difficult and costly to do in a developing country. However, the planning model has its merits on the process (how the result is arrived at) and not so much of the results. The thinking process accounts for a good plan (not necessarily a correct plan).

(5) The cost of public (or local community) participation should be taken seriously, too.

Rees offered some additional points on the Songkhla Lake Basin Planning Study (SLBPS) as he himself had been involved since its inception.

(1) The coordination between Thai environmental and planning agencies exhibited great "political will" and commitment at all levels.

(2) Regular consultations with affected groups were assured, e.g., through workshops.

(3) The action plan (development strategy) provided a policy framework and rationale for development projects and recommendations for an investment timetable.

(4) Such a planning study brought out opportunities to strengthen institutions including universities. This was ultimately helpful in achieving optimal use of the region's resources and in assuring the acquisition of relevant knowledge or technology.

(5) Study tasks were defined in terms of problems or spatial arrangements rather than technical disciplines. This helped ensure a balanced outcome.

(6) The terms of reference called for identification of projects as "packages" to ensure mutually reinforcing investments for infrastructure, production, and services.

On the modelling aspect, some comments were received from Jørgensen who brought out the fact that the situation of Songkhla Lake indicates a need for strong forcing functions such as salinity. He also felt that the computerization should have been done in the host country to expand opportunities of working together. Setamanit pointed out however that time constraints prevented students from acquiring new skills although students are currently overseeing certain aspects of the project.

Viloria asked about the role of Prince Songkhla University (PSU) in offering graduate courses. One factor that would have to be considered is whether there is a market for the graduates. Setamanit sees the limited market. The people of PSU, he stated, have shown interest in the rural projects of the lake basin.

Hashimoto cited the case of Lakes Kasumi (Kasumigaura) and Shinji, both suffering from salinity intrusion.

Biswas voiced a query as to whether conflicts can be reduced if the EIA mechanism is decentralized. The feasibility of such an arrangement may perhaps be a point to consider in the succeeding country papers, he suggested. Rees mentioned that the planning agency maintained an environmental division even before the NEB came into existence. Setamanit added that this division still remains.

Viloria also pointed out the issue of land use -- that a regional land use plan in tandem with socioeconomic development objectives may prove useful. Yahya, chairperson of the session, agreed that keeping this issue in mind was important and reiterated Malaysia's and other Southeast Asian nations' interest in experiences from the Songkhla Lake System.

SESSION 4: (continued)

Tuesday, 11 November 1986, 14:40-16:00

Topic: Assessment of Environmental Planning and Management in Laguna Lake Region

Speaker: Marlito L. Cardenas
Discussant: Beatrice Munyando
Chairperson: Zabir Yahya
Rapporteur: Antonio L. Fernandez

Cardenas presented the case of the Laguna Lake Region as one which, although an early starter in terms of environmental motives in a regional sense, has remained largely unable to be managed according to objectives mandated to the Laguna Lake Development Authority (LLDA). As early as 1969, the environmentally-oriented regional project was started. The region is characterized as the most urbanized, most industrialized, densest, richest region in which also rests much political and economic power. The lake as a common property is open to both resource users and abusers.

The unique features of the basin -- both natural and man-made -- were highlighted. Among these are the proliferation of water hyacinth, intensive fishpen development, supporting a traditional duck raising industry and macrophytes in accretion areas. The lake has been identified as a future domestic water supply source. This, as an objective, poses major implications on policy.

The main problems identified are environmental degradation, inefficient and inequitable resource allocation, as well as gaps and conflicts among institutions (regional bodies overlapping in jurisdiction area, local governments, line ministries).

Policy instruments so far in existence are information, motivational and educational campaigns, economic incentives/disincentives (for example, tax deductions on pollution control equipment), regulatory mechanisms (standards), and strategic use of public funds for capital formulation, improvements, maintenance, and operations.

Although LLDA assumes an institutionalized environmental planning and management, its coordination of the different multiple uses has in some areas been weak or nonexistent. A cross-referral system with the environmental policymaking body and the Human Settlements Regulatory Commission is in place.

In conclusion, policy implications were listed, which were in effect recommendations, namely:

- (1) Technical improvement of environmental planning and management by using "new" technologies in regional analysis and more local expertise (which has been underutilized).

- (2) Policy instrument design (such as reexamining regulatory standards suited to tropical conditions).
- (3) Realizing the full regional mandate and supporting institutional arrangements.

Discussion

Munyando raised five points relevant to the country reports, namely:

- (1) need for technical information on lake system,
- (2) integrating environmental issues in planning,
- (3) need to examine laws and regulations including environmental quality standards, which are important in the case of water shared by two or more countries,
- (4) need to assess groundwater in conjunction with surface waters,
- (5) building up resources to manage problems.

Eutrophication and related phenomena such as the proliferation of water hyacinth (*Eichornia crassipes*) were considered. Goda inquired about the future domestic water supply and the effect of eutrophication on this plan. Cardenas replied that anti-pollution campaigns are being sustained while other possible water supply alternative sources are being considered. A Metro Manila environmental project is still in the proposal stage; if this is pursued, it may have a positive impact on controlling eutrophication.

Rees reiterated what seems to be the key element in such wide-ranging projects -- i.e., the executing arrangements. What sort of working associations may be established? What financial resources may be committed and what are the expected outcomes? Can investment programmes or projects be anticipated?

Profuse water hyacinth growth, according to Vollenweider is mainly due to nitrogen. Uses include biogas generation through anaerobic digestion, according to Goda, and paper, too, added Cardenas. Vollenweider also inquired as to how eutrophication is realistically considered in environmental planning and management. Cardenas pointed out reducing point sources as part of the regulatory mechanism. Fish from culture pens have also somehow accounted for much nitrogen intake. To this, Vollenweider expressed the need for sound assessments of the scientific basis for such a nitrogen-limited lake, to guide decisions.

SESSION 5: GENERAL DISCUSSION (Identification of Issues Arising from the Presentations and Discussions of the Past Two Days)

Tuesday, 11 November 1986, 16:20-17:00

Chairperson: Guenter Tharun
Rapporteur: James F. Goater

This session was designed to identify the principle issues arising from the presentations and discussions of the previous two days work.

Tharun reminded all assembled why they were there and noted that the task was summing up and synthesizing major issues which had emerged. He restated the five principal questions contained in the original UNCRD Aide Memoir. Thus, it was seen that the workshop organizers wished to structure all the input so far around these questions.

The chairperson, who considered himself a learner, found presentations interesting and noted the similarities and overlaps in the papers. He noted that if scientists wanted to be successful in getting their messages across, their messages must be presented in such a way that they could be understood by policy/decision-makers. Perhaps guidelines could be formulated, to assist the organizers to locate appropriate training measures for better environmental planning/management -- focusing on inland water management.

Nakamura questioned whether the secretariat had any idea how the final product should be put together, any final image? There were so many ways -- unless a clear image is in mind, many things could be done which would not be in line with what the secretariat wanted.

Oya responded to this question in an attempt to clarify. He outlined the basic set up and organization of the workshop, which was in two parts. He described the kind of output which was desired, and hoped that the five points previously described would serve as a framework for identifying issues relevant to environmental planning/management. This was to serve as the basis for guideline formulation for developing training programmes for better environmental planning/management.

The workshop programme was then outlined. Saturday morning round-up discussion to identify relevant issues for drawing up guidelines was planned with working group sessions to further deliberate on specific issues. (Oya outlined each of the three groups' brief.)

He allowed that the general intention here was rather broad.

Nakamura inquired as to if there were any follow-up activities? Was the group going to produce a final product, or would it be for

revision? Producing guidelines for the development of training programmes was a complex job.

Sazanami interjected here, noting that this was the first such joint workshop. The timeframe for a training programme was up to three years. Formulation of an environmental training course in water resource management was a long process. Already from the presentations, there seemed to be a great number of considerations. Sazanami noted UNCRD efforts to associate with other institutions/governments in Asia to strengthen capabilities in undertaking training courses. There was also the difficulty of adapting developed countries work to developing ones. Time seems short, particularly as the situation is deteriorating in developing countries. This meeting represented a first step only, and sought advice as to UNCRD/ILEC's future action regarding this.

Overbeck voiced support for Sazanami's words. As a scientist, he was impressed by the extent and quality of the environment programmes, as contained in the developing country case studies heard so far. Approaches could be more successful if there is a transfer of experience in training, research/knowhow. The state-of-the-art of aquatic environmental conservation, can be improved. The ensuing discussion should centre on ways in which this could be done, he thought.

Bauer sounded a warning note that countries cannot advance more than their absorption capacity determines. How far can transferability of experience/advice etc., be successful? (UN in the 1960s thought simple loans would trigger development.) This factor must be borne in mind. Experience is not transferable -- each country must develop its own.

- (1) Develop awareness of these problems -- it must be shown that solutions are possible. Confidence development.
- (2) Solutions must be sought (not necessarily comprehensive).
- (3) Articulation of involved institutions in environmental management (upper levels conspire against the seeking of solutions!).
- (4) Public participation must be encouraged. People's welfare is central. People must be free to select future, options must be available, without scientific interference.
- (5) Relations of the universities with actual situations in the country.

Tharun concurred that solutions will be unique to each country. Each country must be responsible for its own solutions. The case studies have indicated that there is scope for local involvement.

Hashimoto wished to clarify the nature of ILEC's orientation. It was addressed to the question as to what is environmentally sound water resource development. ILEC has a narrow brief of sound lake development. UNCRD is concerned with a wider brief.

Yahya wanted to make an observation, that all participants come from a single field. He had not talked about the "environment" before. There was a need for change of direction. He observed the need for government-level to be concerned. He opined that environment inputs are ignored by developers themselves. Increase in awareness possible -- this conference gave reason for hope. Training issues should reach the right people.

Tundisi wanted to draw attention to the theme. How can the gap between scientists and managers be bridged? Strategy should be developed. ILEC has this as an objective. Maybe this is a training strategy which should receive emphasis. (More crucial in the developing countries.)

Biswas made a two-point comment. Firstly an enormous amount of data is being generated from scientific analysis, how can this be synthesized into usable form by decision makers. A simplistic form of information should be presented to decision makers. Secondly, each country has its own policy procedures, general patterns of administration and institutional mechanisms, but what are the pros and cons of centralized vs. decentralized systems. Can a broad framework be developed to combine both? Integration of local communities must be approached carefully. At what stage should people be consulted.

Any lake system training programme should include four areas:

- (1) Pollution monitoring/control level
- (2) Loss relating to pollution -- not resource audit
- (3) Necessary rehabilitation measures
- (4) Educational awareness of environmental concerns -- to what extent can it be fostered. Project-level officers must be educated through realistic case studies. Can this be included in an educational curricula in the same way as physics, geography, etc., at the school level? Is a specialized branch of education possible. Top priority is valid.

Haeruman distinguished between environmental management and environmental administration in developing countries, little knowledge of latter. Different strategies should be studied (scientific and bureaucratic). Most developing countries have standards of technology use and EIA, which is actually negative impacts management, management of ecosystems is lacking. Rigid compartmentalism. Coordination must be acquired. Difficult to get professors to meet, on issues of environment. Integrated research needed, as it reflects, more clearly, the environment.

He saw a distinct role for UNCRD (different from UNEP) in two stages. (1) Environmental administration, (2) integrated workshops to get everyone together -- communicating/understanding. Intersectoral communications is a good basis for developing information systems.

Finally as regards community participation; it seemed to him that government is the best location for planning. The private sector can be influenced. Government and community leaders should be target groups for this type of training. Will EIAs be used as planning tools?

The chairman here observed that more appropriate packaging of proposals should be done, to preclude failure.

The final word was given to the Tanzanian participant who expressed doubt as to where training should start. Maybe trainers should be trained? At what level? Who should be target group? How can issues be integrated so that the groups (trainers, administrators, target group) all meet. What type of curricula should be developed?

Sazanami wanted to clarify UNCRD's standpoint in relation to the last question: One of UNCRD's ongoing projects was "Local Level Development Planning." Who are target groups? (administrators, technicians, etc.) Collaboration among governments and universities is sought. Educating local communities is a national task, but UNCRD seeks participation of professors, scientists, administrators, etc.

Chairman Tharun had some final points (from Rees) for dissemination.

(1) We must be aware of different aspects of education and training -- focus is too much on universities, there are other possibilities for training.

(2) Basic research can make great contributions in outlining solutions.

Tharun himself saw environmental problems as more political in nature. If answers are sought only from one sector, he doubted whether we would be well-guided. The scientific community is a part of society, science must serve society. With these comments, the round-up session closed.

SESSION 6: COUNTRY CASE STUDY PRESENTATION (III)

Wednesday, 12 November 1986, 9:30-10:40

Topic: The State of the Art of Environmental Planning and Management in Kenya and Tanzania: Focus on Inland Water Resources management

Speaker: Beatrice Munyando
G. L. Kamukala
Discussant: C. E. Bauer
Chairperson: P. K. Biswas
Rapporteur: Antonio L. Fernandez

Presentation by Munyando: Environmental Planning and Management of Inland Water Resources in Kenya

Lake Victoria was taken as the case through which environmental planning and management of inland water resources in Kenya was presented. With an area of 1,200 sq km, it is the third largest freshwater lake after Lake Baikal (USSR) and Lake Superior (U.S.A.). Other major lakes are Naivasha, Jurkana, Baringo, and Magadi. Lake Victoria is shared by three East African countries, viz., Kenya, Uganda, and Tanzania.

The presentation pointed out the lack of data from which to ascertain observed phenomena in the lake such as occasional fishkills and widespread occurrence of algae blooms. This in turn is caused by lack of equipment (both field and laboratory) and even boats to carry out field surveys and water quality analysis. On the whole, funding of such activities is sorely needed.

Aside from these, Munyando pointed out that the following needed to be considered for proper planning and management of inland waters:

- climatology of the region
- waste loadings
- land use in the catchment area
- assessment of fish stocks and study of biota
- trained personnel in related fields.

Other highlights were:

- a baseline study conducted in 1984 (data included transparency, conductivity, alkalinity, DDT, sodium, potassium, fluoride, among others).
- Lake Victoria is an important fish source with abundant aquatic plants (macrophytes) along the coast.

Presentation by Kamukala: Environmental Planning and Management in Tanzania with Special Reference to the Management of Inland Water Resources

The presentation was divided into three parts: a description of the environmental planning and management system, what is being done, the case of a river-basin with multiple uses.

Planning for inland water is based on the twenty administrative regions of the country. The major river basins number five, two of which drain within the internal boundary of Tanzania while the rest drain into three major saltwater systems, the Indian Ocean, the Atlantic Ocean, and the Mediterranean Sea. In master plan formulation water balance and potential, rather than quality, has been emphasized. An Act of Parliament in 1974 dealt with water utilization, amended in 1982 for provisions related to water pollution. Institutionally, an Environmental Protection Unit was first established in the Ministry of Lands, Housing and Urban Development. By 1986, the National Environmental Management Council was formed; it has a coordinating role.

Rufiji River Basin occupies 20 per cent of the country's area. To harmonize development and management, a development authority was established in 1975. Its waters are rich in fisheries and prawns for which it is famous. A pulp and paper plant has operated since 1985 in the industrial area. Tea plantations are nearby and therefore have to be protected from SO₂. A water quality monitoring programme has been established, however, laboratories are poorly staffed and barely equipped. Although the River Basin Development Authority tries to harmonize activities such as dam construction, grazing, agriculture, fishing, etc., lack of funds and manpower has made its activities limited. On Lake Victoria, Kamukala mentioned the diminishing stock of *ilapia nilotica* which has been largely attributed to the introduction of Nile perch in 1958. Lake Tanganyika, on the other hand, has known oil deposits. Both lakes have attracted UNEP's interest.

Discussion

Hashimoto posed the question as to what extent data can be used for planning. At present, data are scattered and gaps exist, replied Kamukala. Tanzania needs advice from experts.

Vollenweider suggested the following:

(1) Certain equipment, still functional but no longer used in advanced countries, may be donated to laboratories in developing countries.

(2) Satellite data are available through which basic problems and system heterogeneity can be quickly assessed.

(3) The polluter pays principle advanced by OECD should provide the basic means for the state to control industrial pollution.

Kamukala stated that the pulp and paper plant is owned by the government. A waste treatment plant also exists in which efforts are being made to maintain standards.

In his presentation, Bauer first indicated that developing countries under such conditions can make a good start by drawing concern and awareness to yield public understanding and international assistance and then provided a systems approach to articulate environmentally-oriented development to provide an integrated analysis related to the workshop's task.

Objectives,

Policies,

Management (Strategies/ Instruments)	must be articulated and coherent; relationships between time and space as well as stocks and flows must be borne in mind
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Bauer went on to elaborate on the features particularly of strategies and instruments. Instruments include training/education, research and development, legal, economic, institutional (e.g., NGOs), plans, programmes and projects. He detailed the features of doing a feasibility study to come up with programmes. Of the ten steps, the ninth, which was evaluation, was further broken down into technical, economic, financial, sociocultural evaluation (e.g., public participation and motivation), and environmental (stress on actions and impacts).

He also stressed the importance of the scientific basis noting that technical tools form the link between managers and academicians/scientists. He believed that level of execution of environmental planning and management must be regional. Skills to be developed must be for technical and political consideration. The legal and economic tools constitute an area in which many are trying to cope. Bauer expressed concern about progress in these kinds of activities and drew attention to the distributed material concerning the San Roque Reservoir, a case wherein planning was not done well.

SESSION 6: (continued)

Wednesday, 12 November 1986, 10:50-12:00

Topic: Development of Environmental Planning and Management at Village Level: A Case Study of Desa Sidroejo, Biltar, East Java, Indonesia

Speaker: Herman Haeruman
Discussant: Kenji Oya
Chairperson: P. K. Biswas
Rapporteur: Antonio L. Fernandez

In the presentation, Haeruman gave a general background and the water resources management organization of Indonesia and provided a brief description of the case of Brantas River Basin. He dealt mostly with the emergent grass-roots organizational system that now serves as an important link between the government and the rural population.

The Brantas River Basin in Java consists of ten cities, two of which have populations over 400,000. It has roughly one-third of the population of Indonesia and is a potential disaster area. The life of the five dams in the basin that were designed for a maximum of 400 years has been reduced to as low as twenty-five years. This is due to excessive sedimentation of the reservoirs.

Given such a situation, the usual top-down approach may not work, especially if conservation is to be sustained. Such pitfalls have to be avoided. Water resource management in Indonesia is carried out by the Watershed Development Commission. It has provincial-level offices with sections for water conservation, river basins, and soil conservation. Training/education, "river training" (for public works), and extension are undertaken in these sections, respectively.

The government's inputs in response to the community needs were:

<u>Community Needs</u>	<u>Government Response</u>
Physical	Physical inputs (infrastructure)
Information/technology	Extension
Socioeconomic	Policy input

Haeruman described grass-roots level organizations in the middle of the community and the government, which are now exerting influence on the bureaucracy to change its former top-to-bottom way of thinking. These organizations (NGOs) were defined by Haeruman, although distinguished from such movements as Greenpeace. Some NGOs receive inputs from universities and private entities.

There exists a three-tiered village organizational system. The government undertakes planning for communities and manages community-related facilities via this system. A village consultative council has its village executive council which maintains "office" space which is always manned. This is not a volunteer group as workers are salaried. The village executive council receives funds for maintenance of facilities and infrastructure from the central government.

The most important feature is the community itself which is organized into family planning, women's study, soil conservation, and water user groups. The farmer and his family are involved in these groups, and receive information, consequently becoming aware of possibilities. This set-up may not be able to fight pollution effectively but may serve as a potential force. The planners in the government must appreciate the need to accommodate the needs of the rural population at the village level.

Discussion

Oya saw the Indonesian experience as a new perspective on environmental planning and management in the context of regional planning. He pointed out that it is the people who use resources and are entitled to manage them. There are thus two approaches. The first being the sectoral approach, which emphasizes the infrastructure such as dams, almost for their own sake. The other approach is to accommodate local initiatives and cultivate partnerships or interlinkages between administration and local communities. Traditional practices and institutional organizations may have been better left alone.

He also emphasized, firstly, the need for planners, administrators, and managers to understand community organization dynamics particularly in the use of environmental resources, and secondly, the need to reconstruct the organization at the intermediate level. This will increase the ability to coordinate and also reconcile the issues, not merely to execute programmes generated from the top. Maximum benefits may be expected from an area-specific style of coordination among provinces, counties, and villages.

The resulting comments included those of Cardenas who wanted to know about the preparedness of the so-called NGOs to accept these duties and also the use of training. In his reply, Haeruman referred back to 1966 when such rural-based organizations were suppressed and used for political purposes. After this time of suppression, villagers were not prepared to organize and expected much from the government. The current NGOs are trusted and given responsibility. These are reinforced by leadership training, extension services, and informal discussions with farmers. People receive information about agriculture and are encouraged to try suggestions and hence may trust other such future extension ventures. Particularly, house-to-house visits are more effective than government-called meetings.

Kada made reference to Clifford Geertz's study on Java in the mid-1960s. Java has a tight village structure with a traditionally strong resource management base, particularly of land, forest, and

water for irrigation. The query was how this strong background related to contemporary problems. Haeruman thought that the anthropological basis remains but the return to the traditional structure is just a matter of time. As he pointed out, it took time to reestablish trust between local government and people. Urban individualism encroached upon the rural areas giving rise to sociological ambivalence particularly between material and spiritual values. For instance, traditional belief asserted that if the river is polluted, the "green ghost" will show its anger by appearing. He emphasized that one of the problems of regional development is how to enhance traditional structures. The village executive council may execute policies respecting tradition. In Java, there is no tradition of private ownership. A move to make the organizational system uniform is contemplated but the advisability of such an action needs to be clarified.

Hashimoto said the groups in the community are symbolic. He inquired whether the farmers accept the council through their own choice. In reply, Haeruman drew attention to the fact that the village had to contribute to self-sufficiency in rice in the national interest. Farmers were convinced of the validity through the example of extension work.

Rees stressed the importance of accommodating the sociocultural domain -- the hidden dimension. A sensitivity to the social organization of beneficiaries (or victims) must be reflected in project processing. He cited a case of some farmers who, after resettlement discovered that their new land was unfavourable for rice production despite modest needs. While the government recognized this, it took the view that other crops could be established to compensate for this oversight. However, rice culture was an important feature of the farmer's culture; it had symbolic value and went beyond mere financial considerations. Consequently, the community suffered more in terms of psychological stress than economic privation would ever allow.

SESSION 7: COUNTRY CASE STUDY PRESENTATION (IV)

Wednesday, 12 November 1986, 13:30-14:40

Topic: Environmental Planning and Management in Malaysia:
A Case Study of EPM in the Kelang Valley Region

Speaker: Augustine Koh
Discussant: Guenter Tharun
Chairperson: Sven E. Jørgensen
Rapporteur: James F. Goater

Koh began by announcing that his presentation would fall into two parts -- a general national framework, as embodied in the Fifth Malaysia Plan; and, set against this background, a detailed account of the Kelang Valley Region study.

The Fifth Malaysia Plan contained seven policy guidelines related to the environment. A list of the essential legislation showed both the lengthy history of environmental concerns in the country (dating back to the 1920s) and the enforcement measures in place to enforce policy.

The previous four national plans had contained only curative measures for the environment, whereas the current plan attempted to embody a preventative approach through nonbinding environmental guidelines. (Pollution control was the earliest consideration, though there was little incentive to abide by the provisions.) Control measures were instituted through six means: (i) licensing (palm oil, rubber); (ii) taxes/royalties; (iii) nature reserves; (iv) fiscal incentives; (v) EIA for large-scale development; and (vi) guidelines (for large-scale projects).

The presentation then moved on, via slides, to show the context and structure of development planning and implementation, noting that there are linkages -- (cabinet/parliament approval necessary for environmental planning measures).

Parallel to the Federal, is the state system of government. Coordination takes place at this level. Problem-solving regarding development also takes place here.

Having sketched out the national framework, the speaker then moved to the Kelang Valley Case Study: (i) administrative setup (5 districts); (ii) numerous agencies/local governments -- Kelang Valley Council, City hall, Petaling Jaya Council, etc.; and (iii) various types of plan formulated by each agency, long-term plan, structural plans, etc. All these must harmonize.

The geographic setting and physical location of the Kelang Valley was shown; internal communications; Kelang Valley has 2.1 per cent of

land area, 17.6 per cent of population but 32 per cent of GDP. Hence large-scale in-migration problems.

To coordinate activities within the Kelang Valley three administrative organizations were set up, viz.,

The Kelang Valley Region Planning Council

This is under chairmanship of the PM, charged with the task of determining policies and strategies, coordinate planning and development, approve plans and monitor ongoing projects.

The Working Council

This is made up of civil servants under the State Secretary and responsible for evaluation, assessment, and submission of proposals to the Council.

Kelang Valley Secretariat

This is responsible for reviewing policy statements, data collection and coordination of all activities in the Region.

Environmental Planning in Kelang Valley Region

There is a seven-point policy, chiefly to ensure pollution-free rivers; regulate mining activities, enforce soil erosion measures; minimize noise pollution, and so on. This is an example of the kinds of policy/administration in the Kelang Valley. From environmental planning/management viewpoint seven problem areas have been identified, chiefly, air pollution; noise pollution; etc.

Koh focused on air pollution and outlined the measures taken to combat it. As 92 per cent of air pollution is from traffic, large-scale traffic dispersal is being tried. The 7 per cent from industrial sources (sawmills, mainly) are being relocated; measures aimed at unsuitable industrial location is being enacted. Dust fallout from quarrying was shown and indications are, that a general improvement in the situation has occurred. Air quality improvement recorded.

Water pollution: a central sewage system has been the strategy. The aim is a 0 per cent pollution level through conversion of industrial effluent (conversion to fertilizer). However data indicate that water quality is deteriorating, nitrogen concentration increasing.

The presentation then shifted to NGOs. Five are of special importance: World Wildlife Fund; Friends of the Earth; Malaysian Nature Society; Environmental Protection Society of Malaysia; and Environmental Management Research Association of Malaysia. Some are pressure groups, others work within state government structure. (One official of the EPSM has been coopted on to the environmental quality council.)

Thus in conclusion, Koh stressed five main points: Firstly, the need for greater coordination (activities are still handled on a sectoral basis). Secondly, representation, which is absent, but

necessary on crucial decision-making bodies. Thirdly, harmony among development activities. Fourthly, lack of awareness among people who matter, i.e., government officials who handle planning. Lastly, educational programmes needed in addition to the ad hoc schemes operated by NGOs.

Campaigns were aimed at raising the level of consciousness in terms of keeping environment clean. Educational institutions have not really started to incorporate environment concerns into the curricula.

Discussion

Tharun was interested in the case and gave a brief review of Koh's paper, saying it had familiarized the workshop with the details of a federal type of government. The case study was interesting in demonstrating effects of a prime region (political, economic, administration, and power concentration). Pollution resulting from over-exploitation, overconcentration, etc. Policy guidelines were also introduced -- and ways to balance environmental concerns with development priorities. Strategy components (licensing, EIA, guidelines, etc.).

Tharun observed that it may not be wise to concentrate on one strategy component only.

Considering the Kelang Valley Region Planning Council, Tharun opined that it was not just a coordinating council, as the Prime Minister himself was the chairman. (Executive power was at his disposal.) However, water pollution had worsened -- what are the essential measures needed? Many points should be considered. This institutional framework is very important as we can only plan for action within this framework.

Hashimoto sought clarification of the Earthwork Excavation By-Law (p.47). What is the background to this? The second point concerned NGOs, he was interested in specific groups which are internationally known, what were their backgrounds? Thirdly, he noted that there was little mention of water resources, only water pollution issues (noted that aerial views of Kelang Valley area indicate a rich, complex area of water resources). Did Koh have anything to add? Was this concern outside the prerogative of the state, a Federal concern, or what?

Koh, before responding, had a point to add to his presentation, viz., in association with the ADB, the government of Malaysia is carrying out a study of all the environment policies in the Kelang Valley region, which will form a strong basis for future action. The Earthwork Excavation By-Law was one of the early ad hoc measures to take care of problems as they arose -- to prevent soil erosion -- it was a by-law (added here by Yahya). Thus it was not a national law, but a special local measure. Regarding the "Friends of the Earth (SAM)" question, it was Penang based, and began as a consumer group. Although national in nature, it is, in terms of press comments, Penang oriented. Natural water resources are a Federal concern.

Nakamura wanted to make a comment on the water resource problem. JICA made a study (1980-83) to review natural water resource management up to 2000 AD. The report predicted a water shortage, specifically in the Kelang Valley. UNU funded a 2-year study (by University of Malaya), which also showed water resource problems. However, the ensuing economic slowdown entailed that the predictions did not hold.

Biswas sought clarification regarding the NGOs. Who identifies the problems for research? How was the work utilized and who funded it? Are there any structural/financial supports to aid these professional societies? A further question concerned figure 1, p.22 of Koh's paper, "Development Planning and Implementation Structure and Linkages at Multilevels." Referring to the "other ministries" below the EPU -- Biswas asked if there was any available component in regard to environmental issues indicating with whom they are to interact? What was feedback mechanism, in terms of understanding the regional problems?

His third question concerned toxic waste disposal. In regulating this process, was it only the disposal, or was the handling of the material (operational hazards) included in these measures/regulations.

Koh's response was brief (on request from chairperson). He replied that depending on the NGO listed, they were mostly internally funded and identified their own problems for research. In regard to structural coordination at state level, there were two mechanisms, (i) state committee on the environment (political); (ii) DOE has regional branches (administrative).

Toxic waste disposal is a difficult problem as nobody wants waste disposal sites. Biswas reiterated his question as to the identification of specific wastes and their control. Koh replied that there were still difficulties in identification, but there are regulations.

Tharun described a 1986 workshop on hazardous waste management (UNEP, CDG, ASEAN under auspices of Singaporean government) -- policies and strategies. Experts from around the world came up with guidelines, and the published results are now available. In Malaysia attention is only just beginning to be paid to this area. It is clearly a problem to which developed countries can contribute a great deal of assistance.

SESSION 7: (continued)

Wednesday, 12 November 1986, 14:50-17:00

Topic: Environmental Planning and Regional Development in Malaysia

Speaker: Zubir Yahya
Discussant: Jose G. Tundisi
Chairperson: Sven E. Jørgensen
Rapporteur: James F. Goater

Yahya introduced his presentation with a slide show which graphically depicted the richly endowed environment of Malaysia as well as providing salient details of land development achievements. The slides were designed to show the Ministry of Land and Regional Development's programme which has three compartments: (i) New Land Development; (ii) Rehabilitation and Consolidation of Land; and (iii) Replanting of rubber trees, especially for smallholders. Land Development was a major strategy for national rural development. The problems generated by large-scale land development were shown, adverse effects included; forest depletion, soil erosion, sediment discharge, increased flood risks, etc. The assertion was made that environment problems have not yet reached the critical stage (62 per cent of the country is still forested). The legal provisions and government policy relating to environmental concerns were growing. Indications of this were to be found in the Fifth Malaysia Plan; development of a comprehensive system of monitoring and assessment; establishment of state-level bodies to ensure coordinated environment programmes; and an active mass media campaign to increase public awareness. Overall, the government stressed the need to strike a balance between development and the environment.

Yahya explained that his concern, as a planner, coordinator, and implementor of projects, is to share some of his experience of ten years -- the paper is in two parts; firstly, (1) Malaysia's development perspective, and secondly, (2) Discussion of two case studies involving land development.

The Malaysian New Economic Policy (NEP) intended to eradicate poverty, and restructure the society through rapid economic expansion. Land development was a prime tool. The country is currently undergoing final phase of NEP -- the Fifth Malaysia Plan.

As far as regional development as a policy instrument is concerned, the country currently has seven regional development authorities (RDAs). These RDAs act as coordinators to bring development into regions through public and private sector participation.

Malaysia, being a Federal country has a number of state authorities, Yahya explained, an understanding of which can help to comprehend conflicts between various agencies. The constitution is

supreme. Land is a state matter, tax/revenue raising is a Federal matter, etc. Coordination bridges are essential. Government is very sensitive to the environment -- legal provision for control dates back to the 1920s. Problems stem from misunderstanding and poor enforcement of regulations.

Large-scale land development has been identified as a major factor in economic growth. The Federal Land Development Authority (FELDA) is the foremost agency. Masterplan strategies have identified land for different uses (infrastructural development, industrial development, etc.). Environmental plans have been invariably included. Appendix of the paper provided a summary of the RDA's Master Plans on environmental planning and management. Impact assessment is now possible to see if provisions have been taken care of.

However, in cases where land has been opened up for private development it has been found that some of the regulations have not been observed. In terms of planning, the necessary regulations exist, problems arise due to lack of enforcement or identifying who should be in control.

He referred to p.15 of the paper which contained details of a World Bank impact evaluation report on projects in the Jengka Triangle. The report gave, according to Yahya, a better perspective of environmental planning and management in regional development areas. The study revealed noteworthy findings, chiefly that there appeared to be no evidence that the projects contravened existing legislation at preparation or appraisal stages. (Area development, 69,000 ha.) The conclusion was that FELDA had closely adhered to existing legislation -- much less environmental depredation occurred than might have been expected.

However, on checking back, negative impacts were found, e.g., a loss in forested area. In 1958, forested area was 80 per cent, but by 1985, this was reduced to 49 per cent and by 1990 all forests outside of natural paths, will have disappeared. There was also a concomitant loss in wildlife.

The joint DID/FELDA, Department of Agriculture, Forest Research Institute, etc., initiated a well-defined specific-objectives control study. Principal results -- (i) increase water run-off due to forest clearance, (ii) increase in soil erosion, (iii) changes in soil chemical content, (iv) increased suspended solids in water due to felling-related soil erosion.

There seemed to be a conflict between the two studies. Differences in study methods may account for discrepancy.

The conclusions seemed to contain important policy implications. The joint study concluded that land-use changes do effect the environment in the short-term. Corrective measures were necessary to prevent further damage. The World Bank study, however, concluded that in the long-term, when the project reached maturity land and agricultural development need not constitute a negative impact on the environment.

Thus, Yahya observed, lack of adherence to regulations resulted from a lack of awareness. A final slide presented a detailed depiction of land application procedures which was intended to illustrate the existing dilemma, viz., should the issue of the environment be left to scientists or environmentalists (or both), or should the understanding be greater, in order to increase awareness among the people at large? How could government balance the protection of the environment with the need to promote economic development? Declining revenue from export of primary products entailed the need to develop 1,000 ha of land per year, in order to record, a 1 per cent growth rate in GDP.

Discussion

Tundisi, the discussant, noted that the paper highlighted the need for structural change in Malaysian society -- also the extensive change from rural to urban development and the large-scale land developments, i.e., new towns, displacement of rural poor. Very similar developments had been noted in Brazil's Amazon basin.

The dilemma concerning the relationship between conservation and development is very clearly delineated. It raised two important questions. What is the basis of research for this development? And, what is the data-base relationship?

Yahya deferred a response to colleague Koh, who was called upon to elaborate on the training aspects. Training related-research is conducted both in and outside the universities. The universities produce relevant data. His institute trained civil servants in management of environmental systems. Then a link-up took place with the Department of Environment on various scientifically based organizations. Yahya added that within his own agency, there was a research unit to analyse data.

Tundisi's other point concerned EIA, clearly brought out in the paper. He was interested in the resulting conflicts. How is the basis for EIA determined?

Yahya responded by describing the EIA, a recent addition to the environment act which has not really been enforced for project assessment. Government is continuously enforcing it (because of monitoring and control). It was not clear how full initiation would occur. Certain projects have to comply with EIA standards (water resource management, water, petroleum, forest industries, etc.). Lax enforcement -- government was still locating suitable methods of enforcement.

Tundisi reiterated striking similarity with results of a Brazilian study concerning the effects of reforestation on water quality. The paper, he thought, clearly revealed the dilemma posed by conservation concerns and development which countries like Malaysia, Brazil, and many others faced.

Hashimoto made some comments/posed questions on the impact of land use on the hydrological basin as outlined in the two studies.

This was a great contribution; ways of dislocation -- he desired a small response on this point; and were any rough calculations made on the Masterplan? (rough costs, how much resources). His last point concerned sustainable resources -- was there any econometric study on renewable resources?

In responding, Yahya said agencies like ADB and the World Bank do monitor project requirements, and identify resource allocations. If resources are identified and allocated it is reflected in five-year plans and budgets.

Regarding sustainable resources, a beginning has been made; responsibility has devolved to those agencies involved in the activities, e.g., Ministry of Agriculture is involved in water management subject to National Water Policy requirements; likewise for forests. Centres for studies are conducting investigations into this.

Biswas declared his interest in the cultivation of the oil palm, and secondly, in a review of EIA. Environmentalists have expressed concern over the palm's ability to survive to a second generation, doubts as to seed production have been raised. Secondly, regarding EIA review -- was there any need for training to be included, any modification. EIA is to be enhanced. So was there any such thinking along those lines?

Koh outlined training aspects, workshops on EIA (Dec. 1986) together with the Environment Agency. A principal focus is needed on what to look for in projects in terms of EIA. His agency is planning, via training, to make sure that whoever handles development projects will also have a knowledge of EIA.

Biswas, again, noted the problem of what type of expertise should be included in the EIA structure, department, planning, etc., who is enabled to give clearance. This was a training problem -- what level (not general) because a complex level of understanding is required.

Yahya admitted to having no definitive answer to hand and observed that perhaps most countries are at the same stage of implementation, facing similar problems.

Biswas suggested professional groups (e.g., engineers) who can comprehend the technicalities should be accommodated in departments. Planners and administrators should be exposed to these technicalities so that they can understand the different parameters.

In returning to the palm cultivation question, he repeated the environmentalists' concerns as to harmful effects on soil. Seed production thenceforth decreases resulting in reduced commercial prospects.

Yahya, interestingly says there was no evidence in Malaysia that the oil palm industry, now in its second phase, faced any such difficulties. The main problem was spiralling labour costs.

SESSION 8: GENERAL DISCUSSION (Identification of Issues Arising from the Day's Presentations and Discussions)

Wednesday, 12 November 1986, 16:20-17:00

Chairperson: Colin P. Rees
Rapporteur: Antonio L. Fernandez

Presentation by Rees: Rees initially provided a synthesis of recurring themes generated in the past sessions. A list of problems facing developing countries in development planning and management were drawn from the discussions and papers presented. For convenience, these problems were classified into technical, expertise, administration/management, legal, socioeconomics, and sociocultural. He also presented a framework as an approach.

There was a pressing need for strategies to overcome these and other problems. A start could be made by looking at the development/environment policy cycle and at the factors affecting such a cycle (a diagram was offered to the participants for their review). In this context information would be generated to identify actual targets for environmental planning and management and thus help determine the form that such training should take.

Bauer made a comment that people may think that it is not possible to change the degraded condition of the environment. Technical people "fighting" in the field are important targets for training.

Hashimoto raised three points, viz.: The policy system in the framework ought to be concrete in regards to resource assessment. This orientation is fairly crucial; technical issues are different from scientific issues as far as academicians are concerned; attention must be given to mass communications for it surrounds administrators, technical men, and the interest groups.

Viloria saw it convenient to match the needs identified with national and international institutions thereby roles can be assigned. By so doing, the workshop can zero in on concrete proposals for UNCRD.

Sazanami explained that UNCRD on behalf of many international institutions has collaborated with ILEC within the "limited" sphere of water environment. He foresaw this being pursued for the next three years. He said UNCRD's role is one of a troubleshooter, strengthening capabilities in the process. He regarded it as significant that databank issues have repeatedly cropped up in this dialogue between scholars and administrators. He identified information systems as an important corollary to the databank issue considering computers are in widespread use.

Overbeck expressed the need for databanks and equipment. He recalled excursions with his students, who learn through practice by using cheap equipment. Then, he cited a study of 24 volumes on an

Indonesian lake made several years ago. It should be very useful as a source of data on the metabolism of tropical lakes.

Jørgensen shared his experience in conducting postgraduate courses in Copenhagen that gathered people from different fields of study or of different professions. Communication is a principal aim together with provision of the proper orientation.

Haeruman mentioned the following points: He agreed with Hashimoto in considering the rational use of resources in the framework and agreed that training at local government level is lacking. Strengthening the local government will mean good bargaining power for ecodevelopment. Universities, government administration, and the private sector should link together to strengthen the data base at the local level. Corruption in government he said is an issue or question of opportunity. Perhaps the many regulations or taboos "encourage" this. However, information has a role to play in social control through the NGOs.

Tharun also wanted to explicitly highlight resources. He stressed the importance of encouraging communication to increase the effectiveness of training. This hinged on enhancing the human factor among different sectors of society for exchange of information.

Biswas highlighted information synthesis and dissemination, and the importance of training for managers and technical personnel. For the latter, specific institutions should be identified.

Regarding the framework, Vollenweider proposed that "environmental issues and conflicts" from the "policy system" be moved to "top" the human ecosystem in order to explicitly show a management orientation. To this, Rees replied that the model is subject to revision.

SESSION 9: JAPANESE APPROACH TO ENVIRONMENTAL MANAGEMENT

Thursday, 13 November 1986, 9:10-10:10

Topic: Regional Environment Management in Japan

Speaker: Takao Abe
Discussant: Colin P. Rees
Chairperson: Surin Setamanit
Rapporteur: James F. Goater

Abe briefly described the development process in postwar Japan, outlining the rapid economic growth and its accompanying social change and environmental problems. Pollution was recognized but only gradually was the need to take drastic measures seen. Pollution control programmes were formulated (still working). But a higher quality of life was sought. New measures and concepts were needed, such that three targets were set; (i) pollution control, (ii) nature conservation, (iii) amenity creation. Thus, this new concept can be termed Regional Environmental Management -- local governments devised environmental management plans to achieve the abovementioned targets. (Indispensable for success.)

Abe supplied subsidiary roles for environmental management plans:

- (i) must be comprehensive in obtaining consensus;
- (ii) must be comprehensive in organizing measures, excluding contradiction;
- (iii) must be comprehensive in engendering private participation;
- (iv) must be comprehensive, supported by scientific information systems.

Concept is still rather new -- only thirty local governments have environmental management plans. There is a general lack of public participation. Among other things, high land prices prevent amenity provision.

Returning to the development of the concept of regional environmental management in Japan, Abe sketched out a brief background starting from the 1950 enactment of the Comprehensive National Land Development Law which marked the beginning of Regional Development in the country. Prime objectives were to secure economic independence through food, energy provision, and disaster control. In 1960 the National Income Doubling Plan was adopted. It brought problems of overconcentration resulting from rapid heavy industrialization. Other problems included regional income differentials, agricultural depletion. Thus new policies/projects were adopted aimed at tackling the fast-growing problems. Through these, industrialization was spread

more evenly throughout the country, though interregional population imbalances persisted.

In 1969 the New Comprehensive National Development Plan aimed at spreading development more evenly through large-scale communication/infrastructure projects -- little consideration for environmental impact. Thus, three stages of emphasis could be discerned: 1950s, resource/land preservation; 1960s, industrialization; 1970s, national transportation network construction. People now required a more secure living environment rather than an increase in private consumption ability.

Environmental conservation groups sprang up. Heavily industrialized areas saw many health-related problems. Clearly, regional pollution control measures were needed. Areas were clearly defined, which needed special enforcement/control measures to safeguard these environments.

Under Prime Minister's guidelines, prefectural governors formulated programmes -- regulated by the Basic Law on Pollution Control -- as of 1986, forty-one areas had pollution control plans.

Lake Biwa had no programme, so it could be assessed that the standards were rather low. The lake has a regional environment management plan. The purpose of REM was the same as the Stockholm Declaration of 1972 (concluding the "Only One Earth" UN Human Environment Conference) which Abe repeated to emphasize his point. Accordingly many laws were enacted to cope with pollution.

Central Council for Environmental Pollution Control's 1972 report contained recommendations aimed at securing environmentally desirable land utilization, among other things; while a later report (1975) promoted regional environmental management systems to realize better regional development. Abe then read a direct translation of suggestions from the Central Council for Environmental Pollution Control as contained in his paper. The report suggested the necessity of a comprehensive policy to cope with environmental improvement.

Reference was then made to the OECD's Environment Commission's report on Japan which noted that health objectives had formed the main focus of policy rather than the enhancement of quality of life. Broader based environmental policy was expected to develop. Amenity provision was now accentuated.

There were, he said, three aspects of the environment: pollution; national environment; and agreeable environment. (Reference was made to page 24's itemization under these three categories.)

Who is responsible for environmental management? It was noted that this paper described a specific system -- the Japanese system. Each country should find its own system. Implementation of policy/programmes -- local governments, enterprises, individuals themselves; four management methods were added, viz., restoration and guidance; environmental consideration (EIA); and implementation of physical work (sewerage, greenery, etc.). Any environmental management plan should

include these four methods to ensure efficacy. Japan's Regional Environment Study Committee issued a guidebook to clarify policies/concept, which clearly states that regional environmental management should be based on the concept of environment as resources. It has three aspects: (i) Energy sources are components of the environment; (ii) "Environment as resource" is beneficial for mankind, and (iii) the environment is a common property, both now and in the future -- regional environment management should be conducted along these lines.

Abe, in outlining the roles of an environmental management plan, drew the connexions between environment management, an effective environmental management system, and a good regional environmental management plan. He outlined the importance of a perceived common target among government and people to achieve consensus/community participation. An environment management plan should reflect this. In Japan, environment management plans are not yet utilized under law -- hence conflicts arise with other developing projects. The plan should also support EIA in environmental conservation. (There are other roles, he suggested, but these are the principal ones.)

Abe then referred to a comprehensive list of local governments who had prepared regional environment management plans. They could be classified into the following categories: Pollution control; Comprehensive Programme; Environmental Impact Assessment Supporting; Monitoring; Environmental Data Bank; Land Utilization Planning. Abe concluded with a request for all to read the paper.

Chairman Setamanit noted that this informative paper included many of the points which underline the reasons behind Japan's clear success in environmental management.

Discussion

Rees thought that there were two very important aspects which would be of interest to developing countries. Firstly, the consensus aspect, whereby common objectives for government and people are identified as part of the input to the environmental management plan, and secondly, local autonomy, whereby a clear-cut distinction is made between central and local governments. These seem to be important features, which, in terms of the possible transfer of Japanese experience, should receive attention.

Haeruman is intrigued by the solutions to the problem.

- (i) The regional approach, with reference to fast growing regions; How was the boundary of a "region" determined -- natural or administrative?
- (ii) In determining the objectives/issues of the area for environmental conservation, is there any evidence of industrial relocation out of the area as a result? Or do the regulations deter potential locating industries? How are the national environment quality standards applied, in the regional context?

Abe's response was that areas for regional environment plans are administratively formed (i.e., prefectural or citywide). Page 11 of the paper illustrated the nature of the boundaries.

Baisyet wondered about the involvement of the local community. Did they know what was going on? He was of the opinion that as local people were the cause of the environment problems, plans could not succeed unless there was local involvement.

Cardenas was interested in aspects of EIA, specifically concerning programme and implementation assessment. In the Philippines and other countries, EIA has been the major instrument for environmental management and is used when the projects are ongoing or have been completed -- but the models for EIA assume preproject assessment. How do these two differ in terms of methodology?

Biswas' question concerned legal authority. Quoting from the paper (p.29) "Environmental management is partially supported by judicial organizations...." Thus, if the regional plan detected polluting agents, if there was no legal authority, how is control and follow-up action tackled?

Abe responded by saying in general (in Japan) there was a lack of success in getting the support of the people. Plans/programmes were formulated by experts, then shown to the public. Until that time, there was no participation. Now there is change occurring -- experts wanted to consult people at earlier stages of plan preparation.

Regarding programme assessment and implementation assessment -- this is a Japanese-style characteristic. EIA has Japanese character. Finally, the involvement of the courts was touched on, in reaction to Biswas' question. When pollution became a serious problem in Japan, the courts decided it was illegal, and suggested that EIA was necessary before project implementation. Sometimes development projects are considered illegal -- this promoted development of pollution controls, use of EIA, and the concept of environmental management.

SESSION 9: (continued)

Thursday, 13 November 1986, 10:20-11:30

Topic: Lake Water Quality Administration in Japan

Speaker: Kohki Nakajima
Discussant: Marlito L. Cardenas
Chairperson: Surin Setamanit
Rapporteur: James F. Goater

The paper set out, declared Nakajima, to describe the lake water quality administration in Japan from a technical viewpoint. He began by tracing a brief history.

- (i) As a result of rapid economic growth, insufficient sewage treatment and deteriorating water quality became a great concern in the late 1960s.
- (ii) He cited two laws in particular -- the Basic Law for Environment Pollution Control of 1967, and the Water Pollution Control Law of 1970.
- (iii) Great efforts made to attain the standards in public water laid down by the Basic Law. The Environmental Agency was established in 1971.
- (iv) More stringent measures were needed for semiclosed seas and lakes. In 1978, the Areawide Pollution Load Control System was introduced and the Law concerning Special Measures for Conservation of Lake Water Quality was established in 1984.

Nakajima then referred the meeting to "Water Pollution Control System and Institutions Responsible for its Operations" in his paper, together with a schematic diagram (p.36, appendix 1), and figure 1 on p.3, "Legal System for Water Quality Management."

The forty-seven prefectural governments were vested with wide-ranging powers -- article 9 of the Basic Law concerned standards and their maintenance. He then referred to two types of environmental water quality standard -- (i) those which need to be achieved to protect human health and, (ii) those that need to be achieved to conserve the environment.

He then moved on to Water Pollution Control, which concerned measures based on the achievement of standards contained in the Basic Law for Environmental Pollution Control. Two measures were of particular importance.

- (i) Control of discharge from industrial and municipal sources into public water areas by the Water Pollution Control Law.

(ii) Development of sewage treatment systems.

The purposes; definition (facilities of ninety types specified by the Cabinet), effluent standards -- reference was made to the detailed lists contained in the paper (p.19) which recorded the two types of effluent, defined under the Basic Law. All prefectures had stringent standards in force.

Regarding the enactment of legislation concerning lakes, Nakajima thus described the Clean Lakes Law (the Law Concerning Special Measures for Conservation of Lake Water Quality) of 1984. This law had two aims, viz., to introduce regulations for which conventional controls were ineffective due to the special nature of lake environments, and, secondly the provision of a Lake Conservation Plan stipulating such measures as to reduce pollutant loads.

Briefly introduced were "Basic Policy for the Conservation of Lake Water Quality," the question of Designated Lakes and Designated Areas (ten to twenty lakes were expected to be designated); a Plan for the Conservation of Lake Water Quality; Promotion of Conservation Projects; and Regulations for reducing pollutant load.

Participants were encouraged to examine a number of pertinent appendices to Nakajima's paper, including the principal text of the Water Pollution Control Law (1970-78).

Discussion

On the chairperson's invitation, discussant Cardenas made some background comments to the general environmental standards. He noted that it was frequently a matter of enforcement, and Japan had demonstrated the political will to enforce environmental standards.

Some countries had environmental standards only because they were Stockholm Conference Signatories (1972 UN Conference on the environment). The Philippines actually had higher standards, in some areas, than Japan. Environmental standards were invariably copied from Western countries, i.e., USA's, and were therefore unrealistically high. In referring to the paper's statistics he was puzzled by the standards for BOD and COD (Table 1(2), p.19), which seemed to indicate that (Biological and Chemical) permissible limits of discharge were identical for each -- did this lead to conflicts?

He appreciated the use categories of fisheries, usually considered incompatible with domestic water uses. This seemed to be a lesson for developing countries.

A third point from Cardenas, concerned a clarification. Nakajima had stated that compliance with environmental standards was lower in enclosed water systems than in coastal areas or rivers; Cardenas observed that due to water movement (currents, tides) it was natural that the compliance was more difficult in lake systems. Special emphasis should be placed on preserving water quality in natural lakes.

Admitting reluctance, Cardenas brought up a fourth point regarding Japanese' companies operating in developing countries. Did they observe the same environmental standards outside Japan, as they were obliged to do inside Japan?

In response to the discussant's comments, Nakajima explained that he would answer the question concerning COD/BOD, standards in writing, due to his limitations in English. Concerning the fourth point, it was explained that there was an informal 1973 agreement to adhere to Japanese standards. Chairperson Setamanit, was chairing a study into multinational compliance to environmental standards, noted that there was no evidence of harm being done to the environment.

Vollenweider was surprised at the high effluent values for nitrogen and phosphorous. They were far too high to conserve the lake's properties: the assimilation capacities of lakes were now more clearly understood, thus it should not be a question of blanket permissible standards but case by case assessments of the receiving capacity of each lake concerned.

Hashimoto wanted to add more on the topic of Japanese companies' behaviour abroad. The Japanese government had no power to enforce compliance with national standards. He reasserted the free compliance of Japanese companies, according to the 1973 Code of Conduct. Studies have been undertaken to test compliance -- each country must decide its own standards and see they are complied with.

Rees had an observation regarding environment quality standards. In outlining the ADB's attitude he noted that a case-by-case approach was adopted. The Bank looks at the applicability of government -- imposed environmental quality standards, and weighs prevailing economic factors along with the assimilative capacity of the affected environments. Occasionally standards were found not to be stringent enough, occasionally they were too stringent. This was a pragmatic approach and avoided the application of absolute standards per se often a difficult and costly exercise.

SESSION 9: (continued)

Thursday, 13 November 1986, 11:30-12:30

Topic: Lake Kasumigaura Chronology

Speaker: Osamu Maeda
Discussant: Hans J. Overbeck
Chairperson: Surin Setamanit
Rapporteur: James F. Goater

Maeda, through a series of slides, presented a comprehensive historical survey of Kasumigaura Lake, focusing on the interrelationship between the lake and human activities.

After some photographic slides, a location map was shown, illustrating the lake's position, northeast of Tokyo in Ibaraki prefecture. A satellite view showed the lake complex with its feeder rivers' system.

The historical/geological features leading to the lakes formation, its geographical setting and historical importance as a wildlife preserve (knowledge of this dated back to the 8th century AD) were the subjects of the next three slides.

In the seventeenth century the river system was diverted, such that entailed an increase in water flowing into the lake. This was later to cause serious damage.

The eleventh slide illustrated flood countermeasures/discharge channels, etc., which have been undertaken during the 20th century. Briefly, 1896-1930 Tone River Conservation Plan and 1939-1948, Tone River Widening Plan. Before the 1970s an extensive navigation network had been developed throughout the river and lake system. There was a link with Tokyo (slide 12). However steamer traffic was halted in the 1970s. Extensive reclamation projects, dating from 1918 had been carried out -- it was estimated that 10 per cent of the lake had been reclaimed by 1986, for agricultural land. Slides 15 and 16 depicted a bird's-eye view of the reclaimed area, while slides 17-20 were composed of fisheries activities. In 1962 the Lake Kasumigaura Comprehensive Development Project was launched at a cost of ¥305 billion. It included city water supply; industrial water; irrigation; flood control banks; surplus river water channels, etc. (slide 23). This was followed by a detailed exposition of measures to reduce negative influences, e.g., variable water rates (embankment, bridges, pumping stations); consolidation of catchment area (water treatment systems, supply systems, sewage treatment plants); consolidation of fisheries (fish incubation plants, foodstuffs provision, water quality monitoring systems). A further eleven slides showed (in succession) a water control gate; the water balance of the lake; an overall map of the river system; a map showing pipelines; irrigated area; the polluted nature of the lake; decreasing trend of forests and

fields, due to increasing urbanization; livestock (pig) increase; factory location; food (fat/protein) daily intake; production of toothpaste/shampoo -- (a great increase demonstrating striking sociological change); fish catch in the lake, changing fishcatch reflecting changing ecosystem; monitoring station for water quality; distribution of such stations; barrier prevention of algae drift; waterbloom treatment station; water-surface cleaning boat; and finally, a slide illustrating the lake, which by now, had been transformed from a natural lake into a man-controlled reservoir due to its long period of interaction with the local communities.

Chairman Setamanit noted the complex range of activities around the lake and the effective presentation which had portrayed their effects -- instructive for "lakelovers." Then invited "lakelover" Overbeck to discuss the paper.

Discussion

He observed that the history of ecosystems and activities of mankind is also true for Plon lake. A water level increase was caused by construction of a medieval watermill. Although it was not understood at the time -- this caused an increase in eutrophication. The lake changed from mesotrophic to eutrophic and back again. Overbeck stressed that perhaps the principal lesson to be drawn from Maeda's paper was the degree to which a detailed knowledge of the historical process of interaction with man, as well as rainfall and climatic cycles, was extremely important in understanding the current state of man/climate influences on lake environments.

Overbeck brought his comment to a close by quoting Maeda ... "The history of Lake Kasumigaura is suggestive to management of freshwater ecosystems. Detailed investigation of the lake chronology will provide useful information about maximized and meaningful management of such a lake that has a highly populated or a heavily developed catchment area."

Haeruman noted the paper discussed "physical changes" but wondered about sociocultural change in terms of the lakeside dwellers.

Maeda explained that the community had grown more complex, along with developments in the society.

Vollenweider, in focusing on the agricultural sector wondered about the resulting influence on the loading of the lake. For future control, this is a fundamental question.

Maeda, explained that farmers had abandoned low cost pig farming and through government loans, were utilizing treatment facilities.

Vollenweider, upon enquiring what treatment, was informed that tertiary treatment was being undertaken.

SESSION 10: REGIONAL ENVIRONMENT MANAGEMENT: A CASE STUDY OF LAKE BIWA

Thursday, 13 November 1986, 14:00-17:00

Topic: (a) The Evolution of Environmental Policies for Lake Biwa

Speaker: Takaaki Niren

Discussants: Sven E. Jørgensen

Pradip M. Baisyet

Jakkris Sivadechathep

Chairperson: Jose G. Tundisi

Rapporteur: Antonio L. Fernandez

Niren's presentation served as an introduction to three others dealing with Lake Biwa. Lake Biwa, Japan's largest lake, is administered by Shiga Prefecture whose boundary coincides almost perfectly with the watershed. Niren thought that existing conflicts are more between interests or among zones in the watershed than between development and conservation. Decisions on resource use by the people exerted influence on Lake Biwa, and vice versa.

From a historical point of view, the economy of Shiga and subsequent water quality changes were discussed. Among the highlights were:

- Traditional spinning and rayon processing that require large quantities of water benefited from Lake Biwa from the 1910s to the 1930s.
- Although Shiga is mainly agricultural, its secondary employment remains bigger (40 per cent share as of 1980) than that of the rest of Kinki region.
- Industrial parks had been in existence, one since 1964 and another, since 1970.
- The lakeshore experienced biennial floods mainly caused by a narrow outlet. Drainage capacity was increased by constructing a weir in 1905 on the Seta River and continuous dredging until 1908.
- From then on, upstream-downstream conflicts surfaced in the matter of flood control.
- During and immediately after the Second World War, land reclamation was carried out on several lakeshores to increase food production.
- Reclaimed land caused the lake water level to rise, thereby increasing the flood risk.

- Pre-lakes and irrigation ponds in the watershed received an overload of nutrients and sediments through the years.
- Awareness of water quality deterioration reached a high when Kyoto's tap water became malodorous and as nationwide diseases caused by pollutants (lead, mercury, PCBs, cadmium) received publicity.
- The occurrence of "red tide" (mainly uroglena americana) from 1977 and recurring eutrophication in summer due to excessive nitrogen and phosphorus loads necessitated new environmental policies.

Regarding policy, Niren outlined the following as desirable actions:

- Classification of water bodies according to use, effluent, and environmental (specifically, water quality) standards.
- Polluter pays principle.
- Promotion of sewerage infrastructure.
- Promotion of local and regional lifestyle good for the lake ecosystem.
- A ban on use of synthetic detergents with phosphorus (1982).

Sources of nutrient loads are domestic, industrial, agricultural (non-point) and natural. Of these domestic wastes have the highest contribution. Both public and private responsibilities are recognized. One effect is the "Use Soap Movement" organized by local women which led to the detergent ban.

Efforts are being made along the following lines:

- (1) provision of environmental information for people of all ages and backgrounds;
- (2) internalizing environmental sense through social education and learning;
- (3) public participation in environmental management;
- (4) integration of local and prefectural governments (institutional arrangements); and
- (5) resolution of regional conflicts.

Niren stressed the interdependence between man and nature so evident in Lake Biwa.

SESSION 10: (continued)

Thursday, 13 November 1986, 14:00-17:00

Topic: (b) The Lake Biwa Comprehensive Development Project and Environmental Conservation

Speaker: Junji Takayanagi

Discussants: Sven E. Jørgensen

Pradip M. Baisyet

Jakkris Sivadechathep

Chairperson: Jose G. Tundisi

Rapporteur: Antonio L. Fernandez

Takayanagi made reference to a pamphlet entitled "Development of Lake Biwa to Make the Lake More Fruitful" prepared by Lake Biwa Development Division, Water Resources Development Public Corporation (WRDPC). Lake Biwa's watershed is a social, cultural, and economic centre and continues to influence the cities of Kyoto, Osaka, and Kobe.

Takayanagi described the Lake Biwa Comprehensive Development Project which was started in 1972 as a ten-year project. It has been extended till 1991 to further preserve water quality and enhance the welfare of residents.

The Project has three main categories, namely, conservation, flood control and river improvement, and water utilization

Project cost is ¥4,525 billion. It is being administered by prefectural, municipal, and other local governments. Only one component (water resources development and water utilization for the Hanshin district) is administered by the WRDPC.

The various components were briefly described. Selected highlights were:

- lake levels and roads for flood control

- land improvement

(Both of the above ensure safeguards against vulnerability to changes in lake water level)

- improvement of Seta River (to regulate drainage at a specific flow rate)

- mountain management (to improve water retention capacity)

- "ayu" (sweetfish) breeding facilities (to preserve fishermen's livelihood)

- sewerage systems for agricultural communities
- nature conservation parks owned by the public
- advanced wastewater treatment on reclaimed island (dredged soil)

Discussion

Sivadechathep expressed interest in the livestock wastewater treatment. Takayanagi mentioned river improvement works and mountain management as soil conservation components, which were of interest to Baisyet. Setamanit queried on procedures in carrying out plans. An annual programme is prepared by the prefectural governor and submitted to ministries concerned for approval, according to Takayanagi. Tundisi inquired whether pamphlets were distributed to citizens. No specific reactions were especially noticeable during meetings in local communities upon distribution, according to Takayanagi.

SESSION 10: (continued)

Thursday, 13 November 1986, 14:00-17:00

Topic: (c) The Regional Environment Management Plan of Shiga Prefecture

Speaker: Toshiaki Kagatsume
Discussants: Sven E. Jørgensen
Pradip M. Baisyet
Jakkris Sivadechathep
Chairperson: Jose G. Tundisi
Rapporteur: Antonio L. Fernandez

Kagatsume gave an overview of the regional environment management plan of Shiga Prefecture, which is still being formulated. The basic concept of the plan was intended to meet the demands of the 21st century, and was contained in seven basic points.

Through the years, needs have become sophisticated. An increase in demand for amenities in the living environment is anticipated. High-tech industries are also coming to Shiga.

The basic concept emphasizes the need for the people of Shiga to co-exist with nature, to be ecologically aware, to integrate all elements of the environment -- natural and man-made, and to engage in activities to further sound environment and sustainable development.

The comprehensive goal is a nexus among people, lake, and a green environment. One goal is to formulate administrative measures to assess plans and projects. Another goal is to encourage participation to accomplish conservation. EIA and information systems are supporting systems of the plan. Four guidelines for measures relating to the aquatic environment are the promotion of:

- city planning
- water quality management
- works and undertakings for conservation of water quality
- water quality conservation as a unit of the ecosystem.

Discussion

Haeruman wanted to know how the regional environment plan is related to the development plan. Kagatsume pointed out that the environmental plan is still tentative. Biswas asked about nightsoil collection and treatment. With only 10 per cent of the population being served by sewers, some 30-40 per cent account for nightsoil treatment. Nightsoil is still used by some as fertilizer. Kagatsume agreed that algae bloom is a critical problem but, as yet, no clear predictions are available, in reply to Overbeck's question.

SESSION 10: (continued)

Thursday, 13 November 1986, 14:00-17:00

Topic: (d) Environmental Information Data Base System and "Shiga Prefecture Environment Atlas"

Speaker: Yukio Onishi and Yukiko Kada

Discussants: Sven E. Jørgensen
Pradip M. Baisyet
Jakkris Sivadechathep

Chairperson: Jose G. Tundisi

Rapporteur: Antonio L. Fernandez

Onishi and Kada carried out a video-presentation to elaborate on the environmental information system for the Lake Biwa watershed as presently developed. Kada described research being done at the Lake Biwa Research Institute as differing from university research.

The presentation took the following form:

- (1) background of eutrophication in Lake Biwa
- (2) why an environmental information data base is necessary
- (3) basic ideas, standpoints, and ways in which the data can be used.

The aim of the data base is to "enhance the visibility of our environment." Visibility connotes both actual and symbolic meanings. In addition, a "Shiga Prefecture Environment Atlas" was prepared. Examples of computer simulation models utilizing the above data-base system may help the interrelationship between human activities and environmental conditions to be better understood.

The information system is being developed such that it is socially meaningful. Reactions vary with each group. The data base is an aid to the thinking process. Scientists want original (not secondary) data.

People need quick and easy answers. On the other hand administrators are ambivalent. Kada pointed out that data can be used by the public to oppose specific plans or programmes.

Graphics were shown using a nutrient discharge model, map overlay model, and resources model.

Discussion

Jørgensen asked if the data bank is linked with other models. There were in fact many, but what was shown was the nutrient discharge

model. This model has a unit production factor that may vary depending on what management strategy is utilized.

Rees reiterated the importance of the social factor in using environmental data systems but endorsed their utility for developing countries. In the overlay approach, has any weighting been considered? Kada said that could be done according to a person's point of view as an economist, geographer, etc. Tharun added that Rees was hinting at implicit weights. Nakamura mentioned that equal weights are used in the present system. Definitely in the assignment of weights, value systems come into play.

Haeruman was concerned with accuracy of information or the amount of available data. In the developing countries, over and over again decisions have to be made with very little information. Kada cited the "Green Census" sponsored by the Environment Agency. This utilizes the general public to gather data particularly in monitoring biological organisms outside Tokyo.

Nakamura informed the group that the information system involved laborious work done by individuals from the LBRI and Shiga Prefectural Government. Modelling for lakes may be done for eutrophication, dynamics, and pollution load, among others. It is difficult to do interfacing. Models are a collection of many different perspectives.

Sazanami said UNCRD wanted to develop such techniques, though it may not be completely applicable for technology transfer. It may be of use in the future for developing countries.

Jørgensen proposed the following for Biwa Lake: control of nonpoint sources; regulation of fertilizers; and protection of shoreline.

Kada indicated the many measures that farmers use in paddyfields to obtain data. Also, an ordinance was passed to conserve the shoreline only in 1986. The local government administers the shoreline.

Baisyet was interested in bringing people from different professions together. A common language is not possible but efforts to communicate strategies must proceed.

Sivadechathep expressed his wonder over results of efforts in Lake Biwa. It seems that when implementing a plan, development proceeds and the environment "lags." It could be that people are not yet ready. The Japanese adopt a step-by-step approach from which a lot could be learned. Heads of government and officers must regard the lake as a "source of life." Kada agreed and recounted a legend surrounding Lake Biwa that signified that Lake Biwa indeed is a "source of life."

Tundisi ended the session by saying that "regional culture is our strength not our weakness."

FIELD VISIT: LAKE BIWA AND ITS SURROUNDING AREA

Friday, 14 November 1986

- 9:00 Lv. Biwako Hotel
- 10:15-12:00 - Large-scale sewage treatment plant located in man-made island on southern Lake Biwa
- Small-scale rural sewerage system at Kiryu
- 12:15-13:45 Lunch at Shiga Modern Art Museum
- 14:00-15:00 - Setagawa Weir
- Sand arrestation (sabo) works in the southern catchment area of Lake Biwa (Briefing on the sand arrestation works was provided by an official from Lake Biwa Works Office, Kinki Regional office of Ministry of Construction)
- 15:30 Ar. Biwako Hotel

SESSION 11: ROUND-UP DISCUSSION

Saturday, 15 November 1986, 9:30-12:00

Chairperson: Leandro A. Viloría
Rapporteur: Antonio L. Fernandez

This session commenced with document which contained the highlights of presentations and discussions, being made available to the participants. Viloría then called the attention of everyone to another handout which contained the proposed agenda for the round-up discussion. Two tasks outlined for the group to tackle were contained therein:

Task 1: Synthesize the major issues emerging from discussions during Part I (Otsu sessions) of the Expert Group Workshop (10-14 November) with particular reference to:

- (1) Scientific bases of lake environment management;
- (2) Technical aspects of environmental planning and management (EPM);
- (3) Administrative, management, and institutional arrangements for EPM at the local and regional levels;
- (4) Legislative aspects;
- (5) Socioeconomics; and
- (6) Sociocultural/political aspects.

Task 2: Formulate terms of reference for working group sessions, and finalize the tasks for Part II of the Workshop.

Proposed Objectives

Task Force:

Delineate the concept, objectives, approaches and methods of EPM for local and regional development.

Working Group I:

Identify the needs of developing countries to effectively promote EPM (focus on management of inland water resources and river basins) in the context of local and regional development.

Suggested terms of reference (TOR):

- (1) Objectives of EPM in developing countries
- (2) Technical capabilities/expertise/training needs
- (3) Administrative/institutional/legislative framework
- (4) Financial aspects

Working Group II:

Devise a framework for the development of a data base/information system for EPM: focus on management of inland water resources and river basins.

Suggested terms of reference (TOR):

- (1) Objectives
- (2) Data requirement and quality
- (3) Data collection, processing, communication, storage, and retrieval
- (4) Planning tools and modelling
- (5) Utilization of scientific information in environmental planning and management
- (6) Suggested potential projects for research on information system/data base for EPM

Working Group III:

Work out an outline of a training programme on environmental planning and management (focus on management of inland water resources) in the context of local and regional development.

Suggested terms of reference (TOR):

- (1) Objectives (capabilities, skills, behavioural)
- (2) Target group
- (3) Training content/curriculum
- (4) Training methods, strategies, and approaches
- (5) Training materials
- (6) Institutional network (international, national)
- (7) Linkage with research project (suggest potential projects for research on EPM)

Nakamura proposed to open the discussions on the TOR of Working Group III (training). He said this would surely help crystallize what training and its guidelines are intended to be. The discussions themselves could then concentrate on training specifics, for instance, resources, intentions, and the like.

Viloria said good input was needed to determine training content which was one of the terms of reference for Working Group (WG) III. Koh thought that the deliberations of WG I would serve as a basis for WG III, entailing that "needs" would have to be identified first for these, surely, would provide the basis for any meaningful training.

Viloria reminded those present that a synthesis of the issues was to be made during the session which was intended to serve as input for WG III to base its discussions on. These were all to be related to the assignments of the three working groups.

Cardenas suggested that the sixth TOR of WG II include "research on technology." This suggestion was accepted for the ensuing half of the session. Viloria asked for comments on whether discussions had been adequate for the TOR for the Nagoya sessions.

Viloria again asked if the proposed agenda was adequate. Tharun thought that the wider aspects (3-6 of issues for Task 1) should probably be identified as such. To avoid unnecessary detail the three issues could be grouped into environmental management, as "management" was the main problem under discussion. Setamanit drew attention to Nakamura's chart which signified the triangle relationship of science/technology, popular movements, and administration. The case studies had provided adequate information to support this.

Biswas commended the secretariat for a well-planned agenda but observed overlapping areas. If the formulation of training modules was to be aimed for he said, there was a need for broad categories, which he enumerated. Even broader areas could be identified from which the following perspectives (or categories) could be deduced, viz:

- (1) survey and assessment
- (2) resource utilization
- (3) resource conservation
- (4) rehabilitation (or restoration)

Nakamura observed that ten different classifications were possible. This was why he had suggested that the TOR of WG III should be discussed first. The classifications were all correct, entailing difficulty in reaching a consensus as to which one would be best for synthesis. By examining what type of training was derived together with guidelines, it would be easier to look into the four categories presented. Were conceptual or procedural guidelines in question? Discussions could proceed backwards from WG III's TOR.

Tharun agreed with Nakamura. The problem however, he thought, was that the papers on training were not scheduled till the early part of the Nagoya sessions. By that time, perceptions on training may be considerably narrowed. He said both Nakamura's model and Biswas' categories provided two dimensions. The latter gave a suitable guideline for training within a general framework.

Viloria requested comments from end-users. In response, Haeruman said that feedback mechanism and decision systems exist among the people-administration-scientists/technologists. Training did not need to be by separate sector. The environmental manager was also a regional manager. The essence of "regionality" must not be lost. Training must relate to resources and management of all objectives. Viloria then concluded the session by observing that training targets were also issues.

After a short break, Viloria solicited more views from the developing countries. He said that the target groups for training are the managers whose functions were regional in scope. This fell within UNCRD's mandate. The discussion on the TOR for the WG sessions was then formally opened.

Nakamura said devising training materials was difficult. He asked how the body would develop key guidelines.

Haeruman then introduced a social dimension, observing that community perceptions in the tropical ecosystem are an important factor to consider. Developing countries have relied on imported technology for so long. In most cases, the main weaknesses lay in the community or social structure. Sociologists have produced several models but the problem remains.

Kada delivered a major conceptual point by referring to educating the masses, fostering intraregional cooperation, and heightening environmental consciousness specially with the rural population as the target group.

Nakamura cautioned against existing models which may have specific biases. There are several examples in training and so the group need not "reinvent the wheel," so to speak.

Bauer added a few general observations saying that there were no magic solutions. The environment required multi-disciplinary work. People in the environmental field should develop a common language, an open mind, and capacity to understand the specific community. Two different tool orientations may be identified:

- (1) clarifying familiar situations
- (2) solving "unfamiliar" problems

The importance of forming environmental awareness by interacting with the community was stressed.

Cardenas said that there were practical ways to include the social dimension in management. In understanding agroecosystems, for example, there were tools relating to the agricultural system that were relevant to environmental management. Community-oriented rapid appraisal techniques were available. In attempting a comprehensive or holistic approach, there was need to interphase with other developments in planning programmes such as the one for agroecosystems.

Viloria reiterated that the purpose of the task force was to delineate the concept, objectives, approaches and methods of EPM for local and regional development. Koh recalled having received a questionnaire from UNCRD regarding training needs. Oya informed the group that of thirty sent to different countries, only eight were returned. The results would be made available to the participants. Rees suggested that the results of the questionnaire be used as a database for WG I.

This concluded the final discussion of the Otsu workshop.

SPECIAL PRESENTATION AND OPEN FORUM

Saturday, 15 November 1986, 14:00-16:30

Special Presentation

Topic: The Present State of Lakes and Swamps in China

Speaker: Liu Hongliang

Chairperson: Tatsuo Kira

Rapporteur: James F. Goater

The presentation began by showing the polluted nature of some of China's most important lakes -- some of which were sources for drinking water. Their location and size distribution were minutely analysed along with their geographical and geological origins. Having sketched a very comprehensive background to the lake system of China, the presentation turned to an analysis of point/nonpoint sources of waste, particularly focusing on phosphate/nitrogen discharge. With the abandonment of chemical fertilizers and their replacement by organic fertilizers some improvement had been noted through analyses of nutrition status of major lakes in China. Specific figures relating to one lake's research study were introduced along with detailed figures concerning eutrophication processes/species composition. Seasonal changes in phytoplankton were noted. The interesting experiment of phosphorous removal by snail was outlined -- a ten-year study into lake eutrophication in China indicated some progress.

Discussion structured around comments and questions solicited from the floor. Questions focused on sewage treatment plants, and the programmes at the speaker's institute (oxidation, absorption capacity, eutrophication, and the establishment of a data bank). People's involvement and action programmes and awareness of environmental problems was another related enquiry.

Here, the speaker responded by giving details of a Beijing case where citizens joined forces to clean up a lake. Awareness of environmental quality was considered to be on the rise in China.

Open Forum

Topic: Sound Lake Environment Management

Panelists: C. E. Bauer
G. L. Kamukala
Liu Hongliang
Hans J. Overbeck
Surin Setamanit
R. A. Vollenweider

Chairperson: Tatsuo Kira

Rapporteur: James F. Goater

The chairperson, Kira of LBRI invited each of the panelists to present a brief statement from which discussions would proceed.

Bauer (Argentina) focused on a case study of a reservoir in his country (the San Roque Reservoir) and discussed some of the problems.

Overbeck (FRG) discussed a sediment removal system, for restoring polluted lakes in his country.

Kamukala (Tanzania) outlined the paradox of the people's historical reliance on the waters of Lake Victoria, while at the same time slowly polluting it; also mentioned the persistence of data shortage.

Setamanit (Thailand) spoke of the problems of management of inland water bodies in Thailand, the difficulties of raising public awareness, and the lessons to be drawn from Biwa.

Vollenweider (Canada) discussed some important statistics, distilled from the material presented so far, i.e., 30-40 per cent of the world's lakes are eutrophied. Outlined his experience in the Great Lakes area. Phosphorous reduction noted, but level of toxic substances increasing.

Following these presentations each panelist was invited to give a summing up statement before the proceedings were opened to the floor.

Bauer opined that there was an apparent lack of application of solutions and a generally weak level of awareness among public/administrators.

Overbeck noted the alarming rise in toxic waste overspill, spoke of the need for high-tech solutions, particularly for heavy metal (cadmium, mercury, etc.) pollution of the Rhine.

Kamukala was intrigued by the use of water snails for phosphorous removal in China, noting that snails in Africa were regarded as sources of disease. Liu responded by saying that the experimentation was in its early stages but seemed safe.

Vollenweider hastened to add that developed countries do not know all the answers, and sometimes ignored the problems.

Overbeck remarked on the importance of farmer education, and necessary assistance for soil testing, etc.

Bauer emphasized the engineer's responsibility concerning hazardous waste and announced a forthcoming Cairo seminar on hazardous waste management.

A remark was made concerning the Thai context and the difficulty of local involvement -- an additional problem was politicians' self-interest; other remarks seemed to agree that all too frequently the subject engendered an overemotional response. It was also noted that the experience of various NGOs was impossible to transfer.

The final exchange focused on the technical experience of the restoration of Lake Michigan as outlined by Vollenweider. What accounted for its success? It transpired that the chief element centered on the removal of phosphorous deposits.

Chairperson Kira hoped that the developing countries would not repeat the errors of the developed countries. Overbeck summed up the whole forum in positive terms and noted that it had been a useful experience in information/views exchange.

Open forum thus ended.

IV. OPENING ADDRESS FOR PART II OF THE EXPERT GROUP WORKSHOP AT
UNCRD, NAGOYA

17 November 1986

Hidehiko Sazanami, Director, UNCRD

Friends, Colleagues, Ladies and Gentlemen:

It is my great pleasure to welcome you all to Nagoya and to the United Nations Centre for Regional Development. For those who are here for the first time, I would like to extend a special welcome.

From this morning we are resuming the sessions of the second part of the Expert Group Workshop. Let me first take this opportunity to express my sincere thanks for your valuable contributions which made the first part of the Workshop so successful. The papers presented, together with the ensuing discussions, have clarified to a large extent some of the key issues and requirements in promoting environmental planning and management in the context of local and regional development in the developing countries. I am most grateful to all of you for your commitment and kind cooperation in making this Workshop a productive and rewarding experience for all of us. I sincerely hope that the same spirit of commitment and cooperation will be sustained throughout this week as well.

Let me briefly introduce to you our Centre, UNCRD. The Centre is a global training and research institution concerned with promoting local and regional planning and development. It was formally established in Nagoya in 1971 through a funds-in-trust agreement between the United Nations and the Government of Japan. As an integral part of the United Nations technical cooperation for development, UNCRD is mandated to assist the developing countries in enhancing their national capabilities in local and regional planning and development.

From its inception, UNCRD has been striving to respond to the ever changing needs and requirements of local and regional development in the developing countries. The current priority areas of research at UNCRD include, among others, Local Social Development Planning, Increasing the Absorptive Capacity of the Urban Economy, Information Systems for Local and Regional Development, Shelter and Services for the Poor in Metropolitan Regions, Planning and Management for Development and Conservation of Metropolises, and Regional Development Planning for Disaster Prevention. The main theme of the current Expert Group Workshop, Environmental Planning and Management for Local and Regional Development, is one of the major areas to which we at UNCRD attach particular significance.

Ladies and Gentlemen:

As I mentioned in my opening speech at the Lake Biwa Research Institute last week, in this second part of the Workshop we will

discuss training aspects of environmental planning and management for local and regional development. Of the various issues to which we will address ourselves, a prime area of concern is the question as to how training in environmental planning and management can be specifically designed to effectively meet the needs of regional planners and development administrators in the developing countries.

You will agree that given the limited availability of resources and trained manpower, the principal target groups of training programmes in environmental planning and management should be those groups which are the essential multipliers within both their countries and development institutions, such as planners, development administrators, and environmental managers, who serve as trainers in imparting the necessary knowledge, skills, and attitude to their staff in promoting environmentally sound development at the local and regional levels.

The principal aims of training programmes in environmental planning and management should be to stimulate an awareness of the importance of the environmental dimension of development, and to refine the approaches and methods of integrating environmental concerns into the process of local and regional development. It is indispensable for environmental training to emphasize active planning which means that environmentally sound development must be anticipated. Similarly, this implies that environmental planning and management training must be oriented towards practicable applications.

Due to the differing physical, social, economic, cultural, and political conditions in developing countries, there are no universal approaches or solutions for training programmes. Countries confronted with different environmental problems and issues require different methods and instruments of environmental management. Thus, training programmes in environmental planning and management should be effectively interwoven with environmental research. It is possible to develop workable strategies and programmes of environmental management only when an extensive knowledge of the local or regional environment, and of those forces and factors determining the transformation of the local and regional environment are available.

In order to develop concrete ideas and strategies for training in environmental planning and management, we would like to suggest that the distinguished scholars participating in this Workshop should focus deliberations on the following issues:

- (1) What kind of training would be needed for regional planners and development administrators to be able to systematically integrate environmental considerations into the process of local and regional development?
- (2) What should be the content or curriculum for an appropriate training programme in environmental planning and management for local and regional development?
- (3) What training methods, strategies, and materials would be needed?

- (4) Who should be given priorities in training programmes?
- (5) What and how national and international organizations should be mobilized to promote training programmes in environmental planning and management for local and regional development?

As you are aware, working group sessions will be held from the 18 to 20 November in order to consolidate all the major concerns, problems, issues, and recommendations which have emerged from the deliberations of this Workshop into a framework for action which can be of practical relevance to developing countries.

Finally, I assure you again that we will try our best to assist you in accomplishing the tasks before you and also to contribute in making your stay a valuable one. With these words, I am pleased to declare open the second part of this Expert Group Workshop.

Thank you all once again.

V. SUMMARY OF PRESENTATIONS AND DISCUSSIONS, PART II

SESSION 12: CAPABILITY BUILDING FOR ENVIRONMENTAL PLANNING AND MANAGEMENT

Monday, 17 November 1986, 10:30-11:40

Topic: Manpower Development for Environmental Planning and Management in Developing Countries

Speaker: Michio Hashimoto
Discussant: Zubir Yahya
Chairperson: R. V. Vollenweider
Rapporteur: Antonio L. Fernandes

The workshop, having repaired to Nagoya, recommenced with Vollenweider's short introduction, as a prelude to the paper by Hashimoto.

The presentation centred on essential elements of manpower development especially oriented towards EPM, as distilled from the speaker's experiences in dealing with Japanese and Asian situations. Just like any resource, human resources are characterized by demand and supply. For manpower development, education is a basic necessity and it also means ascertaining what kind of persons should be recruited. Personnel recruitment means going over the various disciplines and fitting the right grade for a job.

However, training is different from education. There are three types of training in general:

- (1) In-service training programme:
- (2) Pre-service training programme: and
- (3) Scholarships/fellowships from governments.

These are intended to "make" key persons for the future. Other devices that may somehow resemble training very closely are staff rotation, exchanges, and promotions. In Japan, particularly, rotation occurs among local and central government staff every three or four years.

In table 4 of his paper, Hashimoto had produced a matrix intended as a framework for making a training scheme. The scope of training ranges from policy to science. He identified the following individuals whose sphere of activities cover a certain scope through the spectrum of policy to sciences, viz., policymaker, senior administrator, development planner, administrator, technical officer, and technical staff member. For instance, a development planner is ideally a

well-oriented individual with a proper sense of proportion since he has to deal with policy-administration through "regular" administration and administration-sectoral programmes. A senior administrator is expected not only to dabble in his own sector.

The big change occurring during the period between the Stockholm Human Environment Conference in 1972 and the Nairobi Conference in 1982 was that it became increasingly clear that environment must be integrated with development policy. The main issues relate to population, resources, development and the environment. Environment and development are interdependent. The environment needs to be protected to achieve sustainable development.

Another matrix (table 1) of scope vs. approach to EPM provides another aid for training needs. The scope includes: Basic human settlement (living environment); urban, rural, and industrial development; environmental conservation. Environmental conservation is further divided into pollution control, nature conservation and cultural heritage preservation. Dynamic processes are at work here. The environment has a relatively shorter span of "experience" than development in terms of consciousness. It is therefore a matter of matching the pace of environmental protection with that of development.

The past weak points have to be taken into consideration. Environmental rules and regulations have existed but how has implementation been carried out? How much more worse has it been at the local level? In the early Meiji era in Japan, health, flood control, water supply, and other such needs necessitated agricultural extension centres, health centres, as well as public health and sanitation measures. These were arranged in a sectoral manner.

After 1963, it became increasingly obvious that some form of EIA was needed. Antipollution and antidevelopment groups were bringing tremendous pressure to bear on administrators. The speaker had his first real contact with environmental pollution under these circumstances. Science could not predict or assess quantitatively what was happening, while much uncertainty hung over the fact that engineers could only venture to "guesstimate" the probability of failures. Doctors could only outline the possible health risks in widespread industrial pollution. The reality of Japanese society was that vested interests conflicted with policy. Those in the administration were confronted with the dilemma of whether to take action even in the absence of data. To what extent does one rely on science and technology. This is a crucial point in training.

Another challenge is technology transfer. What is appropriate for laboratory or field work? Solutions cannot be found in textbooks. A lot of constraints necessitate the adjustment.

Traditional sectoral administration relies on statistics and census on industry, health, etc. On-the-spot observations though important may not be of sufficient duration. There is no doubt the fishermen in Minamata observed the deteriorating water quality; their relationship with the bay is on a life-long basis. The move to cope with the situation could be stagewise, a jump, or a steady up-hill

strategy. Japan's approach was in a stagewise manner. The subject requires extensive discussion in the country concerned, and difficult choices have to be made.

When it comes to investment projects, cost bearing systems must be analysed. In Japan, three policies apply: (1) polluter-pays-principle (PPP); (2) beneficiary pays; and (3) social responsibility of enterprises.

The spectrum of environmental problems intimate that there is no escape from the historical background of the development process. This became evident from the experience in Japanese lakes. The following considerations need to be emphasized:

- (1) survival issues (drought, floods)
- (2) early stages of development (food, energy)
- (3) interindustrial conflicts (mining against fisheries, agriculture, forestry)
- (4) population (solid waste, excreta)
- (5) pollution (external diseconomy)
- (6) nonpoint sources
- (7) degradation, deforestation, destruction (nature, scenery, national heritage)
- (8) upstream-downstream conflicts
- (9) transnational conflicts.

The speaker also stressed grading risks especially where human lives are concerned. This has to be one of the subjects of training. The main issues of conflicts in EPM are to be identified in a matrix (table 2) that sets environment against development in its various forms (socioeconomic, national land use, regional development, etc.). Table 3 aims to define the nature of conflict described in terms of scientific uncertainty, different judgement by experts concerned, and interests of parties involved. These were proposed for consideration as part of the training content. At the presentation's end, Vollenweider (chairman) said the paper could serve as an excellent introduction and basis for a textbook for developing countries.

Discussion

Yahya, as discussant took note of the fact that national development advanced faster than the environment could cope with -- which exemplified the situation at the local level, viz., being unable to cope. This was generally because of very weak local administration.

He also pointed out that field staff are recruited on the basis of educational attainment, not training. Table 4 of Hashimoto's paper identified an interdisciplinary approach among planners and administrators. The proper group/level for training may be among senior administrators and development planners who could learn of the latest developments at UNCRD. Yahya ended by saying that Hashimoto's wide experience could be appreciated from the paper.

Haeruman followed this comment by saying that similar problems occur but the mechanism behind their generation may be different. In the case of industrial estates, the central government leads and the local government is left behind. "Mitigating conflicts" serve as entry points where managerial skills, systems analysis, and trade-offs were applicable. Then he went on to discuss fiscal policy on environment. He identified the "four musketeers" of regional development:

- regional university (an available core, which is now currently helping local governments),
- regional planning agency,
- regional administration, and
- people participation (including NGOs)

Cost-benefit inputs should be of value to central and local governments.

Hashimoto added that rather "wonderful" cooperative environmental training programmes were now being undertaken jointly between the government and educational institutions. He had great respect for such programmes. Grassroots issues such as malaria control and water supply were dealt with. He also recalled in the course of a stint as consultant in North Sumatra, Indonesia having met and talked with the governor whose sense of equity impressed him.

Bauer stressed the following issues, remarking that they were not in any special order:

- (1) Environmental problems are a priority.
- (2) It is true that the environmental manager in contrast to the development manager uses a diversity of technical terms and qualitative information (p.5 of Hashimoto's paper). Hutchinson, who may likely be the father of environmental science, had said that the capacity to evaluate quantitatively by incorporating mathematical tools has to be improved.
- (3) The Indonesian system was praised.
- (4) "Psychological" tools (motivational?) should be developed for the benefit of the development manager to show them the potential risks they are facing.

(5) The usage of lectures, case studies, and field exercises meets the training methodology requirement although perhaps the time allotment needs further discussion.

(6) The projections on the environment ought to include both long-range and short-range, entailing some clarification. Taking the example of a road, the immediate need is obvious, but adverse consequences may surface only later.

(7) Results of implementation are usually evaluated, but for technical people evaluation prior to programme implementation is important. For instance, the location, scope and size of the project must be reexamined as size greatly influences cost. Different points of view (technical/economic/social) are needed for monitoring and obtaining feedbacks.

Biswas asked how people in administration, planning, public services can get exposure, and grasp the situation with the intensity of an education. He said the real problem concerns perception of priorities -- which is more important, the environment or development? He felt that this should be made clear as a framework for planning. Table 4 showed a strata of people, who ideally should move among the different "levels." Will there be time to accommodate such exchange and/or promotion, he asked, and suggested that senior level scientists must be involved in planning and administration to reduce conflicts by carrying out "fault-finding-oriented" research. Past experiences should be utilized as a tool for training programmes (analysis of setbacks, including economics).

Vollenweider observed that values cannot be attached to all things. Biswas indicated that the scope for action also depended on the social and economic stability of the country. In Japan, Hashimoto noted, 2 per cent of GNP had been earmarked for environmental protection measures, annually, since 1975. Indeed, economic planning has taken a major role in this. He had seen econometric models based on specific assumptions which, he felt, were simple brain exercises. The results in one way or another could indicate future policy directions.

Yahya mentioned important cases where information or technology had not reached the right people, and had thus been ineffectual with regards to contributing to the betterment of living conditions. Rees made a follow-up of observing that cost and benefits must be analysed. He felt that economists would eventually win the battle. Progress would be made despite occasional lapses.

At the end of the session, Vollenweider reiterated his original point that it was very difficult to attach values to intangibles.

SESSION 13: TRAINING IN ENVIRONMENTAL PLANNING AND MANAGEMENT

Monday, 17 November 1986, 13:10-14:20

Topic: Needs for, and Prospects of, Training in Environmental Planning and Management for Local and Regional Development

Speaker: Leandro A. Vilorio

Discussant: Surin Setamanit

Chairperson: Jose G. Tundisi

Rapporteur: James F. Goater

The paper began by delineating the region (ASEAN) with which the paper was to deal and went on to sketch out a preparatory strategy for training in environmental planning and management which an international organization such as UNCRD should be taking.

The review was drawn from three seminar papers from specific countries which concerned appraisals of the art of environmental education. The progress, at best, was uneven. The speaker suggested four main factors accounting for this:

- (1) society's perception of the role of the universities
- (2) university's reaction to specific requirements
- (3) civil servant's reaction -- how to use university resources
- (4) availability of technical cooperation.

A hierarchical list was included to portray the extent of government/university tie-up in environmental matters (the placing indicated a high involvement in Indonesia and the Philippines; medium, for Malaysia and Thailand; and low for Singapore). The speaker mentioned a specific viewpoint -- that of the Central Government Training Agency in Malaysia -- viz., a 1975 rationale for INTAN's noninvolvement in research. There was, he quoted, "a danger in innovation for this agency, because if it becomes branded as an academic institution it would not be considered as fulfilling its role as a deliverer of goods."

The speaker saw this as evidence of the colonial heritages' influence in shaping the traditional role of universities vis-à-vis government. Importance was attached to this as it had previously been suggested that there should be closer contacts between universities, governments, and industries -- this may not be possible in all developing countries. However, close ties were recorded, e.g., in Brazil, at the São Paulo university and numerous centres in Indonesia. Observed influence from USA, i.e., the universities/land grant colleges, grant extension services to the local community. Thus within particular national contexts what roles could be identified?

The second part of the paper concerned a regional review of what had happened in the ASEAN group. The Director Generals of the EPAs organized themselves into a UNEP-assisted expert group on the environment. UNEP prepared agenda for action/priority had led to regional cooperation, e.g., at a Thai university (with Australian help) a regional training course to include other ASEAN countries was ongoing. Other activities were noted, including those fulfilling recommendations from the expert group. Noted formation of Asian Council for Higher Education and the Environment (ACHEE).

The speaker then moved on to a suggested strategy for UNCRD to take in Southeast Asia.

- (1) A regional approach -- environmental problems are region-specific.
- (2) There is a readiness for training/technical cooperation in this area. ASEAN is ready for the Regional Approach (Above-mentioned organizations formed on a regional basis.)
- (3) More "mileage" from increased reinforcement of existing institutions -- institutions in the area can strengthen and support each other.

Discussion

In discussing this presentation Setamanit acknowledged the regional bias, but was at the same time convinced that wider application was also possible.

Universities in developing countries take many forms -- including manpower training for government's source of personnel. There are increasing expectations of the universities, not only as sources of learning and manpower but as initiators of solutions to national problems -- academic institutions, in some developing countries, were permitted more freedom. University and administrative agencies cooperate in training programme formulation. There are large amounts of interinstitutional assistance. The focus seems more on scientific technology for community than planners and administrators. This gap was identified in the presentation. In the 1970s developing countries began to see the need to incorporate an environmental aspect to their development -- EIAs produced legislation. Change in emphasis away from scientific could be discussed. Many papers had underlined the capability-building efforts toward administrations, officials -- but there had been little focus on the community-building aspect. The discussant found the NGO role in the Japanese case interesting -- it should not be forgotten that environmental planning/management must involve this faction. With reference to the Thai system he found the NGO approach a little erratic.

Discussions revolved around a number of related issues: In Denmark, it was observed, the universities have a close role with government when a problem arises. EPA-launched projects aimed at specific targets. University was always brought in and used for

follow-up. The commentator wondered whether this model was transferable. University and industry involvement was a different question. Additional comments noted the multilevel nature of university-administration connexions in FRG, including the environmental agencies, with training being combined with education in the universities to create sound bases for future "combine training and education early." The Japanese context was outlined -- the government expected accurate scientific information/data. University wanted, however to be free from government. Social ethics were essential among academics -- consistency also essential. Early education prior to specialization is necessary.

Follow-up work was necessary for civil servants after joining administration. There was a dilemma as to what role in the development process the university should play. There was a difficulty in asking universities for solutions; UNCRD could fulfil a special role in information dissemination. "Learning by doing" was vital, perhaps a wider scope of participation could be envisaged in any succeeding meetings i.e., to include NGO officials or politicians. Further comment concerned relations between universities and government as well as the structure of training itself -- the implementation of a foundation programme. Suggestion was made of organizing university training for NGO staff. The university was considered by some as the best place for training, though university staff not necessarily essential. NGOs must participate in curriculum building. Is environment a science or management discipline? It was emphasized, also, that at UNCRD the vital importance of the university was realized. Due to British influence the traditional role of university professor as teacher was emphasized in the developing countries, rather than viewed more widely as having a strong research or policy orientation. Lower target groups, who face the real environmental problems, seem to be ignored -- universities perhaps lack ability. NGO, local level, opened up the debate, but it was also observed that from UNCRD's viewpoint the target groups were local trainers. Many examples existed regarding models for NGO training. A lack of interest on the part of the universities was noted, and vice versa -- further questions were raised as to who would conduct courses. Enthusiasm was voiced for the ASEAN initiative outlined by the speaker -- and at the same time further questions as to who will educate, suggestions concerned "public health workers." The chairman voiced his views -- saying that the universities were not playing their full part in developing advanced research, they could not play a full part in contributing to government efforts. (In São Paulo the problem was being tackled -- as was follow-up work for qualified personnel.) The importance of follow-up work to ensure success, and financial counterparts for continuing the success was considered essential.

Finally, the speaker wanted to observe that UNCRD was moving in the right direction. Training should be research-related and geared to advisory institutions (national/regional). The best bet was still, in the speaker's view -- the universities.

SESSION 13: (continued)

Monday, 17 November 1986, 14:30-16:00

Topic: Approaches and Methods of Training in Environmental Planning and Management

Speaker: Guenter Tharun
Discussant: Masahisa Nakamura
Chairperson: Jose G. Tundisi
Rapporteur: James F. Goater

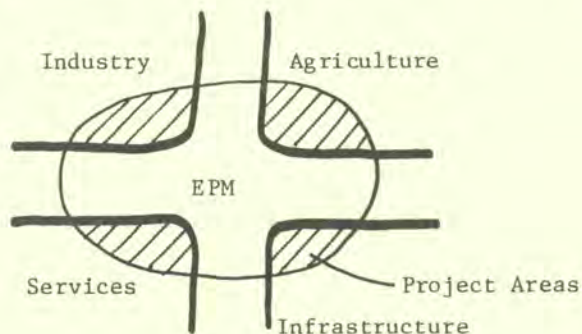
The speaker began by declaring that the provision of useable water, its utilization and the control of water pollution were foremost tasks of management though it did require the input of science and technology, etc., among others. (The presentation progressed through a series of slides.)

Management entails a series of steps: to analyse the problem; decide on objectives; develop options; select most suitable action; prepare an action plan; implement it; control the implementation; evaluate results. The speaker stated that action does not necessarily stem from the preparation of a plan only. Differentiation between departmental management and project management is important.

Development could be considered as planned change for improving living conditions/environment change, etc. Sound project management is essential for this to succeed in: (1) locating single point of responsibility (wherever possible, to be coupled with authority); and (2) integrating planning and control.

The problems associated with water quality management are location/culture specific, value loaded and very complex. Management skills, including training management was essential. The perception of an environmental priority issue as a realistically manageable mission and its transformation into reasonable action are to be made the main issue. These two goals should be central to any environmental management training.

The speaker utilized the figure below to illustrate the necessary outreach for environment planners and managers.



However in his view the universities hardly prepare for very complex management tasks and are not well equipped for this type of training. (The scientists are often too specialized-technical, the social sciences too general-diffuse.) Thus, complementary training is needed, which has to be built on existing conventional education. A systematic decision-making process should be followed:

- (1) First of all it has to be asked whether any training could really contribute to solving a given problem, before proceeding towards identifying training needs;
- (2) Develop training objectives;
- (3) Design for training action;
- (4) Evaluate training results.

Although training has meanwhile become "fashionable," the speaker feels that training can never be a cure-all. It is not action for changing any circumstances in practice itself, but only the often necessary preparatory step or prerequisite for it. In-house training has a higher chance for success in implementing the results of the learning processes (in training at international level, only "eventual" application of training results can be expected).

Training quality depends on relevance of input/output -- what is effective training? Speaker provided a range of indices for learning, i.e., we remember 10 per cent of what we read, but 90 per cent of what we do; this indicated the limitation of certain learning processes. The speaker strongly advocated the "learning by doing" approach, which should be goal oriented.

Key principle of the action training approach -- "to let trainees develop themselves" -- project method; case work/study; simulation game; role playing and group work (or combinations).

Aim of action learning approach is the transformation of problem awareness into problem solution -- but main question...HOW?

At the speaker's centre a Project Case Work based training approach has been developed: Exercises of simulated water pollution control planning/inland water management to involve preparation for real action.

The Project Case Work (PCW) approach can lead to constructive training experience and real life improvements. Taiwan has adopted this approach for its water pollution control plans.

The speaker concluded the presentation by giving a brief outline of the PCW approach. His final words put much into focus by saying that the results were for "eventual application for change." We could not influence it directly, only hope for it.

Discussion:

Discussant Nakamura wished to bring out a few observations regarding the more important aspects of the paper:

- (1) The paper highlighted the importance of "doing" -- 90 per cent recall, following action learning;
- (2) Application of results dependent upon personality (commitment). Nakamura felt this was frequently overlooked, but still crucial;
- (3) People who have received effective training very often can act as "propagators" of the training.

This provoked a wide range of discussion, firstly the comment that training materials frequently lacked good case studies. Tharun responded by saying that consultants could be utilized to overcome shortcomings. Consultants had to do a good job because they were interested in business. Academics are sometimes difficult to approach. Awareness existed as to the value of case method/project approaches -- is the PCW really a good method? The response indicated that no immediate change could be assumed; there is no one single best method. From the ADB's viewpoint, a strong endorsement for the use of consultants in training material was voiced. University personnel had generally been disastrous -- this was also the feeling of governments. Consultants work with material/time constraints and are familiar with the field. Academics nevertheless have their worth in specific areas. The Han river development project corroborated the value of a few well-trained personnel capable of propagating training. Case studies/field trips have proven very useful -- UNCRD should pay attention to case studies, and try to fill gaps. A further comment concerned value laden training -- it was considered unavoidable. How could this be dealt with? Also differentiation was required between project case work and project case study. Tharun responded to the first point by replying that these values were implicit rather than explicit. Simulation models indicated that different solutions could be devised. Finally, project case work was accentuated by a prospective view, whereas case studies were more retrospective. Further corroboration for the project case work approach, but before starting project-oriented work, wasn't preparatory material necessary? Agreement was forthcoming, with reservations and illustrations -- background materials were in reductionist form. The point was made that care must be taken in project selection, and training personnel selection. An anecdote provided an illustration of the importance of realizing time constraints on project management; this point was conveyed as a good example of "exercise" work. One-week-training will hardly change attitudes, this was another point from the presentation which attracted attention, although simulation game exercises with people of different backgrounds interacting over a period of time could induce attitudinal change. Maybe this type of training was more effective than on-the-job-training.

Tharun summed up by saying such an approach was always personnel-dependent -- the right mix of people was always important. Caution

was advised. The chairperson sought to clarify some views and stated his conviction that project case work combined with fieldwork had proven very successful in Brazil. The "ecosystem" approach in tackling any environmental problem was a very successful technique, which had global ramifications.

SESSION 14: GENERAL DISCUSSION: (Identification of Issues Arising from the Day's Presentations and Discussions)

Monday, 17 November 1986, 16:00-17:00

Chairperson: Sven E. Jørgensen
Rapporteur: Antonio L. Fernandez

The chairman commenced the session by soliciting comments on the outcome of the ILEC group discussion. A book of guidelines on principles of lake management, coedited by Jørgensen and Vollenweider was scheduled for publication in May 1987 -- to be the first of a series of such books. A further handout concerning the Lake Environment Youth Programme was also examined.

Resulting discussion centred on the topic of guideline identification with deliberations raising the following three topics:

- (1) Participants felt it worthwhile including the study of a tropical lake, as it was voiced that conditions in tropical areas were so different from northern climates where much of the research had been carried out. Cardenas and Vilorio were coopted to collaborate in the production of a short study.
- (2) Disagreement was expressed on whether or not costs should be included. The chairman and Vollenweider, at the same time as accepting the importance of financial considerations cautioned against getting too involved with costs, at this stage. At appropriate studies financial aspects could be included.
- (3) Sociocultural aspects was another area which participants felt it worthwhile considering. It was generally agreed that social factors were strong influencing functions in lake systems, although for the group to get itself involved with systematic social analysis was considered by some, to be unwise. The chairman agreed that this area should be left to other experts perhaps being the focus of another study.

Further discussion centred on: Clarification concerning certain aspects of the book of guidelines, viz., the book's scope; its scientific explanations; its intentions (i.e., provide broad guidelines, with more specific questions on water resource management to be tackled at a later date); and its potential leadership (i.e., it provides "practical checkpoints and is not intended as a handbook).

It was stressed that the ILEC, a new NGO, was in its infancy and that no great achievements could be expected so soon, however the lake data base system at LBRI was to be updated. It was also described how ILEC's central brief was slightly different to UNCRD in that the

latter stressed, principally, environmentally sound development, while the former focuses on environmental management.

UNCRD, it was emphasized, wanted to produce training modules, teaching materials, useful for local level development planning; hence the collaboration with ILEC was not just academic. Topics to be discussed at ensuing sessions, via working group organization were for gradual expansion in the ensuing years. Follow-up activities were to be discussed in further sessions. Finally, it was voiced that a possible handbook could be jointly published at some future date.

SESSION 15: TRAINING NEEDS IN DEVELOPING COUNTRIES

Tuesday, 18 November 1986, 9:30-12:00

Topic: Regional Development and Training for Planners in Asia and the Pacific

Speaker: Masahiro Ohta
Discussant: P. K. Biswas
Chairperson: Hans J. Overbeck
Rapporteur: Antonio L. Fernandez

Ohta began by outlining his paper, which was divided into four sections: (i) the Asian-Pacific region situation; (ii) the environmental problems of the region; (iii) case studies from Indonesia and Thailand; and (iv) countermeasures to tackle problems, with reference to training.

The Asian Pacific Region extends from Iran in the west to the small Pacific islands of the east. China, India, and Indonesia make up the bulk of the region's population. The environmental issues may be related to either natural resource development or industrialization. In the case of natural resources, forest degradation is common. In Japan, environmental degradation was once understood as industrial pollution.

Ohta highlighted the cases from Indonesia and Thailand in order to define the problems, which may well be common to other developing countries. He cited information on critical areas identified by the UNEP-sponsored clearing house project -- in the Jakarta-Puncak corridor. The land was threatened primarily because of population pressure and rapid economic change, the impact being mainly on the surrounding rural areas.

In Thailand, the urban population accounts for 14 per cent. It was observed that only the educated and well-informed were practicing family planning and that this sector was found easier to cooperate with when dealing with ecology. Ohta saw this as an advantage for regional planners. Government institutional structures came into existence in rapid succession. In government offices, the belief that management organization required political clout helped very much in the daily operations. Although laws exist, policies embodied are frequently not implemented.

Environmental agencies were enthusiastic to have trained personnel on their staff. Training needs included the development of manpower for the formulation step of the planning process where the collaboration of planning and line agencies may remedy the difficult situation and also help overcome the complications encountered in implementation of EIA. Ohta also stressed the concept of area-based integrated EPM, putting local government to the fore. (This paper detailed major areas of training needs on pp.20-21.)

The environmental authorities required capability strengthening. In turn, the environmental authority staff could train the line agencies' personnel. Examples of this existed in the region. As it was impossible to reach all decision makers in the area the environmental authorities may require specific training in this sense. The line agencies should also assist in formulating the plan to integrate the environmental factors.

Discussion

Biswas, as discussant, pointed out that with the environmental authority carrying out planning, management, and implementation, efforts may be counterproductive. In this sense he agreed with Ohta that involving the vital sector's line agencies in environmental matters needs to be considered in plan formulation. In other words, decentralization should be promoted when environmental matters are considered.

He referred to the media sector as another target group. Perhaps, he suggested, teaching materials should include video and film animation as these create greater impact on the audience, in addition, he said, more emphasis should be attached to the training of trainers. They could then disseminate or propagate what they had learned. Perhaps a group of up to 30-40 persons could be trained. A kind of refresher course may also be needed. An award system could be established for motivating mainly academic institutions to produce training materials. These materials need to stress how basic available resources could be made useful in the field.

Viloria continued the discussion with an enquiry concerning Annex 2 of the paper, the "Programme of Action for Environmental Education and Training (EET) in Asia and the Pacific Region," particularly on the establishment of a regional network of tertiary educational institutions, and on whether UNEP Bangkok has already organized one. Ohta asked the chairman if Surin could offer some information on the matter. But before that he explained that after the EET meeting, an umbrella network of specific institutions had been established. The umbrella network had been organized by Surin in 1985 who explained that during the working group discussions, the relevant institutions were identified. It was also agreed that education and training activities would be documented together with a list of important personnel in the field. (A kind of who's who.) The participants of that meeting joined in their personal capacity and therefore development has been slow. Surin said he plans to write to the workshop's participants when he goes back to give them more information and invite them.

Referring to his paper, Viloria said that the Asean Center for Higher Environmental Education (ACHEE) was formed in order to support the UNEP programme of encouraging subregional groups. Similar centres were also supported by UNEP and UNESCO. In this way, ESCAP will find the institutional network more relevant and manageable. What UNEP has started -- ASEP, SASEP (South Asia), etc., -- should also have counterparts or subregional training centres in the region. Viloria

promised to send a formal proposal to Surin and proceedings of the Manila meeting (1983) of which Sazanami had been a participant. He felt that with the acknowledged training needs, the universities definitely had an important role to play.

Baisyet expressed interest as to whether Surin's group had produced training materials. His second question concerned UNEP's role regarding the Action Plan for Tropical Forestry. In replying to the second question Ohta stated that three different Asian regions each had meetings where discussion focused on tropical forestry. UNEP, ESCAP, and other agencies found it difficult to coordinate because each agency had its own funds for projects at regional and subregional levels. The Government Council meeting for the South Asia Coordinating Environmental Programme had been held in Colombo in January 1986 while the one for ASEAN was to be held in Jakarta in April 1987. The latter two had environmental education and training as their top priority, although there was a lack of funds. A meeting was being planned for NGOs of the region.

Koh wanted to know how much effort UNEP was expending on training administrators rather than scientists. Ohta replied that there was an ongoing information dissemination programme for decision makers and politicians whose names are on their mailing list. There was a clear need for administrators to evaluate their overall situation. Environmental authority must train personnel in local government, which could be done step by step. Overbeck (chairman) in his final remarks said that exchanges had to take place between field level and management level personnel for effective training programmes to be implemented.

CLOSING SESSION:

Friday, 21 November 1986, 13:00-15:00

Chairperson: Michio Hashimoto
Rapporteur: James F. Goater

The session was intended to act as a forum at which the findings and discussions of the three working groups, who had deliberated during the previous two days, could be presented to the workshop for further examination/refinement.

The chairperson called upon Setamanit, the chairman of working group one, to read the findings of his group, which had been set the task of identifying the needs of developing countries to more effectively promote environmental planning and management (focused on inland waters) in the context of local and regional development.

The document produced by the group was circulated and each item was presented, basically verbatim, although sections were omitted, in order to highlight others so as to show the development of ideas within the group. Setamanit's presentation therefore consisted of highlights of the distributed document.

Chairperson Hashimoto then called upon Tundisi to deliver the findings of working group two which had been set the task of devising a functional framework for the development and use of scientific knowledge for environmental planning and management (focus on inland waters with specific reference to lakes and reservoirs) in the context of local and regional development.

Tundisi delivered a synthesis of his group's paper which highlighted, once again the principal points considered. Five main areas were selected from the nineteen pages of text and figures which were distributed. Some key words which summarized the working group's efforts -- ecosystem approach, watershed, sampling problems, statistical analysis, intercalibration, criteria, monitoring and research, modelling, and training -- also stressed was the link with socio-economic considerations.

Thirdly, group three's chairman Viloría was called upon by chairperson Hashimoto to present his group's findings. He began by acknowledging the work of group one, whose findings constituted a point of departure for his group. The task of group three was to design a training programme.

Referring to the circulated material, Viloría noted the principal areas sketched out, i.e., programme objectives, four subject areas, training approaches, exercises, etc.

Upon the completion of these working group reports mention was made of the ad hoc discussions which had taken place the previous day. Viloría was further called upon by the chairperson to present a summary of this work.

It was first revealed that the "brainstorming group" (Viloría's team) had been organized in response to UNCRD Director Sazanami's request that the possibilities of a one-month training course should be looked at, with a view to testing its feasibility. The document which resulted from this session was entitled "Basic Considerations for the Development of Training Programmes in Environmental Planning and Management for Regional Development: Focus on Inland Waters."

The document was organized in three parts, e.g., "Design Parameters for Development of Training Course," "Determinants of the Contents of Prospective Courses," and "A General Framework for the Development of Training Courses on EPM." For his delivery Viloría focused on the second part of section three, "Enhancement of Ability to Incorporate EPM in the Development Cycle" and concluded by observing that there could indeed be agreement among various institutions who are interested in sponsoring joint programmes like the one under consideration.

Chairperson Hashimoto then opened the workshop proceedings to comments from the floor after noting that the documents before the workshop were all subject to language "consolidation" by the UNCRD secretariat.

Director Sazanami added some words, principally noting that further collaboration was anticipated between UNCRD/ILEC. He solicited further additions/revisions after the workshop. Moving on to the last part of the material "Conclusions and Recommendations," Hashimoto invited Viloría to present the draft. Eight points constituted the document, which Viloría read verbatim.

No comments or discussion was forthcoming after the presentation of these paragraphs so Golubev was requested to deliver his closing speech. (See after)

Following this an appreciative speech was briskly delivered by ILEC Chairman Kira, followed by UNCRD Director Sazanami's closing remarks which thus enabled Chairperson Hashimoto to express his hopes for the future and close the workshop.

VI. CLOSING ADDRESS

21 November 1986

Genady N. Golubev, Assistant Executive Director, UNEP

Dr. Sazanami, Dr. Kira, Dr. Hashimoto, Distinguished Experts, Ladies and Gentlemen:

It is a pleasure for me to be with you here in Nagoya today at the conclusion of your Expert Group Workshop on "Environmental Planning and Management for Local and Regional Development: Focus on Training Aspects Derived from Studies of Inland Water Management." This surely is a longish name for a Workshop. But we all agree that it refers to a vital area which is, today, very much in need of scientific and international support.

During the last two weeks, over seventeen regular sessions and four working sessions, you have discussed the subject of environmental planning and management. During these sessions you gave particular attention to freshwater resources and lake and river basins. Very significantly, you have also reflected upon the preparation of training modules on this topic, keeping in view the context of "local and regional development." It is encouraging, and very much in line with UNEP's own priorities, that the results of your efforts will help establish a regular training course at the UNCRD in this field. The UNCRD, as all of you are well aware, has had a history of research and training in the field of regional development planning. It is satisfying to see that the environmental dimension is soon going to be a regular part of UNCRD's work. UNEP is happy that it has been able to collaborate with the UNCRD in this process, over the last three years. I am happy to note that even the results of our joint June 1985 Workshop in Nagoya, which focused on Japanese experience and developing countries' needs, have been drawn upon in your two weeks' deliberations.

I would also like to recall today, with much appreciation, the collaboration of the Shiga Prefecture with UNEP in convening the 1984 Conference on Conservation and Management of World Lake Environment, which led to the establishment of the International Lake Environment Committee (ILEC). The two strands of our collaboration with the UNCRD and ILEC have happily come together here to see how the methods and procedures of environmental planning and management can best be applied to lake and river basins in frameworks of local and regional development planning.

The various special topic papers, the case studies from the developing countries as well as the experience of Japan that you have discussed over the last two weeks make it quite clear that there are no simple or unique answers to environmental planning and management

of lake and river basins. But it is also clear that one needs to approach the task methodically, keeping in view the physical, socio-economic and ecological parameters of the situations concerned. It is the distillation of this method that has been the objective of your efforts over the last two weeks.

It is not easy to define and formalize this approach. Specific techniques are available to establish base line physical-environmental and socioeconomic data in "regions" or "localities" where environmental planning is being put into effect. Techniques are also available to ascertain the potential environmental impacts of project alternatives considered for implementation. The social and economic significance of such environmental impacts can also be ascertained, in part quantitatively, and in part, qualitatively. Conflicts of interests are necessarily involved as regards the use of scarce natural resources, e.g., freshwater. Conflicts are also inherent in the possible distribution of the benefits and costs -- including environmental damage costs -- of the proposed development interventions. The larger ecological interests such as water quality, water safety, protection from eutrophication, erosion, siltation, maintenance of the hydrological cycle and so on, must also, somehow, find expression in the calculation of social benefits and costs of various schemes. Moreover, the various sectoral projects have to be coordinated and examined from the standpoint of their total or synergistic effort in the context of specific geographic contexts. So considering the environment in the planning of development in a geographical unit (locality or region) is a highly complex job.

By and large, experience on the ground suggests that comprehensive regional plans are too complex, expensive, time-consuming and vulnerable to the development uncertainties with which we are all too familiar. Such plans cannot provide cost-effective means of pursuing environmentally sound development in most countries. At the same time, a collection of projects, even if they were to be environmentally examined individually, cannot constitute a good enough regional plan for sustainable development.

A practical approach to come to grips with the task could follow the now well-known three-step procedure of "diagnosis, strategy, and project development." After a rapid analysis of the main problems, constraints and potentials of the geographical region, e.g., lake or river basin, including appraisal of its socioeconomic and natural resources situation, a strategy can be defined to deal with the major problems and mobilize the promising potentials. Within the framework of this strategy a set of mutually supportive projects can be designed and implemented aimed at environmentally sound and socially satisfactory development.

It is somewhat along these lines that UNEP has been trying to give practical expression to its programme on Environmentally-Sound Management of Inland Water (EMINWA). The purpose is to assist countries in the design and implementation of environmentally sound water management programmes. As a first step, in collaboration with the

Governments of Angola, Botswana, Malawi, Mozambique, Namibia, United Republic of Tanzania, Zambia, and Zimbabwe and the United Nations Council for Namibia, UNEP has catalyzed the preparation of the Draft Action Plan for the Environmental Management of the Common Zambezi River System (The Zambezi Action Plan). The Plan is based on a diagnostic study of the Zambezi basin with a focus on environmental issues. It contains a strategy of environmental planning and management of development in the region, and specifies a set of programme priorities as well as specific, interrelated projects.

As I said before, I am particularly gratified that your Workshop has helped launch the preparation of training materials on environmental planning and management of regional development. Training is indeed a critical part of the building up of institutional capabilities in countries. UNEP anticipates UNCRD's planned training course in environmental planning and management of local and regional development should benefit, when fully mature, at least fifty developing country planners every year. I am pleased to see that three experts from African countries which are participating in the EMINWA programme have attended this Workshop. This should not only help develop further the EMINWA initiatives, including the Zambezi Action Plan, but should give substance to UNEP-ILEC-UNCRD collaboration to strengthen African institutions in the environmental planning and management of lake and river basins. Activities of the Zambezi Action Plan relating to Lake Kariba, Lake Cabora Bassa, and Lake Malawi, will, for example, all need the collaboration of the ILEC.

UNEP appreciates this collaboration with the UNCRD and the ILEC very much, particularly because of the potentially strong support it should provide to its increasingly action-oriented work. It is through such work that the United Nations system can prevent environmental disasters and mitigate conflicts at local, sub-national as well as international levels. When the work of the United Nations is seen to transform, for the better, problematic or potentially problematic situations, it will receive the now much-needed additional support of the world community.

UNEP is grateful to the Government of Japan for the significant part it has played in bringing the UNCRD-UNEP-ILEC collaboration to fruition. With a limited natural resource base Japan has achieved extraordinary economic growth within a short span of time. Moreover, in this process the social and environmental aspects have received careful attention with emphasis on "learning by doing." The manner in which consensus is built up at local, prefectural and national levels, and land use, environment and development plans developed with emphasis on people's participation, offers much for other countries to draw lessons from. It is therefore fitting that the UNCRD, with UNEP, and ILEC collaboration, should make available widely the technical papers, proceedings and reports of the Nagoya Workshop of June 1985 and this Otsu and Nagoya Workshop.

Finally on behalf of UNEP I want to pay a heartfelt tribute to the organizers of this Workshop -- the Secretariats of UNCRD, ILEC, and Shiga Prefecture. UNEP appreciates the thoughtful attention to detail and the hospitality in the convening of this event. UNEP looks

forward with confidence to continued collaboration with the UNCRD, ILEC, and the Government of Japan in the development and implementation of its Programme.

Thank you very much Ladies and Gentlemen.

ANNEXES

ANNEX 1

PROGRAMME OF THE EXPERT GROUP WORKSHOP

EXPERT GROUP WORKSHOP ON ENVIRONMENTAL PLANNING AND MANAGEMENT FOR LOCAL AND REGIONAL DEVELOPMENT: FOCUS ON TRAINING ASPECTS DERIVED FROM STUDIES OF INLAND WATER MANAGEMENT

10-21 November 1986, Otsu and Nagoya, Japan

Venue: Part I: 10-15 November 1986 Lake Biwa Research Institute,
Otsu, Shiga Prefecture

Part II: 17-21 November 1986 United Nations Centre for
Regional Development, Nagoya

Part I: Methods and approaches to Environmental Planning and Management for Local and Regional Development: Focus on Issues Related to Management of Water Resources and River Basins

Monday, 10 November 1986

9:30-10:00	<u>Opening Session</u>	MC: H. Kotani
	Opening address	H. Sazanami, Director, UNCRD
	Opening address	T. Kira, Chairperson, ILEC
	Opening address	K. Tani, Director, International Affairs Division, Environment Agency
	Welcome address	M. Inaba, Governor, Shiga Prefecture
10:00-10:30	Coffee/tea break	
10:30-11:40	<u>Session 1:</u>	Scientific Bases of Lake Environ- ment Management
	Chairperson:	T. Kira
	Topic:	Scientific Approach to Lake Envi- ronment Management
	Speaker:	J. Overbeck
	Discussant:	T. Goda
11:40-13:00	Lunch break	

- (10:40-10:50) Coffee/tea break
- Topic: Watershed Management in Nepal
- Speaker: P. M. Baisyet
- Discussant: A. Koh
- 12:00-13:30 Lunch break
- 13:30-16:00 Session 4: Country Case Study Presentation (II)
- Chairperson: Z. Yahya
- Topic: Environmental Planning and Management in Thailand with Particular Reference to the Songkhla Lake Basin
- Speaker: S. Setamanit
- Discussant: H. Liu
- (14:40-14:50) Coffee/tea break
- Topic: Assessment of Environmental Planning and Management in Laguna Lake Region
- Speaker: M. L. Cardenas
- Discussant: B. Munyando
- 16:00-16:20 Coffee/tea break
- 16:20-17:00 Session 5: General Discussion: Identification of Issues Arising from the Presentations and Discussions of the Past Two Days
- Chairperson: G. Tharun

Wednesday, 12 November 1986

- 9:30-12:00 Session 6: Country Case Study Presentation (III)
- Chairperson: P. K. Biswas
- Topic: The State of the Art of Environmental Planning and Management in Kenya, and Tanzania: Focus on Inland Water Resources Management

	Speaker:	B. Munyando G. L. Kamukala C. R. W. Kayomba
	Discussant:	C. E. Bauer
(10:40-10:50) Coffee/tea break		
	Topic:	Development of Environmental Planning and Management at Village Level: A Case Study of Desa Sidroejo, Biltar, East Java, Indonesia
	Speaker:	Herman Haeruman
	Discussant:	K. Oya
12:00-13:30	Lunch break	
13:30-16:00	<u>Session 7:</u>	Country Case Study Presentation (IV)
	Chairperson:	S. E. Jørgensen
	Topic:	Environmental Planning and Management in Malaysia: A Case Study of EPM in the Klang Valley Region
	Speaker:	A. Koh
	Discussant:	G. Tharun
(14:40-14:50) Coffee/tea break		
	Topic:	Environmental Planning and Regional Development in Malaysia
	Speaker:	Z. Yahya
	Discussant:	J. G. Tundisi
16:00-16:20	Coffee/tea break	
16:20-17:00	<u>Session 8:</u>	General Discussion: Identification of Issues Arising from the Day's Presentations and Discussions
	Chairperson:	C. P. Rees
<u>Thursday, 13 November 1986</u>		
9:10-12:30	<u>Session 9:</u>	Japanese Approach to Environmental Management
	Chairperson:	S. Setamanit

Topic: Regional Environment Management in Japan

Speaker: T. Abe
Discussant: C. P. Rees

(10:10-10:20) Coffee/tea break

Topic: Lake Water Quality Administration in Japan

Speaker: K. Nakajima
Discussant: M. L. Cardenas

(11:20-11:30) Coffee/tea break

Topic: Lake Kasumigaura Chronology

Speaker: O. Maeda
Discussant: H. J. Overbeck

12:30-14:00 Lunch break

14:00-17:00 Session 10: Regional Environment Management: A Case Study of Lake Biwa

Chairperson: J. G. Tundisi

Topic: (a) The Evolution of Environmental Policies for Lake Biwa

Speaker: T. Niren

Coffee/tea break

Topic: (b) The Lake Biwa Comprehensive Development Project and Environmental Conservation

Speaker: J. Takayanagi

Topic: (c) The Regional Environment Management Plan of Shiga Prefecture

Speaker: T. Kagatsume

Coffee/tea break

Topic: (d) Environmental Information Data Base System and "Shiga Prefecture Environment Atlas"

Speaker: Y. Onishi and Y. Kada

Discussants: S. E. Jørgensen
P. M. Baisyet
J. Sivadechathep

Friday, 14 November 1986

Field Visit: Lake Biwa and its Surrounding Area

- 9:00 Lv. Biwako Hotel
- 10:15-12:00 - Large-scale sewage treatment plant located in a man-made island in southern Lake Biwa
- Small-scale rural sewerage system at Kiryu
- 12:15-13:45 Lunch at Shiga Modern Art Museum
- 14:00-15:00 - Setagawa Weir
- Sand arrestation (sabo) works in the southern catchment area of Lake Biwa (Briefing on the sand arrestation works will be provided by an official from Lake Biwa Works Office, Kinki Regional Office of Ministry of Construction)
- 15:30 Ar. Biwako Hotel

Saturday 15 November 1986

- 9:30-12:00 Session 11: Round-up Discussion:
Chairperson: L. A. Vilorio
- 14:00-16:30 Open Forum:
Chairperson: T. Kira
- Special Lecture
- Topic The Present State of Lakes and Swamps in China
Speaker: H. Liu
- Panelists: C. E. Bauer
G. L. Kamukala
H. Liu
H. J. Overbeck
S. Setamanit
R. A. Vollenweider

Sunday, 16 November 1986

- 10:00 Departure for Nagoya by bus
- 11:00-12:00 Visit the Hikone Castle
- 15:00 Arrival at Nagoya Dai-ichi Hotel

Part II: Training Aspects of Environmental Planning and Management
for Local and Regional Development

Monday, 17 November 1986

- 9:30-10:00 Welcome and opening address H. Sazanami, Director, UNCRD
- Objectives and Organization of Part II
- 10:00-10:30 Coffee/tea break
- 10:30-11:40 Session 12: Capability Building for Environmental Planning and management
- Chairperson: R. A. Vollenweider
- Topic: Manpower Development for Environmental Planning and Management in Developing Countries
- Speaker: M. Hashimoto
- Discussant: Z. Yahya
- 11:40-13:10 Lunch break
- 13:10-15:40 Session 13: Training in Environmental Planning and Management
- Chairperson: J. G. Tundisi
- Topic: Need for and Prospects of Training in Environmental Planning and Management for Local and Regional Development
- Speaker: L. A. Vilorio
- Discussant: S. Setamanit
- (14:20-14:30) Coffe/tea break
- Topic: Approaches and Methods of Training in Environmental Planning and Management
- Speaker: G. Tharun
- Discussant: M. Nakamura
- 15:40-16:00 Coffee/tea break

13:00-14:00 Closing Session

Chairperson: M. Hashimoto

Presentation of Reports by Working Group Chairpersons

Presentation of Conclusions and Recommendations of the
Expert Group Workshop

Discussion and Adoption of Reports and Conclusions

Closing Speeches: G. N. Golubev, Assistant Executive
Director, UNEP

T. Kira, Chairperson, ILEC

H. Sazanami, Director, UNCRD

ANNEX 2

LIST OF PARTICIPANTS

Argentina

C. E. Bauer Chairman, Engineering and Environment
Committee, World Federation of Engineering
Organizations, Buenos Aires

Brazil

Jose G. Tundisi Professor, Center of Hydric Resources and
Applied Ecology, School of Engineering,
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Sao Carlos

Canada

R. A. Vollenweider Senior Scientist, Canada Center for Inland
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China

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Engineering
President, Chinese Research Academy of
Environmental Sciences; Deputy Director,
Commission of Science and Technology,
Beijing

Denmark

Sven E. Jørgensen Professor, Department of Pharmaceutical
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Copenhagen

Federal Republic of Germany

Hans J. Overbeck Director, Department of Microbial Ecology,
Max-Planck-Institute fur Limnologie, Plon

India

P. K. Biswas Deputy Adviser, Planning Commission,
New Delhi

Indonesia

Herman Haeruman Chief, Bureau of Natural Resource Management, BAPPENAS
Assistant Minister, Office of the State Minister for Population and Environment, Jakarta

Dodi Poetranto Office of the State Minister for Population and Environment, Jakarta

Japan

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Tatsuo Kira Director, Lake Biwa Research Institute, Otsu

Osamu Maeda Associate Professor, Tsukuba University, Ibaragi Prefecture

Kohki Nakajima Deputy Director, Water Quality Management Division, Environment Agency, Tokyo

Masahisa Nakamura Associate Head, Research and Planning Division, Lake Biwa Research Institute, Otsu

Takaaki Niren Associate Professor, Faculty of Economics, Nihon Fukushi University, Aichi Prefecture

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Junji Takayanagi Councillor, Water Affairs Office, Shiga Prefectural Government, Otsu

Antonio L. Fernandez Department of Environmental Engineering, Osaka University, Osaka

Kenya

Beatrice Munyando (Ms.) Lake Basin Development Authority, Kisumu

Malaysia

- Augustine Koh Oon Shin Programme Coordinator (Human Settlements and Environment Programme), National Institute of Public Administration (INTAN) Kuala Lumpur
- Zubir Yahya Under Secretary (Development), Ministry of Land and Regional Development, Kuala Lumpur

Nepal

- Pradip Man Baisyet Project Chief, Watershed Management and Conservation Education Project, Department of Soil Conservation and Watershed Management, Ministry of Forests and Soil Conservation, Kathmandu

Philippines

- Marlito Lanzona Cardenas Associate Professor, Institute of Chemistry, College of Arts and Science, University of the Philippines at Los Banos College, Laguna
- Colin P. Rees Senior Environment Specialist, Asian Development Bank, Manila
- Leandro A. Viloria Professor, School of Urban and Regional Planning, University of the Philippines, Quezon City

Tanzania

- G. L. Kamukala Director General, National Environmental Management Council, Ministry of Land, Water, Housing and Urban Development, Dar-es-Salaam

Thailand

- Surin Setamanit Director, The Institute of Environmental Research, Chulalongkorn University, Bangkok
- Jakkris Sivadechathep Environmental Policy and Planning Division, Office of the National Environment Board, Bangkok
- Guenther Tharun Head, CDG-South East Asia Program Office, Asian Institute of Technology, Bangkok

Zambia

C. R. W. Kayomba Director of Water Affairs, Ministry of
Agriculture and Water Development, Lusaka

ILEC

Tadao Tonoike Deputy Secretary-General

Hiroya Kotani Head, Planning Division

Takashi Nagase Chief, Finance Section

Tomio Fukada Chief, Data Collection and Guideline
Section

Motokazu Ando Chief, Training and Public Information
Section

Michiko Nakagawa (Ms.) Chief, Conference Section

UNEP

Genady N. Golubev Assistant Executive Director

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Masahiro Ohta Deputy Regional Representative
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UNCRD

Hidehiko Sazanami Director

Chakrit N. Padungkarn Deputy Director

Hirobumi Enomoto Chief, Administrative Services

Kenji Oya Programme Specialist

James F. Goater Documentation Assistant, UNCRD

Kazuhiko Terao Administrative Assistant

Kuniko Kondo (Ms.) Secretary

ANNEX 3

LIST OF PAPERS

1. Hans J. Overbeck Scientific Approach to Lake Environment Management
2. Sven E. Jørgensen Information Systems and Modelling for Environmental Planning and Management: Focus on Lake Environment Management
3. Colin P. Rees The Asian Development Bank's Approach to Environmental Planning and Management: Focus on Economic-cum-Environmental Planning Studies

Training in Environmental Planning and Management
4. Masahisa Nakamura Policy Analysis Perspectives in Environmental Planning and Management
5. Jose G. Tundisi Local Community Involvement in Environmental Planning and Management: Focus on River Basin Management - The Lobo-Broa Reservoir Case Study
6. Pradip Man Baisyet Watershed Management in Nepal
7. Surin Setamanit Environmental Planning and Management in Thailand with Particular Reference to the Songkhla Lake Basin
8. Marlito Lanzona Cardenas Assessment of Environmental Planning and Management in Laguna Lake Region
9. Herman Haeruman Development of Environment Planning and Management at Village Level: A Case Study of Desa Sidroejo, Biltar, East Java, Indonesia
10. Augustine Koh Oon Shin Environmental Planning and Management in Malaysia: A Case Study of EPM in the Klang Valley Region
11. Zubir Yahya Environmental Planning and Regional Development in Malaysia
12. Takao Abe Regional Environment Management in Japan
13. Kohki Nakajima Lake Water Quality Administration in Japan

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| 14. | Osamu Maeda | Lake Kasumigaura Chronology |
| 15. | Takaaki Niren | The Evolution of Environmental Policies for Lake Biwa |
| 16. | Junji Takayanagi | The Lake Biwa Comprehensive Development Project and Environmental Conservation |
| 17. | Toshiaki Kagatsume | The Regional Environment Management Plan of Shiga Prefecture |
| 18. | Yukio Onishi & Yukiko Kada | Environmental Information Data Base System and "Shiga Prefecture Environment Atlas" |
| 19. | Michio Hashimoto | Manpower Development for Environmental Planning and Management in Developing Countries |
| 20. | Leandro A. Viloría | Need for and Prospects of Training in Environmental Planning and Management for Local and Regional Development |
| 21. | Guenter Tharun | Approaches and Methods of Training in Environmental Planning and Management |
| 22. | Masahiro Ohta | Regional Development and Training for Planners in Asia and the Pacific |
| 23. | C. E. Bauer | San Roque Reservoir |
| 24. | Liu Hongliang | A Study on the Present Situation of Eutrophication of Lakes and Its Prevention and Control in China |

ANNEX 4

AIDE-MEMOIRE

Expert Group Workshop on Environmental Planning and Management for Local and Regional Development: Focus on Training Aspects derived from Studies of Inland Water Management

10 - 21 November 1986
Otsu and Nagoya, Japan

Sponsorship and Purpose

An Expert Group Workshop on Environmental Planning and Management for Local and Regional Development will be held under the joint sponsorship of the United Nations Centre for Regional Development (UNCRD), the International Lake Environment Committee (ILEC), and the United Nations Environment Programme (UNEP) from 10 to 21 November 1986 in Otsu and Nagoya, Japan. The general purposes of the workshop are to:

- (1) Examine the major issues involved in current practices in environmental planning and management for local and regional development in the developing countries;
- (2) Discuss and explore alternative methods and approaches that will facilitate improved integration of environmental considerations into the development process at the local and regional levels;
- (3) Identify the role of development planners and environmental managers in promoting environmentally sound development and work out guidelines for the preparation of training materials on environmental planning and management for local and regional development which can be used not only by UNCRD but can also be transferred to the concerned developing countries; and
- (4) Deliberate on issues related to the development of international and national training courses in the field of environmental planning and management for local and regional development.

Focus of the Workshop

In view of the current environmental trends and the associated socioeconomic problems in the developing countries, there is an urgent need to strengthen national capabilities in ensuring proper integration of environmental considerations in the development process.

While many countries have established ministries, departments, and other institutional mechanisms to address environmental problems, relatively few countries have adequate human resources in terms of trained professionals, planners, or administrators who can analyse, plan, and implement programmes and projects for environmental management.

In order to effectively respond to the problem of capability building in the developing countries, it is considered urgent to provide planners and decision makers with opportunities to acquire the relevant knowledge and skills, and in this context, the workshop organizers (UNCRD and ILEC) have decided, respectively, to launch a training project in the near future to assist and facilitate the transfer of essential knowledge and relevant experience to the developing countries.

The workshop is designed to serve as a preparatory step to this end. The major tasks of the workshop will therefore include, among others: (a) the identification of major requirements to strengthen the capacity of developing countries to promote environmental planning and management with special reference to manpower development; and (b) the formulation of guidelines for developing relevant training courses and training materials to be used therein.

In order to derive the maximum benefit from the workshop deliberations, a specific area of environmental concern will be brought into focus for identifying policy issues associated with environmental planning and management. Specifically, the workshop will start by reviewing the resource papers and the case studies which deal with issues related to the management of inland water resources and river basins.

Among the various components of the environment, water is one of the most indispensable resources for human life, and as such, the problems related to the availability and functions of water cannot be overlooked in the process of environmental planning and management. Furthermore, interests involved in the development and management of water resources are becoming increasingly diversified in the modern world. Accordingly a major challenge we face today is how to secure the concerted efforts of experts from a wide variety of disciplines to ensure the long-term benefits of water-related ecosystems. At the same time, water-related issues and problems differ from one region to another as they emerge through the interactions among the whole range of human activities and water-related ecosystems in the region-specific socioeconomic context. Thus, the issues of water resources development and management, being multidimensional in character, can provide a powerful and empirical basis for determining what can be done to strengthen the capacity for promotion of environmental planning and management in a broad-based manner.

Organization

The major inputs into the workshop include (1) resource papers and case studies commissioned by UNCRD and ILEC; (2) background papers on the UNEP's programme on Environmentally Sound Management of Inland Water (EMINWA); (3) additional resource papers.

The workshop will be organized in two major parts, each of which involves a number of work steps, as follows:

Part I: Methods and Approaches to Environmental Planning and Management for Local and Regional Development: Focus on Issues related to the Management of Water Resources and River Basins

Step I-1: Macro-Perspective of Environmental Planning and Management: Resource papers on specific issues related to environmental planning and management will be presented and discussed with a view to arriving at a common frame of reference for discussion in subsequent sessions of the workshop.

Step I-2: Country Case Studies: Case studies on environmental planning and management for local and regional development will be presented and discussed. The following areas of concern are suggested for discussion:

- (1) How and to what extent should environmental assessment information be made available and used in decision making?
- (2) What planning methods and techniques are most effective in facilitating the process of decision making at the various stages of environmental planning and management?
- (3) What policy instruments are effective in directing, controlling, and managing socioeconomic factors and forces along lines that are environmentally sound?
- (4) What institutional arrangements and methods are appropriate for the formulation and implementation of coordinated environmental policies and programmes?
- (5) How and to what extent should local communities be involved in the process of environmental planning and management?

Step I-3: Japanese Approach to Environmental Planning and Management: Case studies of the current practice in planning and management of local and regional environments in Japan with special focus on lakes and their environments will be presented for discussion. In order to provide the workshop participants with an opportunity of appreciating the Japanese experience in environmental management, a one-day field visit to Lake Biwa and its surrounding basin area will be organized.

Step I-4: Round-Up Session: The participants will be divided into groups to deliberate on those issues emerging from the above presentations and discussions with a view to identifying viable methods and approaches to environmentally sound management of inland water resources and river basins for local and regional development. Finally, a plenary session will be held to integrate all the findings and recommendations.

Part II: Training Modules on Environmental Planning and Management for Local and Regional Development

Step II-1: Training Needs in the Developing Countries: Country specific training needs in the field of environmental planning and management will be discussed with a view to identifying a common frame of reference for the formulation of training courses and training materials.

Step II-2: Detail the Outline of Training Materials: The participants will be divided into groups to discuss and work out detailed guidelines for the preparation of training materials on environmental planning and management for local and regional development. A plenary session will be called to integrate all the findings and recommendations.

Date and Venue

Date: 10 - 21 November 1986

Venue: Part I: ILEC, Otsu, Shiga Prefecture, Japan
Part II: UNCRD, Nagoya, Japan

Participants

Participants include:

- (1) Experts who have prepared resource papers and case studies for presentation at the workshop;
- (2) ILEC members who will be participating in its bureau meeting scheduled to be held in November 1986.
- (3) Resource persons including representatives of UNEP and other related international and national organizations; and
- (4) The staff members concerned of the Lake Biwa REsearch Institute, the Shiga Prefectural Government, and UNCRD.

The UNCRD and ILEC will fund the participation of the experts who have been requested to prepare resource papers and country case studies. The ILEC will fund the participation of the ILEC's Bureau

members. Others interested in participating in the workshop are encouraged to seek other financial supports from international and national institutions.

For further information, please contact:

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