

REPORT OF

THE SECOND EXPERT GROUP WORKSHOP ON RIVER/LAKE BASIN APPROACHES
TO ENVIRONMENTALLY SOUND MANAGEMENT OF WATER RESOURCES:

Focus on Policy Responses to Water Resources Management Issues and Problems,
16-25 January, 1989, Bangkok and Hat Yai, Thailand



United Nations
Environment
Programme



International
Lake Environment
Committee Foundation



United Nations
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Regional Development



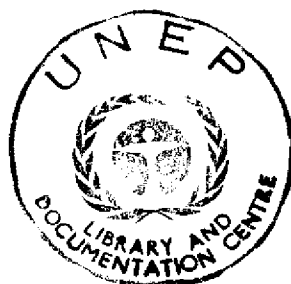
Office of the National
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Prince of Songkla
University

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APPROACHES TO ENVIRONMENTALLY SOUND MANAGEMENT OF WATER RESOURCES:
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Sponsored by:

International Lake Environment Committee Foundation (ILEC)
United Nations Environment Programme (UNEP)
United Nations Centre for Regional Development (UNCRD)
Office of the National Environment Board (ONEB)
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FOREWORD

This report presents the result of the Second Expert Group Workshop on River/Basin Approaches to Environmentally Sound Management of Water Resources: Focus on Policy Responses to Water Resources Management Problems and Issues which was held in Bangkok and Hat Yai, Thailand from 16-25 January 1988 under the joint sponsorship of the International Lake Environment Committee Foundation (ILEC), the United Nations Environment Programme (UNEP), the United Nations centre for Regional Development (UNCRD), the Office of the National Environment Board (ONEB) and the Prince of Songkla University (PSU).

In 1987, a project on river/lake basin approaches to water resources management was jointly launched by ILEC, UNEP and UNCRD. For ILEC and UNEP this was an integral part of the project entitled "Promotion of Environmentally Sound Management of Lakes." The project aims at producing, on the basis of the output of a series of workshops, training materials useful to water resources in a river/lake basin context. The first workshop was held in 8-19 February 1988 at Otsu and Nagoya, Japan, and three categories of papers were presented and discussed at the workshop.

- (1) Resources papers on key concepts and methodologies for the integration of environmental and social concerns in the process of water resources management;
- (2) Case study reports on water resources management problems in specific river/lake basins of selected countries, viz., Brazil, China, Indonesia, Kenya, Philippines, and Thailand; and
- (3) Case study reports on the Japanese experience in river/lake basin management, viz., Lake Kasumigaura, Yahagi River Basin, and Lake Biwa, and

At this workshop, in addition to the above, a series of papers on the environmental issues of Lake Songkhla, the largest brackish lake in Thailand were presented and discussed. Many Thai government officials as well as participants from case study countries attended the workshop and stimulated lively deliberations. The workshop gave the participants the chance to exchange ideas and experiences in water resources management from a river/lake basin perspective. It also gave an opportunity to examine key concepts and social considerations to be incorporated into the water resources development process.

During the workshop, four working groups were formed to discuss selected themes, viz., (a) policy responses to environmental and social problems resulting from water-land use interfaces; (b) policy responses to conflicts among competing water uses/users; (c) policy responses to environmental and social effects of water resources development schemes; and (d) manpower development in the field of water resources management. The reports of the respective working groups are included in this publication.

We wish to acknowledge with deep gratitude and appreciation the contribution of all those who have been involved in the workshop, whether

in presenting the resources papers and case study reports, serving as chairpersons, discussants and rapporteurs, or in providing other support, without whom the workshop could not have been successful.

It is our sincere hope that the work initiated at the workshop will be continued, and also that this report will serve as a point departure for advancing the frontiers of our understanding in environmentally sound and socially acceptable management of water resources in a river/lake basin context.

Tatuo Kira
Chairperson
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Hidehiko Sazanami
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I. REPORTS OF WORKING GROUPS

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WORKING GROUP I

POLICY RESPONSES TO ENVIRONMENTAL AND SOCIAL PROBLEMS RESULTING FROM WATER-LANDUSE INTERFACES

The group tackled the job/task in accordance with three steps, namely: (1) clarification; (2) discussion of substantive issues; and (3) synthesis of report.

Step 1 (Clarification):

There was an agreement that the discussion should include the downstream areas and the areas beyond the lake basins while focusing mainly on the upper watershed-lake water management interface. It was observed that the questions raised in the guide have an inherent logical flow (Fig. 1), which was adopted as the framework for group discussion.

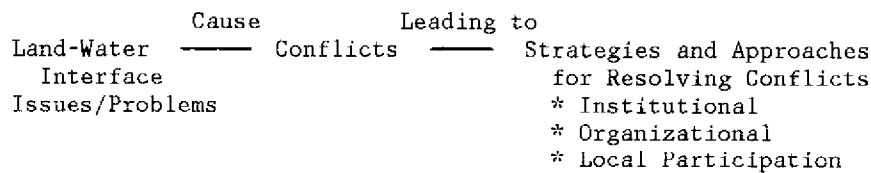


Fig. 1. Framework for Discussion

Step 2 (Discussion of Substantive Issues):

What are the nature and significance of the problems and issues involved in watershed management with special reference to the linkages between land-use activities and the problems of water resources management (quality and quantity)? The answers to this question in terms of the framework are shown in Fig. 2.

The figure shows that problems/issues are defined in terms of human causative activities and resulting effects which lead to both actual and potential social conflicts. Understanding of the problems and issues require appreciation of the specific context of the watershed-lake basin. This context has several dimensions:

- (a) Physical dimension refers to the size and other physical attributes of the watershed/basin;
- (b) Human activity/occupancy - refers to the size, density, distribution and socio-economic activities of the population in the watershed area;

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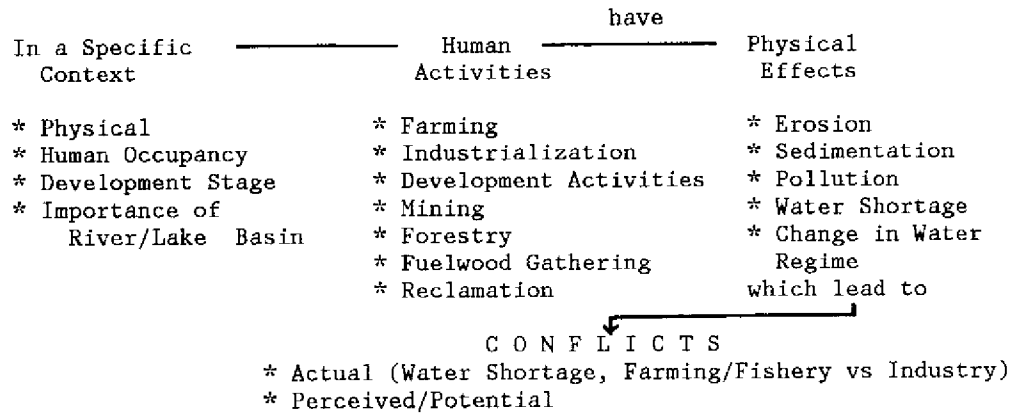


Figure 2. Watershed Management Problems and Issues

- (c) Developmental stage of a particular country - the particular developmental stage of any country has corresponding social and political peculiarities which may affect the nature and magnitude of problems associated with watershed and water resources management. For instance, a developed country may perceive and value a problem differently than a developing country. Moreover, the problems and issues, their causes and effects may vary.
- (d) Importance of the basin/lake resources - this refers to the relative significance/importance of the lake basin and water resources management to the overall development imperatives of a given locality, whether at the local, provincial, regional or national level.

I. Problem-Causing Activities in the Watershed Area

a. Farming/agriculture

This is the most pronounced activity in most watershed areas in the countries studied. Agriculture is practiced either in the upland or in the low-lying areas. Agricultural practices which consist of cultivation and heavy application of chemicals such as pesticides and fertilizers.

b. Industrialization

Industrialization is a phenomenon usually associated with modernization and/or development. However, it has with it tremendous significance to the environment. Industries are usually blamed for pollution problems if not properly regulated.

c. Developmental and urbanization activities

Developmental activities may include: Housing, commercial development, infrastructure construction; recreational area development; and others. These activities have profound environmental consequences which may include pollution, sedimentation and siltation.

d. Mining

Unregulated mining activities are potentially hazardous to safe environment. They can cause excessive soil erosion and siltation, and water pollution.

e. Forestry

As in mining, shifting cultivation and improper logging practices including road construction may result in landscape deterioration which can affect water quality, quantity and regime. Plantation establishment as practiced in forestry can also affect these water resources attributes. For instance, fast-growing tree species may contribute to the drying-up of streams and other water bodies.

f. Fuelwood gathering

The everyday need of basin inhabitants for fuelwood to meet their household requirements led to the over-cutting of trees and other vegetation. Consequently this activity usually and expectedly leads to deforestation. Increased deforestation in upper catchment areas engenders excessive run-off, soil erosion and siltation during periods of continued heavy rains.

g. Reclamation

Demand for additional areas for either agricultural, industrial or residential purposes necessitated reclamation of lakeshore areas. Studies on reclamation effects reveal severe environmental effects which include sedimentation and water pollution.

II. Effects of Land Use Activities in Watershed Areas

a. Erosion and sedimentation

Land-use activities leading to the disturbance of the soil surface and cutting vegetation cause the transfer and deposition of soil particles and other organic debris causing sedimentation of water bodies, including streams, reservoirs, lakes and canals.

b. Pollution

This usually has varied causes and manifestations. For instance, chemical pollution may result to elimination of micro-organisms used as food for the fish. Thus, productivity of lake is diminished.

c. Flooding

During times of excessive rainfall, a great volume of water comes to the lake in form of surface run-off which result to the rising of water level. This phenomenon is further exacerbated by the presence of reclaimed areas, hydraulic control structures and heavy siltation.

d. Water Shortage

Water shortage is an effect of excessive demands for water and the lowered water holding capacity of lakes due to siltation/sedimentation.

e. Water Regime

Ideally, the water volume in the lake throughout the year should be compatible with use to which the lake is put. Human activities may lead to low volume during dry months.

III. Conflicts Arising from Man's Activities in Basin Areas

There are two main types of conflicts identified. Those that are actually experienced and those that are perceived of potential significance. Examples of actual conflicts are water shortage and water-use conflicts. Water-use conflicts can be involved: Industry vs. farming; farming vs. fishery; irrigation vs. industry; and others.

IV. Strategies and Approaches for Watershed Management

Three broad categories of strategies and approaches were identified to include: A. institutional arrangements; B. organizational arrangements; and C. local community participation.

A. Institutional Arrangements

Ideally, institutional arrangements must facilitate the objectives of sound environmental management of lake resources. There are four types of institutional arrangements and related implementation tasks found to have relevance to lake management.

(1) Rights to the use of resources

The rights referred to include ownership and tenure of land and water resources, as well as permits, licenses, and other legal instruments which seek to promote conservation practices. It is hoped that with the rights, comes the feeling of security of tenure as to the use of resources. As a consequence sound resource utilization is assured or enhanced. It was pointed out however, that the rights should carry with them the corresponding responsibility and/or accountability for whatever effects or consequences arising from use of the rights.

(2) Economic incentives

These can be monetary inducements in the form of tax exemptions and subsidies intended to encourage ecologically-oriented practices and technologies, or fees and fines for the use and misuse of water and land.

(3) Regulatory mechanisms

Regulatory mechanisms include those which prescribe certain standards and guidelines as pre-conditions for issuance of permits and rights to use

the resources. It was observed that regulation as applied to industries with regard to pollution abatement is easier handled, than those related to non-point sources as agricultural and domestic wastes and small-scale industries as in the case of China.

(4) Technical assistance

Technical assistance includes information, training and demonstrations of sound resource management techniques, through effective use of technical persons as advisers or consultants.

From the discussion of institutional arrangements one lesson emerged. That is, the institutional arrangements already in place in most countries depends much on the support and involvement of the affected sectors of society. Necessarily, people's support and involvement will be enhanced through adequate awareness of issues related to lake management.

B. Organizational Arrangements

Organizational arrangements refer to administrative structures which have evolved to facilitate the work of environmental management. A number of models were presented for discussion ranging from ministerial committees, characterized as weak coordination to strong coordinating agencies vested with adequate legal authority and resources to effect meaningful coordination.

The models discussed included the following:

(1) Sectoral/Ministerial Model

This model is exemplified by the Chinese case. The Environmental Protection Agency has national, prefectural, district offices which allow for coordination at each of these levels among sectoral agencies involved.

(2) Quasi-Governmental Model

This is the Yahagi model which involves a very strong private initiative for coordinating environmental work. There is the absence of formal/governmental initiatives/mechanisms for coordination. The YWPA is a private organization facilitating coordination for Yahagi River Development.

(3) District Level Coordination Model

This coordination scheme being used in Indonesia, where sectoral coordination is being done at the district level.

(4) The Authority Model

This is exemplified by Lake Victoria's Lake Basin Development Authority and the Laguna Lake Development Authority In Lake Victoria coordination was also being effected at the lower levels through district and sub-district development committees.

From the discussion of the models just presented, several lessons were extracted. These are:

- (a) The appropriate coordination mechanism may depend on the size or scale of the basin area and the number of different political jurisdictions involved. The latter case may require special coordinating mechanism or arrangements.
- (b) The coordination mechanisms may depend upon the relative importance of the lake basin area. Lake basin areas of national significance or value may require different coordination schemes than those areas having only regional, district, or local importance.
- (c) Coordination arrangements require periodic review and modifications. The dynamism of resource management imperatives necessitates periodic reassessment and corresponding adjustments.
- (d) Effective coordination is dependent upon the coordinative capability of the coordinating agency. This implies availability of resources and the relevant/appropriate power and influence.

C. Local Community Participation

It was proposed that community participation can be further enhanced and sustained through various interventions or mechanisms, including:

- (1) Formation of federation, associations and cooperatives;
- (2) Informal education/information campaigns;
- (3) Information sharing; and
- (4) Partnership between NGOs and local governments.

V. Relevant Topics for Discussion

One major relevant topic for further discussion was the changing agenda and policies of government on broader exogenous issues, which impinge upon the sound management of lake basin and water resources.

Examples cited include the decentralization policy in the Philippines which was recently formulated. Likewise, the shift from a centrally regulated economy to an open/market-oriented system as experienced in China is an example of policy changes. Moreover there are policies of government, such as those on fertilizer subsidy, which may have detrimental effects on lake water resources.

VI. Proposed Topics/Themes for the Third Year's Workshop

- (a) A report (update) on the implementation of the Dianchi ordinance in China;
- (b) An assessment of the experiences/problems and progress of the

Yahagi method proposals as contained in page 15 of the Yahagi report;

- (c) Directions, prospects and agenda for lake/river basin approach for water resources management of Lake Victoria in the years ahead; and
- (d) The interrelations of air pollution control and solid waste management with water pollution control in the context of lake management.

WORKING GROUP II

POLICY RESPONSES TO SOCIAL CONFLICTS OVER THE USE OF WATER AMONG COMPETING USES/USERS

TOPIC 1: What are the nature and significance of social conflicts over the use of water in the context of local and regional development?

A. There are many types of conflict.

(1) Quantity vs Quality

A quantity conflict occurs where use of water by one or more entities or sectors precludes other uses. A quality conflict is found where one activity makes the quality of water unfit for use by, or causes damage to, other activities. Although in a sense a form of quantity conflict, as it involves a reduction in the amount of water with desirable properties, it is often useful to consider quantity conflict separately for analysis and policy purposes. It is necessary to consider them together, however, in a mixed quality and quantity conflict, such as found in highly developed metropolitan areas where the demand for water exceeds supply at given prices and with existing institutional arrangements. Any of these three types of conflict may emerge between sectors in the same geographical area or between upstream and downstream users.

(2) National vs Regional

Conflicts occur over objectives and priorities between nation and region. Examples are those conflicts which arise from policies for short-term extraction vs. long-term sustainable development, for employment (involving migration or resettlement), for national integration vs. regional autonomy, and over revenue sources. The use of resources nationally may challenge how the people in a region perceive the ownership of a resource lying within their territory. Comparable conflicts may arise between international and national development, and between regional objectives and priorities and those of more local levels.

(3) Uses and Users

Different uses of water are associated with different constituencies of users, although there is considerable overlap in membership among constituencies. For example, irrigation is associated with farmers (and irrigation bureaus), hydropower is associated with electricity users, notably industry, tourism is associated with tourist outsiders and the tourism industry, and environmental uses such as wildlife sanctuaries are associated with environmentalists, who are often outsiders. In addition nature has its own uses of water, such as flooding and silt transport,

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which have few if any human constituencies but may provoke use conflicts between human users. The three case studies which our group considered (Lake Kasumigaura, Laguna de Bay, and Lake Songkhla) showed that the specific nature of the prevailing use/user conflicts varies from basin to basin and over time. It is largely determined by the character of interest groups operating within the basin, although external forces (such as the oil shock or improved awareness of health effects of pollutants) often play a significant role.

B. Conflicts can be characterized by the process through which they are resolved.

(1) Cultural context

Since water use conflicts take place within a social system, their management or resolution must take into account the cultural values and practices of the people involved.

(2) Political process

Water use conflicts are usually resolved through a political process. Traditionally, non-market approaches are most commonly adopted by government decision makers. The possibility of market or quasi-market approaches needs to be considered as an alternative.

(3) Temporal context

As noted above, conflicts change over time and adjustments must be made accordingly. Sometimes big shocks, either external or internal, dramatically shift the focus of conflict: e.g., the oil shock in Japan and the rise of fishpen technology, the February Revolution, and severe typhoons in the Philippines.

(4) Latent

It may be useful to distinguish between latent conflicts and disputes, which are open conflicts. Many conflicts are dealt with through avoidance; those who suffer do so quietly, or at least ineffectively. Conflicts over water use often do not turn into disputes until a project is in place or economic stresses are felt. To minimize the potential for disputes, the ability of planners to predict social issues should be improved. This may require a greater awareness of the current actual uses of water. Comparison of the detailed case studies in these workshops may also promote understanding and anticipation of latent conflicts in river/lake basins.

(5) Hard to resolve

Some issues associated with conflicts are difficult to resolve. Examples are (i) cumulative global problems such as the greenhouse effect, (ii) big shocks, and (iii) non-point sources of pollution.

(6) Inevitable

Conflicts are inevitable, natural, and sometimes desirable in resource

development. Water resource development is always likely to result in conflicts because it alters the existing socio-economic arrangements. New interest groups (constituencies) may arise and existing interest groups will try to hold on to their positions. Conflicts, especially when they take the form of disputes, provide information about the value of water in alternative uses.

C. Conflicts have many sources.

(1) Increased demands on the resource

The most important source of conflict over water use is usually an increase in demands for the resource. This can arise from increases in existing uses, such as irrigation, or the development of new uses, such as recreation. More water can be demanded for either consumptive use or for the disposal of wastes. It may even be desired for environmental preservation, such as at the bird sanctuary at Songkhla. Conflicts arise inevitably from the pressures of population growth, especially when combined with economic and social development.

(2) Lack of information

Because of the inability to identify and generate the necessary information, conflicts may arise from a lack of understanding, combined with risk aversion and mistrust.

(3) Lack of consultation or representation

Closely related to information gaps is the need for consultation and representation. The generation and dissemination of information can be improved through efficient consultation with and between affected groups. The participation of interest groups in decision making will help minimize conflict.

(4) Cultural differences

Conflict may arise from differences in cultural values. Understanding the nature of conflicts should consider differences in perception and approaches to problems.

D. Conflicts have a number of implications.

(1) They show the existence of tradeoffs in resource utilization.

Using more water for one use may mean using less for another. Certain sectors or interest groups may be favored at the expense of others. Likewise, certain environmentally valuable attributes may be sacrificed to meet other objectives, or vice-versa.

(2) They provide information about the allocation of resources.

They help to identify and monitor key indicators which can help subsequent decision making.

(3) They show that there are cultural and social dimensions to development.

Many conflicts involve a clash of values and social groupings which cannot be analyzed or managed by exclusive reference to technical or economic factors.

(4) They necessitate action.

Many conflicts are resolved directly by the parties concerned or remain latent. Of interest here are those which, because of market failure or other causes, require action by planners and resource managers. Caution must be taken, however, that conflict due to market failure is not aggravated by nonmarket failures such as (i) the construction of major projects in complex environments with unforeseen adverse effects or (ii) control over the resource by an agency whose incentive structure does not conform with the needs of water users. Consideration should also be given to institutional mechanisms which allow more conflicts to be resolved horizontally, either between users or between agencies at the same level of the administrative hierarchy (see below).

TOPIC 2: What institutional arrangements are required to mitigate and manage social conflicts over the use of water?

Institutional arrangements include legal frameworks, customs and social systems, interorganizational and intraorganizational interaction, information systems, and management frameworks. Organizational structures are sometimes considered separately from institutions (see Hufschmidt and McCauley). We maintain the distinction, but include both in this section. In water resource development and utilization the following institutional arrangements should be considered:

(1) Overall rules for water resource use

A few countries, such as China, have a national water code, but most (including Japan, Thailand and the United States) do not. In most cases, the national framework guiding water resource use is in the form of laws, regulations, proclamations, judicial decisions and the like. In many cases, they are inadequate to deal with water conflicts, especially those between different uses or sources (notably groundwater vs. surface). Ownership rights may be poorly specified, allocation doctrines may be unclear or conflicting, and liability for damage may be difficult to establish.

(2) Rules for specific decision making

Specific allocations of water are commonly made according to a rule, such as:

- a. Majority rule (with or without protection of minority rights);
- b. Absolute rights;
- c. Financial benefit (the rule of money);
- d. Social benefit expressed in financial terms (benefit-cost analysis);
and/or

e. Consensus.

(3) Information systems

Institutional arrangements affect and are affected by the generation of information. To be useful, information should be (i) reliable, (ii) consistent, (iii) timely, (iv) presented at a widely understandable technical level, (v) relevant, and (vi) sufficient. Historical information should be gathered from records and, where possible, through nonquantitative techniques such as oral histories. An effective consultation and feedback mechanism should be established to provide continuity and reliability of information generation. Local participation should be encouraged in data gathering, as among the school children at Yahagi. Technical data should be presented in terms understood by the public. Cost-effective methodologies should be selected or developed for information gathering, interpretation, storage and retrieval. Common standards should be established for scientific measurement and analysis by different agencies.

One of the advantages of the market mechanism is that it generates and responds to information which meets many of the above six criteria, particularly timeliness, relevance and sufficiency. On the other hand, the proprietary nature of privately generated information, as at Aquastar Farms, may impede communication about actual water use, and market participants are unlikely to gather information on the harmful effects of their activities on third parties unless required to, for example, by effective liability rules.

(4) Specification of rights, responsibilities and liabilities

To resolve conflicts over water use, it may be indispensable to develop an institutional framework that defines the rights and responsibilities of water users. Efficient institutions requires the specification, enforcement and transferability of rights. In any resource development project, the issue of access to the resource always arises. Any change in the status quo will affect the established distribution of rights, including those which are customary. It is therefore important that there be a clear understanding (i) by analysts and officials, of traditional institutions, some of which may be informal or seasonal, and (ii) by beneficiaries, of the responsibilities associated with newly assigned rights.

This is a weak link in all three brackish lake case studies. For example, rights of access to irrigation water may be tied to the payment of fees or maintenance of tertiary works. They are not at Lake Songkhla, so the farmers appear to feel they have a right to water without responsibility. Rights to manage fishpens may be tied to the responsibility to repay loans for their purchase or construction; the traditional fishermen's organizations do not appear to feel this obligation too strongly. Closely associated with responsibilities are liabilities. Those who benefit from the use of water with competitive uses should compensate those whose interests are harmed. At Kasumigaura, fishermen were compensated by the government for the loss of their salt-water fishery. This was better than no compensation at all, but it insulated the beneficiaries (farmers and Kashima) from directly bearing the opportunity costs of their water use.

Associated with the specification of rights and responsibilities is the need for accountability (see Nickum and Easter). Agencies, especially at the lower levels, need to be made more accountable to water users, while interest groups need to be made more accountable for externalities created by their actions.

(5) Structure of state management organization

The structure of the state management organization dealing with the planning and management issues of water resource development should be considered. One alternative is to establish a single agency, such as a basin authority, to implement policies. Such organizations rarely have sufficient power to enforce their rules over line agencies, however. Another alternative is to establish clear coordinating mechanisms between government organizations. Here the lessons of Nakaumi in Japan may be instructive.

TOPIC 3: What policy tools and instruments are effective in managing social conflicts over the use of water?

The cases presented identified various policy tools and instruments which were adopted to deal with managing social conflicts over water use. These include:

- a. Zoning and licensing;
- b. User charges;
- c. Compensation and subsidies;
- d. Information generation and dissemination;
- e. Organizing work among interest groups;
- f. Organizing water users' organizations;
- g. Establishing mechanisms for receiving and addressing complaints;
- h. Contracts (covenants);
- i. Interagency coordination;
- j. Public hearings;
- k. The construction of new infrastructure; and
- l. Doing nothing.

A primary objective of the next phase of this project should be to determine more precisely which of these or other mechanisms are effective (i) in general, and (ii) in specific national/cultural/basin contexts. The case studies and resource papers have shown that the selection of policy tools and instruments should consider a number of issues, including:

- a. The conjunctive use of groundwater and surface water;
- b. Non-point pollution sources;
- c. The relative merits of private and public management and ownership;
- d. The tradeoffs and complementarities between effectiveness, efficiency and equity, and how well present decision-making criteria address these;
- e. The uncertainty of the future and lack of knowledge about much of the past and present as well;
- f. Environmental conservation, sustainable development, and short-term growth; and
- g. The consequences, positive as well as negative, of not taking action.

TOPIC 4: What factors (social, economic, institutional, political) are considered essential in promoting collective action towards managing social conflicts over the use of water?

It was the consensus of the discussion group that we had addressed this issue in our deliberations over the first three topics.

TOPIC 5: What should be the focus and content of the third-year case study?

The discussion group proposed a number of topics for both case studies and resource papers.

A. Research areas for resource papers

- (1) More comprehensive studies of private and public ownership and administration of resources, focusing on the basin level.
- (2) The relationship between national and regional objectives as a source of conflict, including the effects of global and big shock issues.
- (3) Information methodologies, including the identification and generation of critical types of information, standardization, the use of nonquantitative information, public participation in information gathering, information exchange mechanisms, the influence of culture, the role of information in conflict resolution, and how to develop greater public awareness of the environment and project characteristics.
- (4) "People empowerment" in river/lake basins, including the involvement of the water using public in management and planning, the formation of water users' organizations (WUOs), and the establishment of appropriate rights, responsibilities and liabilities.

- (5) How to better manage open access resources, such as groundwater and open lakes, as well as non-point pollution.
- (6) How to build greater flexibility into project and basin planning and implementation.

B. Research areas for case studies

- (1) More explicit use of cost-benefit analysis, especially as applied to environmental issues, to determine the relative magnitudes of net benefits from different uses of water.
- (2) More detailed consideration of the process of conflict identification and resolution.
- (3) Discussion and analysis of how information is generated and disseminated.
- (4) Closer consideration of incentive structures and behaviour of key agencies, including accountability, manpower/training methods and requirements, and modes of interaction with other agencies and water users.
- (5) Discussion of the effects of culture and the political process on water use conflicts and their resolution.
- (6) Delineation of the rights, responsibilities and liabilities of water and land resource users and how these have changed over time.

C. Materials to provide writers of case studies

Members of the discussion group who were involved in the preparation of case studies felt it would be beneficial for the Secretariat to provide them with standardized check lists of areas to be covered, to guide their efforts and, more importantly, to facilitate comparison between cases.

It would also be useful to provide case study teams with materials on applied benefit-cost analysis such as those developed by Drs. Hufschmidt and Dixon at East-West Center.

Working Group III

Policy Responses to Environmental and Social Effects of Water Resources Development

Introduction

The working group began its deliberations by reviewing the major findings of the group discussion which took place during the first workshop (February 1988) with special focus on integration of environmental and social concerns into water resources development and management. It was an unanimous agreement among the members that the group should further elaborate some of the key issues involved in improving the policy responses to environmental and social effects of water resources development in the developing countries. The major topics of discussion this time were identified with special reference to the scope, methodology, and procedures of environmental impact assessment (EIA), and summarized in Table 1. The relationship between topics discussed at the first and second workshops are schematically shown in Figure 1.

Table 1. Major Topics for Group Discussion: First and Second Workshops

	First Workshop (Feb. 1988)	Second Workshop (Jan. 1989)
Scope	<ul style="list-style-type: none">- Basic considerations for improving environmental management in LDCs- Expanded concept of EIA encompassing both positive and negative impacts	<ul style="list-style-type: none">- Cumulative impacts (*)- Transboundary impacts- Involuntary resettlement (*)- Risk assessment
Methodology	<ul style="list-style-type: none">- Data base requirements for social and environmental objectives- Environmental considerations at the respective stages of project planning and implementation	<ul style="list-style-type: none">- EIA as a tool for consultation/negotiation (*)
Procedures	<ul style="list-style-type: none">- Environmental management during project implementation	<ul style="list-style-type: none">- Public participation (*)- Role of NGOs- Socio-cultural aspects

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Rapporteur: J.M. Branski

Members: E. Brotoisworo; D. Poetoranto; M. Nakamura; M. Akiyama;
H.Y. Chen; A. Attanayake; H. Mizoguchi; C. Ratanachai;
P. Niratisayakul; O. Wongchumpit; I. Suzuki

In view of the time constraints, the group concentrated its deliberations on those topics with asterisk (*), which were considered to closely correspond to the suggested topics for discussion by the workshop secretariat (see annex) as follows:

	<u>Suggested Topics</u>
(1) EIA as a tool for consultation/negotiation	(1)
(2) Cumulative environmental and social effects	(4)
(3) Involuntary resettlement	(2)
(4) Public participation	(3)

Current State of EIA in some Selected Countries

Prior to the substantive discussion on the above topics, a brief review was made of the current state of the art of EIA in the countries represented by the group members, viz: Brazil, Indonesia, Japan, Malaysia, Nigeria, Sri Lanka, and Thailand. The main findings are as follows;

- (a) All the countries represented in the group except for Nigeria have adopted a formal EIA system. The manner in which EIA is implemented, however, differs from one country to another, depending on such factors as legal system, government structure, organizational arrangements, and inter-agency relationships.
- (b) Nigeria has a statutory fund created by the Federal Government called "Ecological Fund." The Federal Ministry of Agriculture and Water Resources has established committees for ecological programmes which assess environmental problems and impacts of development projects as well as propose impact mitigation measures for funding approval.
- (c) In some countries (such as Malaysia, Sri Lanka, and Thailand), the results of EIA are not necessarily binding -- they are rather advisory to decision makers on potential environmental impacts and/or are used as a basis for identifying and proposing impact mitigation measures. Hence, final decisions on projects in these countries depend on a variety of considerations such as economic, financial, political, engineering, and environmental.
- (d) On the other hand, the conclusions of EIA in Brazil, Indonesia, and Japan are binding and can be used as a basis for project approval or rejection on environmental grounds.
- (e) The organizational arrangement for reviewing the EIA reports also varies from an ad hoc review panel (Indonesia, Malaysia, and Sri Lanka) to a permanent review committee (Brazil and Japan).
- (f) Both in Japan and Brazil, the regional EIA legislation prevails over the central government one.

EIA As a Tool for Consultation Among Parties Concerned

According to the country experiences, especially that of Brazil, EIA can be viewed as a tool for promoting consultation on the proposed project among parties concerned such as the project proponent, the government agencies concerned, the local communities which are likely to be affected

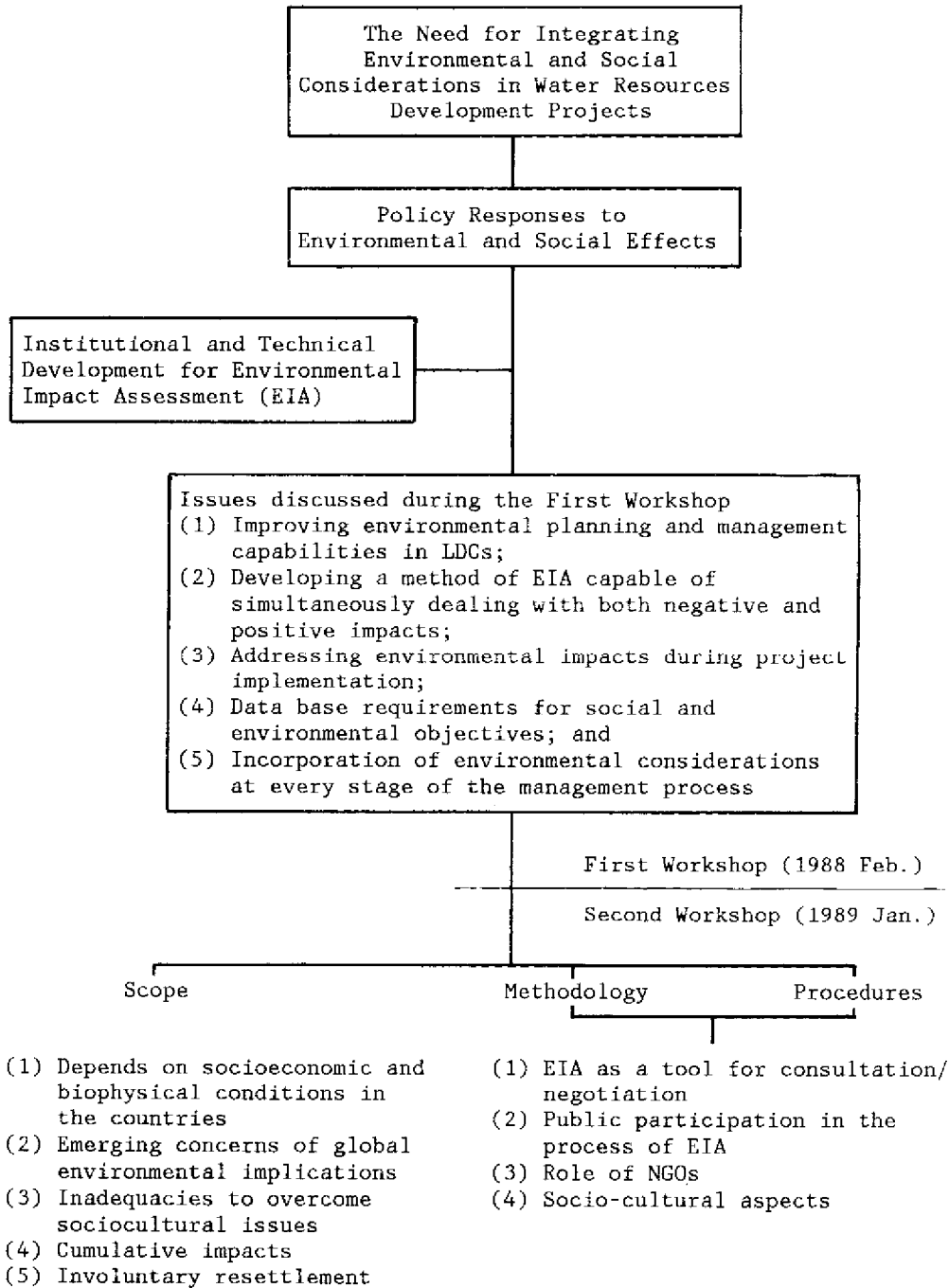


Figure 1. The Relationship Between Topics Discussed in the First and Second Workshops

by the project, and the professional community. The effectiveness of consultation in the process of EIA depends largely on such factors as: (i) the institutional arrangements for EIA implementation (e.g. EIA procedures, inter-agency coordination, and EIA review system); (ii) the mechanisms for public participation in decision making; and (iii) the professional expertise.

The timing of EIA implementation is also crucial in ensuring the effectiveness of consultation among parties concerned. In this context, it was stressed that EIA be carried out at an early stage of project planning (it would be desirable to implement EIA as an integral part of the engineering and economic feasibility studies), in order to allow the proponent (or EIA implementer) a sufficient time for consultation and also for reflecting the views and opinions of those concerned on project planning and decision making.

The consultation among parties concerned, if properly promoted in the course of EIA implementation, would provide a sound basis for formulating, during the stage of project planning, viable measures for impact mitigation as well as for determining the compensation of losses which are likely to be incurred to the affected population. This would also facilitate the inclusion of the required costs for environmental and compensatory measures in the total project budget.

Several issues which are yet to be further considered and elaborated were identified as follows:

- (a) Methods of simultaneously assessing both positive and negative social and environmental impacts of water resources development schemes;
- (b) Methods of integrating social concerns into project planning;
- (c) Identification of appropriate planning stage(s) where both environmental and social considerations can be effectively integrated into project plans; and
- (d) Formulation of country-specific guidelines for integrating social and environmental considerations into the process of project planning, including the specification of EIA assessment procedures and methods of survey and analysis.

Policy Issues in Involuntary Resettlement

Those who are displaced by public projects such as dam construction are seldom the beneficiaries of the projects. Compulsory resettlement often impoverishes the displaced people and disrupts their socio-cultural fabric. In recognition of their basic human rights, appropriate policy measures have to be formulated and adopted in order to minimize the adverse effects of forced resettlement and also to provide the resettled population with opportunities to restore and improve their livelihood.

A number of problems and issues in involuntary resettlement which result from water resources development schemes are ought to be dealt with in the context of a larger, regional or river basin development planning. At the same time, an appropriate method of benefit-cost analysis has to be

developed, so as to ensure that social concerns are properly integrated in project planning and evaluation.

Some policy issues involved in planning for and implementing involuntary resettlement were identified as follows:

- (a) Government responsibilities (at the national, regional and local levels) have to be clearly defined, together with provision of appropriate institutional and financial means for properly implementing involuntary resettlement;
- (b) A full-scale, comprehensive resettlement scheme has to be planned and implemented as an integral part of the project, in order to properly address the social, economic, and environmental aspects of resettlement;
- (c) Institutional mechanisms have to be developed for ensuring effective popular participation in the process of project planning and decision making. In this respect, a Nigerian experience was cited where, taking account of the sociocultural peculiarities of local communities, local councils and communities involved in the Dadin Kowa dam resettlement scheme covering two states participated fully in the plan formulation and implementation of the project;
- (d) A full-fledged social survey has to be undertaken as an integral part of project planning, covering the entire populations who are likely to be affected by the project. Special efforts have to be made to obtain a fuller understanding of the socioeconomic conditions of such disadvantaged social groups as the illegal occupants of public lands, tenant farmers, small and marginal farmers, small fishermen, and nomadic people. Each of these groups may require a different set of policy measures (such as financial assistance, extension services, and vocational training) in restoring and improving their livelihood systems;
- (e) Alternative sites for relocation have to be carefully assessed with respect to their social and environmental conditions, in order to avoid social conflicts with the host populations. In this respect, it was suggested that the recent review of the experience in implementing transmigration in Indonesia would provide a number of relevant lessons to be learnt by other countries; and
- (f) Resettlement schemes have to be planned and implemented on a long-term basis so as to provide a sufficient lead time for resettlers to adapt themselves to the new environment. A case in point can be found in the Saguling hydropower project in Indonesia where a variety of follow-up measures were planned on the basis of the findings of an EIA, and have been implemented as an integral part of local development to assist the relocated people.

Policy Responses to Cumulative Impacts

It is well known that water resources development projects gives rise to a wide variety of social, economic, and environmental repercussions on the river basin community through changes in human activities and land-use

patterns. It is also frequently observed that development of a reservoir coupled with forced resettlement results in the increased pressure on land resources, which in turn increases the risk of soil erosion in the upper catchment areas.

These changes bring about cumulative effects on the river basin community over a long period of time, and involve complex cause-effect relationships among social, economic, and physical environmental factors. The conventional approach to EIA however tends to restrict its scope of analysis to the direct environmental impacts without due attention to the indirect impacts.

It appears therefore urgent and essential to develop, on the basis of the concept of systems analysis, an analytical framework capable of assessing cumulative effects of a large-scale water resource development project on a basinwide scale. The results of such assessment could be used as the basis for formulating a long-term watershed management programme.

In view of the fact that there are serious environmental impacts that cannot be predicted beforehand due to the insufficiency in scientific knowledge and may emerge after the completion of construction works, a proper monitoring system has to be planned and put into effect as an integral part of the watershed management programme.

Mechanisms for Encouraging Public Participation

While a great majority of the population benefits from water resources development programmes and projects, there are people who suffer from such undertakings. In many cases, those who are adversely affected are given little policy attention. It is also observed that the relief measures for the impacted population are frequently short-sighted and implemented without due regard to their real plights.

In order to rectify this situation, policy efforts have to be made to institutionalize mechanisms for encouraging popular participation in the process of project planning and decision making. A variety of methods could be considered and adopted, including: (i) Dissemination of information on the project plan through mass media, publication and distribution of a project brief, and organizing seminars at the local community level; (ii) conduct of public hearings and consultation meetings with those who are likely to be affected; (iii) involvement of local community members in the conduct of environmental and social surveys; and (iv) involvement of representatives from the local communities concerned in the process of project planning and implementation. In order to ensure that these devices are effectively adopted, planning capabilities of agencies in a wide variety of fields such as rural development, agriculture, forestry, fishery, power, and irrigation need to be simultaneously improved.

Suggested Topics for the Third-Year Study (1989)

A. General topics for resource papers

- (a) A review of the policy responses to cumulative environmental impacts with due consideration to the interaction, linkages, and feedback mechanisms among economic, social, and physical environmental factors;
- (b) Institutional and organizational arrangements required for implementing involuntary resettlement in an effective yet socially acceptable manner; and
- (c) Mechanisms for encouraging public participation in the process of planning and decision making with special focus on water resources development projects;

B. Topics for case studies

- (a) Analysis of the case-specific experiences in Brazil, Indonesia, and Japan with special reference to the above general topics;
- (b) Analysis of how and to what extent the resettlement scheme is integrated with the Saguling dam project and the local community development programme in Indonesia;
- (c) Closer examination of cumulative environmental impacts associated with hydropower projects in Brazil and identification of possible policy responses to the cumulative impacts; and
- (d) In-depth review and evaluation of the experience of Shiga prefectural government in involving local communities in the process of decision making for the development and management of Lake Biwa Basin.

Working Group IV

Manpower Development in the Field of Water Resources Management

The analysis of problems and issues arising from the development and management of water resources in developing countries and the policy response to these problem shows the need for manpower training programme in the area of environmental water resource management. The nine case studies which have been presented and discussed in the two workshops sponsored by UNCRD, UNEP and ILEC have underscored the inadequacy of the present approach. The changing view to water natural resource management from commodity-focused to a basin perspective is emerging and certainly a better one.

The possible target groups of the training programme showed include the policy makers, the managers, and the technical staff. However, due to some limitations in the resource needed for the training priority is placed on the training of managers.

Objectives

The training programme should be short, say two weeks, and be designed to achieve the following objectives:

- (a) Provide a broad knowledge of structures and function of ecosystems and social systems;
- (b) Develop capability to translate policies into operational actions;
- (c) Develop capabilities to identify, perceive, and analyze environmental problems/issues and provide options;
- (d) Develop in the managers, the capability to play simple lake/ watershed simulation model.

Educational Materials

- (a) Case study reports on
- (b) Experts reports on key concepts, policy issues, and methodologies
- (c) Softwares for gaming-simulation exercises on water resources management in a river/lake basin context
- (d) Simulation model to be developed from nine case study reports.

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S. Khaodhiar; S. Nawagawong; K. Imai

Recommendations

- (a) Short-term and long-term training should be encouraged in developing countries;
- (b) Technical and non-technical courses be developed.
- (c) Training materials be produced.
- (d) For future training programme, regional differences should be taken into considerations.
- (e) Inventory of existing institutions, and universities which are engaged in man power development for river/lake basin.
- (f) Secretariat should analyze the nine case study reports and come up with training manuals which considers differential presentation of general and specific issues.
- (g) Public approach to environmental awareness skills and acceptance be encouraged.
- (h) Development assistance and available resources of developing countries be effectively integrated in environmental training.
- (i) Effective institutional set up for lake/basin management is essential. This is well illustrated in nine case studies.
- (j) Where several sectors are involved in the administration of water resource, effective institutional arrangement with clearly defined authority is indispensable.
- (k) National training institutions be identified.
- (l) Systematic training for technical staff (younger ones) in the field should be developed.
- (m) Combined training that will include manager and his technical staff of a given development programme should be encouraged.
- (n) Organizers should assist in strengthening existing training programmes in developing countries.

II. REPORT OF THE WORKSHOP

II. REPORT OF THE WORKSHOP

A. ATTENDANCE

The Second Expert Group Workshop on River/Lake Basin Approaches to Environmentally Sound Management of Water Resources was held in Bangkok and Hat Yai, Thailand from 16 to 25 January 1989 under the joint sponsorship of the International Lake Environment Committee (ILEC), the United Nations Environment Programme (UNEP), the United Nations centre for Regional Development(UNCRD), the Office of National Environment Board (ONEB) of Thailand, and the Prince of Songkla University (PSU). Fifty-eight scientists and policy-makers (23 from Thailand) from 11 countries and two international organizations (in addition to sponsoring organizations) attended the workshop. A list of the participants is provided in Annex 5.

B. OPENING SESSION

At the opening of the Workshop Part I (Policy Responses to Water Resources Management Issues), welcoming and congratulatory speeches were given by Prof. H. Sazanami (Director of UNCRD), Prof. T. Kira (Chairperson of ILEC Scientific Committee), Mr. K. Onogawa (Deputy representative of UNEP regional office for Asia and the Pacific), and Prof. Sanga Sabhasri (Permanent Secretary of the Ministry of Science, Technology and Energy). Following the opening session, Keynote Addresses were given by Profs. H. Sazanami and M. Hashimoto (Vice Director-General of ILEC Foundation). Sazanami explained the background and purpose of the workshop as well as on the major issue domains in the field of water resources management to be addressed from a river/lake basin perspective. Hashimoto emphasized the need for manpower development in the field of lake environment management in developing countries. The complete texts of the addresses are reproduced in Annex 1.

Part II (In-depth review of strategies and approaches to water resources management: Focus on Lake Songkhla Basin) of the workshop was opened by the speeches of Prof. T.Kira, Hon. C. Nilpanich (Governor of Songkhla Province) and Prof. P. Kullavanij (Rector of the Prince of Songkhla University).

C. ORGANIZATION OF THE WORKSHOP

The Workshop was programmed in two parts with the following general themes: Part I; Policy Responses to Water Resources Management Issues (16-21 January 1989 at Ambassador Hotel in Bangkok), and Part II; In-depth review of strategies and approaches to water resources management - Focus on Lake Songkhla Basin (23-25 January 1989 at JB Hotel in Hat Yai).

Outline of Part I

Following the keynote addresses and the general resource paper session entitled "Strategies for Water Resources Management in a River/Lake Basin Context" on the first day, nine case studies were classified into three categories of the following three problem domains, and comparative

discussion on each three case studies was made centering on a resource paper of each session during 17th-19th.

* Policy Responses to Environmental and Social problems Resulting from Water-Land Use Interfaces (Cases of Lake Dianchi, Lake Victoria, and Yahagi River)

* Policy Responses to Conflicts Among Competing Water Uses/Users (Cases of Laguna Lake, Songkhla Lake, Lake Kasumigaura)

* Policy Responses to Environmental and Social Effects of Water Resources Development Schemes (Cases of Amazon Region, Saguling Dam, and Lake Biwa).

On the fifth day (20th) of part I of the workshop, the participants were divided into four groups for intensive discussion. The topics suggested by the workshop secretariat for discussion were: Group I, Policy responses to environmental and social problems resulting from water-land use interfaces; Group II, Policy responses to conflicts among competing water uses/users; Group III, Policy responses to environmental and social effects of water resources development schemes; and Group IV, Manpower development in the field of water resources management. In the closing, the result of the four working groups were presented and discussed.

On the sixth day of the workshop, a field trip to Chao Phraya river was organized.

OUTLINE OF PART II

In the second part of the Seminar, environmental issues of Lake Songkhla in southern Thailand was closely examined. Having covered the general outline of issues concerning water resource control in the first part, the Seminar shifted its focus on the second part to specifics so as to deepen the participants' understanding of current problems from a more practical point of view. While Lake Songkhla (a brackish lake) is presently rich in fish and other natural resources, a fresh water distillation plan has been under consideration for some time to fulfill the increasing need of agricultural and industrial developments currently underway around the Lake. In this respect, it was indeed worthwhile to closely examine the situation at Lake Songkhla for its represented a major dilemma facing many of the water resource control projects throughout the world.

The first day of the the program centered around discussing of environmental and social issues imposed by water resource control and fresh water distillation as well as the development plans of the areas surrounding the lake. The results of a survey of the lake conducted by the Songkla University was presented along with detailed reports on Lake Nakaumi/Sinji case in Japan where the fresh water distillation plan was discontinued, as well as the conditions of Lake Laguna, the Philippines and Kasumigaura, Japan, where the distillation was successfully completed. On the basis of such reports, the discussions that followed covered the efficacy of fresh waster distillation as a means of water resource control as well as its possible effects on the ecosystem of a given source of water.

Moreover, the presentation of a film depicting the disaster of a large scale flood that had swept over the southern part of Thailand including Songkhla last November, illustrated the need for an accurate flood forecast system, while at the same time, demonstrated the importance of well-devised development and forest preservation plans particularly in the areas surrounding a major water resource.

On the second day, the participants went on an excursion around Lake Songkhla. The excursion, covering from the northern to southern tip of the lake was especially meaningful in gaining understanding about the actual conditions of the lake and of some of the major developments in the surroundings. By observing at first hand, the bird sanctuary and other precious natural preservations, the participants were able to learn much about efforts to maintain the balance between the developments and nature.

On the final day, after a presentation on the water resource control project of Lake Songkhla, time was set aside for a panel discussion under the title of "Development and Control of Brackish Water Resources." Having had the opportunity to listen to a number of presentations and to observe the actual situations of Lake Songkhla, the panelists as well as the audience were absorbed into a lively discussion on the subject, unconscious of the passage of time. While it was clear that more time was needed to sort out different points of view, a number of valuable suggestions were made as to "how to take environment into consideration in determining development plans around the water resource". These suggestions were particularly important in view of the situation at Lake Songkhla where the decision must be made concerning its fresh water distillation plan as well as for other similar projects under consideration in developing countries in general.

Finally, it must be remembered that in the second part of the seminar, participation by a number of administrators and researchers from the Lake Songkhla region has proven particularly effective in realizing lively and informative discussions, a fact which should be noted in planning future seminars.

D. SUMMARY OF RESOURCE PAPERS AND CASE STUDY REPORTS PRESENTED

SESSION 2: STRATEGIES FOR WATER RESOURCES MANAGEMENT IN A RIVER/LAKE BASIN CONTEXT

A Strategic Concept of River/Lake Basin Management and Planning

by Ken-ichi Nakagami

Nakagami in his presentation attempted to define what is meant by the strategic concept on River/Lake Basin Management and Planning (R/LBMP) and to operationalize the approach to R/LBMP using the concept of strategic decision making. An attempt was also made to examine the rationality of local community participation in R/LBMP.

To enhance the economic value of resources and the environment, it is necessary to define an optimal state of resource/environment use and to develop a system where this can be achieved. For this, it was pointed out that a clear understanding of the relationship among resources, the environment, and mankind was essential.

The importance of consensus forming among concerned interest group was emphasized to make optimal use of resource/environment. However, it was pointed out that institutionalization of mechanism of social consultation to synthesize and reflect views and aspirations of interest groups on public decision making is required. In order to resolve the problem of multiple interest, maintenance of impartiality among interest groups, the formation of realistic policies, and articulation of concrete proposals was stressed.

The strategic conceptual framework of R/LBMP consists of three levels: (i) A strategy level where an attempt is made to develop a fundamental concept of river/Lake basin management and planning; (ii) a tactical level where tasks involved in R/LBMP are identified and appropriate process of plan formation is worked out; and (iii) an implementation level where decisions are made on actions required to implement the process of R/LBMP. In all twenty five steps in this planning process were identified.

In discussing the process of R/LBMP the most important step at the strategy level was identified as the overall evaluation of the direction which the planning of R/LBMP should take for managing river/lake basin. At the tactic level, the planning of the proposed means by way of describing the process of problem solving given the objective of function and constraint factors, the evaluation of alternate plans and the formulation of the River/Lake Management Plan were identified as the most important steps.

In summary, five issues which need priority policy attention were identified. They were: (i) The establishment of an operational R/LBMP system; (ii) the promotion of basin wide movement directed towards economic development and environmental conservation; (iii) the enactment of basic law concerning R/LBMP to serve as a basic legislative framework for promoting R/LBMP; (iv) the development of an organization structure for R/LBMP; and (v) the development of an evaluation system for R/LBMP.

Methodology and Application of Watershed Classification in Thailand

by Nipon Tangtham and Kasem Chunako

Nipon presented the main features of the watershed classification project implemented in Thailand with special focus on the approach and methodology employed as well as its achievements.

Introducing the background against which the watershed classification scheme was launched in Thailand, Nipon described briefly the social and environmental problems emerged as a result of rapid deforestation in the past few decades. The forest cover in Thailand, which accounted for 53 per cent of the national land in 1961, declined to 29 per cent in 1985. The extensive depletion of forest cover, which took place mainly in the mountainous watersheds, resulted in losses of top soil and its fertility, increased reservoir siltation, and other problems of environmental degradation.

The increased need for promoting proper management of watershed resources culminated in the establishment of the Watershed Classification Committee (WCC) in 1979. The specific objectives of the watershed classification project implemented in Thailand are to: (i) Develop a method of watershed classification; (ii) classify watershed areas into those to be permanently protected and those that can be used for forestry, agriculture, and other forms of primary resource-based production activity; and (iii) produce watershed classification maps.

Based on the agreement reached among the representative agencies of the WCC, five watershed classes (WSCs) were adopted with the following recommended land management options: WSC 1: Protected forest and headwaters; WSC 2: Commercial forestry; WSC 3: Fruit-tree plantation; WSC 4: Upland farming; and WSC 5: Lowland farming. This watershed classification system was operationalized by way of multivariate statistical analysis designed to establish the relationship between some relevant landscape variables and the watershed classes. The landscape variables were selected from those whose values can readily be measured in a numerical form from the existing map information. They include slope steepness, landform, elevation, soil, geology, and forest cover.

The functional relationships among these variables and with the predetermined watershed classes were identified on the basis of the information derived from some selected test areas in the respective regions. The equations thus derived for the respective regions were then used to compute the watershed class values of each landscape unit (1 km x 1 km) in the respective river basins.

The watershed classification mapping project for the Northern region of Thailand was initiated in 1985 together with the application of land use regulations. It is planned to complete the mapping of the entire country before the end of the Sixth Five-Year National Economic and Social Development Plan in 1991. The series of watershed classification maps thus produced with the introduction of the land use regulatory mechanism is expected to facilitate nature conservation and watershed resource management in Thailand.

Risk Analysis Issues and Perspectives in Developing Countries

by Masahisa Nakamura

Nakamura's presentation dealt with risk analysis issues and perspectives in developing countries by highlighting some of the disparities in risk concepts and risk management approaches between developed and developing countries.

In the first place, Nakamura examined some important issues and problems related to risks and risk analysis. He referred to the characteristics of environmental risks outlined by White and Burton. They involve a complex series of cause and effect relationships and are connected to each other and to social benefits. They are global in nature and concern many countries. Risks are not easy to identify and cannot be measured precisely. They are also evaluated differently in social terms.

The definitional issues involved were briefly discussed, drawing attention to the every day definition of risk in terms of an impact or a hazard. The common denominator being the probability of occurrence. The disciplinary emphasis on risk varies from natural hazards, chemicals or health to technological and ecological integrity. Explaining how risks are expressed, the fields of application were presented as: (i) actuarial versus predicted; (ii) deterministic versus stochastic; and (iii) potent versus latent.

On the subject of control of environmental pollution, attention was drawn to the different risks, priority considerations and levels of preparedness in countries with various degrees of industrialization. Examples from Thailand were presented to show the seriousness in the depletion of forests which would adversely affect the ecological balance. It was stressed that a great majority of the population is left susceptible to and unaccounted for various risks.

Attention was also focused on the disparities that exist between the developed and developing countries in relations to priority risk issues, managerial capabilities in terms of resource availability and institutional viability, and social values and ethical considerations involved in the processes of policy formulation and implementation.

Nakamura, having made a broad review of the problems and limitations facing developing countries in the field of risk analysis and management, he then elaborated on the risk analysis premises and paradigms in focus by referring to: (i) the importance of separation of risk assessment and risk management; (ii) social and disciplinary liability and accountability in risk analysis; (iii) transboundary issues in the management of hazardous wastes; and (iv) the relationship between environmental impact assessment and risk assessment.

In conclusion, Nakamura stressed that the hasty transfer of risk analysis frameworks from developed countries to developing countries should be avoided and that considerable efforts should be exerted in refining and reshaping risk analysis methodologies in order to achieve tangible impacts on assessment and management of risks prevalent in developing countries.

SESSION 3: POLICY RESPONSES TO ENVIRONMENTAL AND SOCIAL PROBLEMS RESULTING FROM WATER-LAND USE INTERFACES

Institutional and Organizational Mechanisms for Integrating Land Use Decisions with Water Resources Management

by Maynard M. Hufschmidt and David S. McCauley

Hufschmidt began his presentation by reviewing the three-dimensional conceptual framework which he presented at the 1988 expert group workshop in Otsu, Japan. The three dimensions of the water resources management system are: (i) The management process, divided into planning and implementation; (ii) management elements consisting of physical facilities to be built and operated, implementation tools, and institutional and organizational arrangements; and (iii) the specific management activities and tools required to achieve project purpose or outputs.

Hufschmidt elaborated on some selected topics using specific examples from the case study materials of the previous workshop and other cases for illustration. He first discussed the activities and tasks to be carried out in a watershed management programme. According to his conceptual framework, the task in planning a watershed management programme can be broadly divided into three major activities: (i) Dividing the watershed into major land uses; (ii) developing a set of resource utilization and management practices for each operating unit within each major land use; and (iii) developing a set of downstream management practices. He noted that the planning of the management measures for a watershed management programme is an intricate task involving much information that is site specific in nature, and that plans cannot be based on biophysical criteria alone, but must include economic, social and political/administrative factors as well.

It was noted that regulation of land-use activities, especially those in private ownership, is fraught with difficulties, particularly in developing countries where enforcement capabilities are weak. Although economic incentives would be an appropriate tool to achieve environmental objectives of watershed management, many governments find it hard to implement due to budgetary constraints and difficulties involved in distributing such incentives to the appropriate target population. Technical assistance to farmers via extension services is often a successful means of promoting watershed management on rural lands.

Finally, Hufschmidt discussed the institutional and organizational arrangements. The most important institutional factor relating to land and water is concerned with the pattern of rights to the use of water, land and its resources. Some key attributes to the effective integration of land and water management were identified: (i) Security of tenure to encourage watershed occupants to apply future-oriented, long-term land and water management measures; (ii) certainty of rights to land and water uses; (iii) fairness or equity in the access to land and water resources in order to avoid the problem of "free-riders"; (iv) the responsibility of land and water users for the adverse consequences of their uses.

Institutional Analysis of Water Resources Management in Dianchi Basin, China

by Liu Hongliang and Zhang Jiqiang

Liu and Zhang first summarized the major water management problems facing the lake basin. The rapid population growth coupled with the past policy emphasis on promoting industrial and agricultural development at the expense of environment has led to such problems as (i) the frequent incidence of acute water shortages in the drought years; and (ii) the aggravation of water quality problems. The lake environmental problems are further complicated the extensive deforestation in the basin.

It was reported that the policy efforts to address these problems were culminated in the enactment of the Lake Dianchi Protection Ordinance in 1988. Main thrusts of the lake basin management programme envisaged under the ordinance are to: (i) Augment the water storage capacity of the lake by raising the operating water level; (ii) manage water demands by introducing the water use permit system as well as the water charge system; (iii) strengthen water quality management by implementing such policy options as stringent effluent standards, construction of sewage systems, and expansion of the water quality monitoring system; (iv) promote watershed management by way of expanding afforestation and development of alternative energy sources; and (v) promote rational use of lake resources in line with the principle of ecologically sustainable development.

With regard to water demand management, it was stressed that a comprehensive review of the present water use practices in the agriculture, industry and domestic sectors should be carried out with a view to exploring the possibilities of creating a viable water market. Attention was also drawn to the manner in which afforestation should be promoted in view of the fact that the traditional, centralized approach to afforestation has been ineffective.

In respect of water quality management, a few questions that had emerged from the review of the ordinance were presented. They are concerned with the feasibility of (i) creating a water quality conservation authority to coordinate all the agencies concerned; and (ii) establishing alienable water pollution rights along with the streamlining of the pollution charge system. The need for an economic analysis was stressed in order to evaluate various technical and policy options for water quality management.

Some observations concerning the organizational arrangements conceived under the ordinance for promoting water resources management in the Dianchi Lake basin was also presented. It was noted that mere establishment of a coordinating body is not sufficient unless it is delegated authorities and resources required to carry out the assigned tasks.

The presentation was concluded by stating that the ordinance is still very new and much remains to be done, so that more studies are needed to explore specific ways and means to effectuate the management mechanisms stipulated in the ordinance.

**Policy Response to Water Resources Management Issues and Problems:
A Case Study on the Kenya's Lake Victoria Basin**

by S. M. Machooka, David L. Mshila and Morris A. Omondi

Machooka started his presentation by giving a brief background on the region under the jurisdiction of the Lake Basin Development Authority (LBDA). The LBDA region covers a total area of 47,079 km² which includes 4,000 km² of Lake Victoria. The region has a total population of 8.7 million which accounts for 42 per cent of the Kenya's population.

The major environmental problems which have a close bearing on issues of water resources management in the region are: (i) The rapid depletion of forests in the upper watershed areas coupled with widespread soil erosion due to increased population pressures and indiscriminate expansion of farmlands and over-grazing; (ii) water quality deterioration due to the increased discharge of wastewater from agro-based industries; and (iii) increased incidence of water-borne diseases due to deficiencies in potable water supply systems. It was stressed that these problems should be seen as a consequence of the interplay among the social, economic, institutional, and physical environmental factors prevalent in the region.

Machooka then reviewed the policy responses hitherto adopted to deal with these environmental problems with special focus on policy objectives, strategies, and programmes and projects, particularly in the fields of agricultural development, water resources development, forest resources management, public health, and population.

In addition, Machooka discussed the organizational arrangements for promoting land and water resources management in the region. He identified several institutions that are involved in various fields of water resources management, including (i) the Presidential Commission on Soil Conservation and Afforestation; (ii) the Ministry of Water Development; (iii) the Ministry of Agriculture; (iv) the Ministry of Environment and Natural Resources; (v) the LBDA; and (vi) various non-governmental organizations.

The mechanisms for inter-agency coordination were also reviewed. At the national level, coordination takes place through various inter-ministerial committees which are formed to deal with policy matters. Another mechanism at the national level is the sectoral planning groups which are formed to ensure proper coordination among sectoral agencies during project plan formulation and budgetary allocation. At the district level, the District Development Committees are responsible for coordination of programmes and projects in the respective jurisdictions.

In his concluding remarks, Machooka stated that the LBDA created in 1979 as a basinwide planning and coordinating body has been playing a central role in promoting regional development on a sustainable basis. In particular, attention was drawn to the recent emphasis the LBDA has placed on the promotion of watershed management through establishing an integrated extension system.

River Basin Management and Consensus Forming: An Analysis of the Roles and Functions of the Yahagi River Method

by Yahagi River Team:

Renzo Naito, Aichi Sano, Ryoji Harashima and Yoshiro Niki

The presentation was commenced by providing a brief background information on the Yahagi River Basin and the history of the basinwide environmental movement led by the Yahagi River Basin Water Quality Preservation Association (YWPA). With the advancement of industrialization and urbanization in the basin after the early 1960s, however, the deterioration of water quality became the prime factor which triggered off conflicts between the urban/industrial sector on one hand and the agriculture/fisheries sector on the other.

The main topics covered by the presentation are: (i) Water use-related conflicts and mechanisms of conflict resolution; (ii) key factors that have contributed to the success of local community-based water quality protection movement; and (iii) the main thrusts of the Yahagi method of river basin management.

The YWPA, being a local community-based non-governmental organization, has devised a number of strategies to promote river basin management without heavily relying on bureaucratic actions. First, the organizational arrangement adopted by the YWPA is noteworthy. The YWPA is not made up of individuals but centres around the existing water user organizations such as farmers' and fishermen's cooperatives and municipal bodies (domestic water suppliers). This arrangement has enabled the YWPA, for the purpose of the water quality protection movement, to mobilize the organizational resources (including financial and political bases) each of the member organizations is endowed with.

Second, the YWPA has exerted efforts to foster environmental groups at the local community level throughout the river basin. This has contributed to the strengthening of the base of support for the environmental movement initiated by the YWPA.

Third, the basic principle according to which the YWPA has promoted its activities is the pragmatism. In general, farmers and fishermen would offer no support to a movement that is not tied to their own immediate interests, no matter how sophisticated a philosophy it is based on. For this reason, the YWPA mobilized its political resources to establish an institutional arrangement whereby it can exert positive intervention on land use decisions in the river basin so as to ensure proper water quality management.

The presentation was concluded with an explanation of the so called Yahagi Method of river basin management established by the YWPA. The method may be characterized by: (i) The institutional arrangement to exercise predevelopment consultation with proponents of land development projects in terms of the environmental soundness of the proposed projects; (ii) the manner in which consensus is formed among parties concerned with respect to the relationship between land use decisions and water quality; and (iii) the existence of a non-governmental organization capable of coordinating local interests from a basinwide perspective.

SESSION4: POLICY RESPONSES TO CONFLICTS AMONG COMPETING WATER USES/USERS

Institutional Arrangements for River/Lake Basin Management with Emphasis on Managing Conflicts

by James E. Nickum and K. William Easter

The paper presented a discussion on the following issues: (i) Advantages of market; (ii) Sources of market failures; (iii) Sources of non-market failures; (iv) Market based solution to conflicts; (v) Government based solutions to conflicts; (vi) Accountability in water use; and (vii) Collective actions of users.

Besides having well-known "efficiency" properties, markets (i) provide a way to reduce the fiscal burden on the state (both by reducing costs and increasing revenues); (ii) generate relatively undistorted information about critical factors and elicit quick responses thereto; and, importantly for the purposes of this presentation and the task assigned us; and (iii) to resolve conflicts at a low level of decision making.

Among the reasons for market failures in a river/lake basin context are: (i) Characteristics of the resource, (ii) Incentive problems, and (iii) Problems in the specification of water rights. Increasingly, it is apparent that there are a number of kinds of nonmarket failure, often more serious than market failure. Some of these are similar to market failures: (i) poor specification and transferability of rights between agencies; (ii) conflicts over return flows; (iii) rent seeking behavior (corruption and capture of rents by vested interests); and (iv) high transaction costs.

On the basis of this very sketchy outline, various market and nonmarket based solution for resolving conflict are considered. Market based solutions include: (i) Adoption of methods which lower transactions costs (building on or developing shared valued; creating credible commitments and reciprocity; establishing efficient adjudication and enforcement mechanisms; and regulating access to the resource); (ii) establishing water markets, with clear, secure rights, a good information system; (iii) adopting a tradeable permit system; (iv) finding methods of integrating upstream and downstream; and (v) defining property rights.

Governments, nonmarket-based solutions include: (i) Delineating and assigning water rights and adjudicating disputes; (ii) engaging in new construction; (iii) doing nothing; (iv) improving management; and (v) establishing systems to ensure accountability at all stages of the administrative system.

Collective action by water users is an important component of both nonmarket and market solutions, but especially the latter. Where water users' organizations(WUO) already exist, even if informally, it is best to build on them. Some evidence has indicated that WUOs operate best when (i) they are small; (ii) they have good leaders; (iii) they build on experience; (iv) they pay off economically; (v) their members are relatively homogeneous economically; and (vi) financial control can be assured.

Basin Approach to Fishery conflict in Laguna Lake: A Case Study

by Francisco P. Fellizar, Enrique P. Pacardo, Floro R. Francisco,
Ma. Victoria O. Espaldon, Dolora N. Nepomuceno, and Celso F. Espaldon

The case study presented an evaluation of the social conflict existing between the traditional fishermen and the capitalist fishpen operators in Laguna Lake. Discussion of policy responses focused on the major projects which were initiated/undertaken by the Laguna Lake Development Authority (LLDA) which include: (i) Laguna de Bay fishpen development project; (ii) Laguna Lake zoning and management plan; and (iii) the proposed lake reform programme.

Pacardo started presenting the paper by summarizing the major problems and issues associated with the management of Laguna Lake water resource. He showed that current problems and issues are complex and interrelated and have a common origin in lake pollution. Lake pollution in the form of chemicals, organic components and suspended sediments cause a reduction in fish productivity and this gave rise to the development of fishpen technology for fish culture and illegal fishing technique. The uncontrolled proliferation of fishpens in the lake in the early 1980s had put the fishpen owners and small open fishing fisherman in conflict. The need for salt free water for agriculture and domestic use has also put the fishermen sector in conflict with the farmers. He indicated that the general political situation in the country influenced a lot in the resolution of the conflict.

Francisco discussed the specific policies intended to resolve earlier conflicts such as policies related to the establishment of Laguna de Bay Fishpen Development Project, Laguna Lake Fishery Zoning and Management Plan and the Integrated Lake Reform Program. Likewise the administrative capability of LLDA was analyzed with emphasis on interagency coordination and community participation.

Fellizar discussed the effectiveness of these policy responses. The fishpen development project which was intended to provide small fishermen with capital to engage in fishpen aquaculture, was not successful since loan repayment rate was very low and the people was not prepared to manage the project. The Lake Management and Zoning Plan was meant to rationalize the use of water resources in term of spatial distribution. The implementation of this policy which requires the dismantling of excess fishpens was facilitated by the natural destruction of the then existing fishpen (due to the passing of a number of strong typhoons through the lake in late 1986 and 1987).

In general, the policy responses to the fishery conflict were not efficient because the necessary tools and instruments needed for policy implementation tended to favor the more privileged fishpen operators than the traditional fishermen. The policy analysis also looked into the administrative capability of LLDA, the interagency coordination and community participation. Finally, Fellizar made a number of recommendations with regard to future case study.

The Development Planning of the Songkla Lake Basin With Particular Reference to the Proposed Salinity Barrier

by Thai Case Study Team

The case study presented the various alternatives on siting the proposed salinity barrier.

The Songkla Lake Basin Planning Study was initiated by the Royal Thai Government(RTG). One of the main projects arising from this study involved construction of an impermeable barrier for controlling the intrusion of saline water from the see, and three possible locations for the barrier were investigated.

Although the RTG has not yet decided upon those recommendations, a number of potential problem areas in land and water uses conflicts had been identified. The exponential expansion of marine shrimp industry which is the most prominent of all changes that have taken place within the SLB opens up a new alternative for economic land use but, at the same time, poses some concerns regarding social and environmental problems.

Among the major potential problems include land use and water use conflicts among the three beneficiaries: the farmers, the fishermen and the marine shrimp cultivator. It is urgent for the RTG to formulate policies and measures to deal with these increasing problems with or without the Barrier.

In the mean time, the Office of National Environment Board(ONEB) in collaboration with other government agencies such as the NESDB, PSU, NICA, the GRID and the Department of Fisheries continues to do useful works for the development of the water resource of the SLB and the protection of its environment.

The current programmes of the ONEB were also presented. It was concluded that if the Songkla project proceeds, an inventory of different policy instruments should be made and strategies should be studied in order to inform, educate and motivate the public. Regulatory mechanism and incentive programmes shall likewise heed to be enforced.

Comprehensive Development of Lake Kasumigaura and Its Environmental Management

Part III. Policy Responses to Kasumigaura Comprehensive Development

Part IV. Limnological and Socio-Economic Comparison with Laguna Lake and Lake Songkla

by The Kasumigaura Study Team:

Khoji Muraoka, Morihiro Aizaki, Takehiko Fukushima, Hideo Harasawa, Yasuo Kawai, Masao Yokota, and Yoshiyuki Fukazawa

The paper was presented in two parts, Part III and IV. Part III was review of the policy responses to the development and environmental conservation policy responses to the development and environmental conservation activities in Lake Kasumigaura. It was noted that an integration of preventive measures are necessary in the initial stage of development in order to promote environmentally sound management.

Both development and environmental conservation activities are closely related and their relationship has hanged in correspondence with change of social, economical, and political conditions. which were caused partially by external forces like the oil crisis. These both activities have proceeded in a coordinative manner in recent years. However, the lake environment remains still in highly deteriorated condition. The reasons why the lake because so deteriorate are (1) delay of implementation of the environmental control action, (2) lack of preventive reassures like the EIA system, and (3) difficulties of rehabilitating once polluted lakes.

Part IV presented a comparison of limnological and socioeconomic characteristics among Lake Songkhla, Lake Kasumigaura and Lake Laguna. The major similarities and differences among the three lakes are: (1) the nearly same morphometry and striking resemblances in nutrients concentrations, (2) the difference in salinity due to the presence or absence of barrier, (3) low primary productivity in both Laguna Lake and Songkhla Lake probably due to high turbidity, (4) the dominance of agricultural land use and its inflow loads, (5) the typical patterns of the conflict (Fishery - Agriculture; Agriculture/Fishery - Domestic use/Industry; Recreation - Other uses), (6) the poorer sanitation systems and waste water treatment facilities in Laguna and Songkhla Lake, (7) the only operation of domestic water supply for drinking in Lake kasumigaura, (8) the similarities of water quality monitoring systems and regulatory mechanisms against the considerable differences in physical facilities.

Further there are definite dissimilarities: in the case of Songkhla Lake, the hope to give an opportunity of developing; Laguna Lake, a ground for producing fishes and/or storage pond for irrigation; Lake Ksumigaura, the duty to play gradually a more important part in supplying tap water for the people inside and outside its watershed under the difficult condition for reducing the inflow loads.

Lessons obtained from this review are, (1) importance of the forest conservancy and the flood control, (2) needs for the policy change concerning project's scale merits, (3) applicability of effluent regulation, (4) applicability of the pollution control technology, (5) growing importance of the public concern, and (6) usefulness of scientific knowledge.

SESSION 5: POLICY RESPONSES TO ENVIRONMENTAL AND SOCIAL EFFECTS OF WATER RESOURCES DEVELOPMENT SCHEMES

Policy Responses to Environmental and Social Effects of Water Resources Development

by Saburo Matsui

Matsui's presentation was divided into three parts: (i) Introduction of the World Bank's technical paper prepared by Michael C. Cernea on "Involuntary Resettlement in Development Projects: Policy Guidelines in World Bank-Financed Projects"; (ii) a brief review of hydropower development projects in Brazil and Indonesia; and (iii) the Japanese experience in coping with environmental and social problems associated with dam construction projects.

Matsui pointed out that the involuntary resettlement in its nature, is a result of the destruction of a previous way of life, including formal and informal organization of the affected population. Therefore a feeling of powerlessness and alienation is often found in the relocated people. In this subject, involuntary resettlement must be a development programme, discouraging paternalistic policies leading to an absence of the concerned population's self-mobilization.

Lessons from past resettlement performance showed that three key areas were identified as requiring immediate and considerable strengthening: (1) the quality of preparation of resettlement components with respect to technical, sociological and organizational content needed radical improvement; (2) increased attention must be given to economically and socially viable options for developing the productive capacity of displaced populations through project-funded land-and employment-based strategies; (3) supervision by the relevant agencies of the implementation of resettlement operations must be exercised regularly, professionally and firmly.

The three case studies were very illustrative to the theme, dealing with a developed country experience (Lake Biwa) and with two developing country experiences: Saguling Dam (Indonesia) and the Porteira Project (Brazil). The Saguling case focused its presentation on a balance of the effectiveness of the policy responses prepared to mitigate and compensate the negative impacts forecasted for the Indonesian project. The Porteira case discussed both the environmental insertion of hydroelectrical power projects in Brazilian Amazon and specifically presents the environmental strategies used in the Porteira project itself.

The case studies brought up an interesting comparison between the effects of man's activities in a existing lake (Lake Biwa) in contrast to the effects of artificial lakes in environmental and social existing patterns. Lake Biwa case introduced Acts of special measures, taxation and accounting were introduced as well as other types of institutional, organizational and funding systems were introduced to resolve so called "upstream and downstream problems".

Environmental Impact Assessment for the Porteira Hydroelectric Project

by J.M. Branski, J.P. de Avila, R.L.L. Lopes, A.J.T. Goncalvas, and J.G. Tundisi

The Brazilian case study aims at discussing the environmental insertion of hydroelectric power projects in the Brazilian Amazon region and, on the other hand, at specifically presenting the environmental strategies used in the Porteira Project. It describes the Brazilian legal environmental system, particularly the rules for environmental licensing of hydroelectric projects. It shows how the licensing system considers different phases of the project and the role of the environmental impact assessment and statement in approving or rejecting the project through the discussion of mitigating and compensatory measures. Some highlights of the Brazilian Constitution concerning environment and Amerindians are also presented. The main impacts are expected to occur in Amerindians populations, the Trowldtas River biological reserve, on the existing biota, nosological and demographic conditions, archaeological sites and water quality.

Hydroelectric projects in the Amazon, both existing and planned, are presented together with the potential environmental impacts of dams and reservoirs in the region. The importance is stressed of detailed baseline studies in the region prior to dam construction, due to the scarcity of information, together with the complexity and fragility of Amazon ecosystem dynamics. The Porteira engineering project is discussed in terms of its purposes in generating energy to the region. Some details of the civil project and of the river/reservoir system are also given.

The strategies involved in the Porteira environmental impact assessment are presented and discussed. Baseline studies and the environmental control plan of the project are presented for Amerindians, protected areas, biota conservation, nosological and demographic patterns, archaeological sites, water quality, etc. It shows how the environmental control plan draws up programmes and policies that would minimize the assessed impacts and ensure that the project meets its objectives.

The paper shows that at present, artificial reservoirs do not represent the principal altering agents of the Amazon environment when compared with other anthropic activities such as clearing of native forests. Hydroelectric projects in the Amazon, both existing and planned, are presented together with the potential environmental impacts of dams and reservoirs in the region. The effects on downstream river and flood plains are also considered, together with the importance of water quality and quantity requirements. The effects of the forming of the reservoirs flooding tropical rainforests on water quality is shown to have a strong dependency on residence time and mean depth.

The importance is stressed of detailed baseline studies in the region prior to dam construction, due to the scarcity of informations together with the complexity and fragility of Amazon ecosystem dynamics.

**Policy Response to Water Resources Management Issues and Problems:
Case Study of Saguling Dam, West Java, Indonesia**

**by Herman Haeruman Js, Edi Brotoisworo, Doddy Poetranto, Sudaryono,
Tina Artini, Wiwik Wikoyah, and Arief Yuwono**

The most important aspect of the Saguling Dam case study was to analyze the effectiveness of the programmes and projects forecast to be mitigation and compensatory measures to the affected population. Realistically, the authors focuses their presentation on the identification of gaps and limitations in the existing policy and institutional framework in responding to the environmental management issues of the Saguling Dam Project. On the resettlement issue, the importance and fairness of compensation funds have also been extensively discussed, particularly, how to compensate people that do not leave in the flooded area but work on it.

A monitoring programme is on progress in Saguling Dam area, particularly as far as the resettled population is concerned. In this respect several measures aiming at adapting the predicted and actual conditions are being taken on implementing fisheries, water transport, etc. Successful results have been obtained in attracting the rural population to fisheries. A management plan has just been drawn up in order to coordinate the environmental problems to the related or responsible agencies.

Among negative impacts are; (a) Displacement of families, (b) loss of income source, (c) land loss, (d) loss of income, (e) loss of agricultural production, (f) increased number of poor: while positive impacts include fresh water fisheries and lake tourism.

There are three response to the problems faced in the Saguling development: a) conduct detail environmental impacts analysis and establish an integrated plan of action, b) formation of inter-agencies Committed at the central government level, c) formation of technical working groups to plan: 1) land compensation fund, 2) resettlement, 3) fishery improvement, 4) water transport, 5) interdepartmental consultative forum.

Some agreement to consolidate existing plans are achieved, especially on 1) soil conservation (Forestry's Dept), 2) Bandung Regional Development Plan (Provincial Development. Planning Agency), 3) water resource development plan, 4) Saguling Development Plan (State Power Company)

Suggested solution to problems include: 1) compensation plan for land owner, plant owner and other in inundated areas, 2) resettlement of affected population (through local resettlement to agricultural estate and transmigration to other islands), 3) improve lake fisheries for local farmers, 4) improve tourism for jobs to local people, 5) reduce siltation, and 6) reduce urban pollution (garbage and domestic waste). Constraints of implementation are: 1) provision of fund (not enough and not on time), 2) government's agencies responsiveness (competing priorities), 3) community participation (lack of it).

Lake Biwa Case Study of 2nd Year -- Evolution of the Lake Biwa Water Resources Management and Environmental Conservation Policies

by Koichi Imai, Tukihiro Kondo, Yoji Ito, Taichiro Uda, Takashi Otsuka, Shigekazu Ichiki, Masahisa Nakamura, Michio Akiyama, Kiyoshi Nomura, and Motokazu Ando

Lake Biwa is the largest lake in Japan, where watershed area is almost equal to the total surface area of Shiga Prefecture. The lake is a typical multi-purpose water resource, being used to water supply, flood control and environmental conservation. The Lake Biwa case study concentrates its efforts in clarifying the intricate dynamics of development and conservation in Shiga Prefecture through: (i) integrative analysis of major policy measures, (ii) the structure of laws concerning regional development and preservation, (iii) an outline of the Lake Biwa Comprehensive Development, (iv) the review of water quality preservation, (v) Lake Biwa Eutrophication Prevention Ordinance, (vi) land use and environmental conservation, (vii) the water use and management of Lake Biwa, and (viii) the involvement of people and the administration and their roles.

The growing pollution of the lake gave rise to the "Lake Biwa Comprehensive Development Project" in 1972. A unique institutional feature of the project allows a role of negotiator for different, often conflicting, interest groups in the watershed. In this subject, ultimate decisions are taken by the governor of the prefecture and not by the national authority.

Lake Biwa, besides its problems, was seen as a result of a change in mentality in Japan toward environmental problems arisen from development. This is a result of a very fast industrial development in the country and of some recent environmental disaster (like Minamata Bay). A general awareness affect today's Japan in environmental issues, which, together with available funding and environmental technology permitted the development of cases like the restoration of Lake Biwa. Some tasks still remain to be solved in Lake Biwa. Particularly, the water quality standards have not still improved as wished.

Point sources seem to be controlled in Lake Biwa basin, but the lake still received non-point sources nutrient loads from land drainage and domestic pollution, as well as some amount of toxic waste. Among issues of concern on water quality of Lake Biwa are: (i) organo-chlorine pollutants (contamination of groundwater by such organo-chlorine pollutants or tri-chloro ethylene and tetra-chloro ethylene); (ii) domestic wastewater (despite on-going effects to construct sewerage systems, only 17 per cent of the population has access to them to date); and (iii) agricultural run-offs and other non-point pollution from development activities.

It was discussed that Japan's demands on recreation facilities will certainly help the restoration of detrimentally affected environment, particularly rivers and lakes. It is stressed that Lake Biwa can be seen as an example of conservation of a natural resource. Meanwhile, the efforts have to be continued since conservation is a permanent task.

SESSION 7: REVIEW OF LAKE SONGKHLA BASIN MANAGEMENT

Ecological Effects of the Proposed Salinity Barrier in Songkhla Lake: A Review

by Vachira Lhekni and Pimonpan Leelawathanagoon

After the construction of salinity barrier, the following environmental effects could be seen: a) above the barrier, the area of Thale Luang would be inundated at the peak of wet season due to slightly increased water levels, b) at the end of dry season, water levels would be slightly lower, c) Thale Luang may become more turbid than at present, d) Plant growth around the margins of Thale Noi and Phru Khuan Khreng would be stimulated by extended periods of inundation but, as the water recedes, dying plants would begin to rot, possibly increasing nutrient levels and BOD in Thale Noi, e) fringing vegetation around Thale Luang would be favored by water level fluctuations, f) freshwater aquatic macrophytes in Thale Sap would be replaced by more salt tolerant species. This change would be effected on migratory waterfowl and waders because of habitat and feeding ground destruction, g) freshwater fish and prawn catch in Thale Luang and surrounding canals would be reduced and species composition at Thale Luang and Thala Sap would change, h) increase pesticide and nutrient loadings and coliform levels due to irrigation return flows and increase inundation would be effect to aquaculture.

Development and Management of Brackish Water Zones: a Review of the Land Reclamation and Salinity Barrier Project in Lakes Nakaumi and Shinji, Japan

by Takehiko Hobo

Lake Nakaumi and Lake Shinji are brackish water zones that lie along the Japan Sea coast. A land reclamation and salinity barrier project was initiated in the lakes in 1963. The project has been implemented by the Ministry of Agriculture, Forestry and Fisheries of Japan. It consists of three parts: (1) land reclamation in Lake Nakaumi for agricultural use; (2) the construction of salinity barriers for desalinization of the lake water; and (3) fresh water supply to the coastal agricultural areas and reclaimed areas.

The project as a whole has long been subjected to intensive investigation and discussion by many residents around the lakes, scientists, and the local governments concerned, because the project was deemed to bring about a great influence on: (1) the water quality and the lake system; (2) the coastal scenery; (3) the management of water systems; (4) the regional economy; (5) the local public finance, and so on. As a result, in May 1988, the salinity barrier component, which was considered to bring about the greatest environmental damage, came to suspension while two other components of the project are currently being subjected to re-examination.

An important point to be noted with regard to the land reclamation and salinity barrier project is that, as has been the case with many past regional development programmes and projects, the project is deemed to give rise to a substantial impact on the environment as well as on the regional economy. From the viewpoint of regional economy, the author of this paper carried out a cost-benefit analysis of the project. The result of the analysis shows that the costs involved with the project exceed the benefits.

Water Quality Management for Songkhla Basin

by Pichai Taneerananon, Narong Na Chiangmai, Sunchai Klinpikul, Winai Sae-Chew

The principal water quality problems in Songkhla Lake Basin rivers appear to be: a) high coliform levels downstream of major urban and animal populations, b) high floatables levels due to domestic wastes and dumping solid wastes into khlongs, and c) occasionally low oxygen levels in Khlong U Taphao downstreams of Hat Yai.

The estimates nutrient generation rates indicate the relative significance of agricultural and urban sources of nutrients for lake ecology. the relatively low concentration of nutrients found in most river waters reflect the relatively low usage of fertilizers in the catchments. Higher levels of nutrients below towns such as Phatthalung and Hat Yai reflect the impacts of urbanization, and cause minor eutrophication at the lake shores.

Nutrient levels in the stream and lake sediments are relatively high suggesting that rooted plants would not be growth-limited by lack of nutrients. the fine silt and clay contained in the stream sediments cause turbid conditions in the streams and freshwater sections of the lakes, thereby limiting lake and riverine productivity.

Watershed Management as related to Songkhla Lake Basin

by Kasem Chunkao

The management criteria of Songkhla Lake would be summarized as follows: 1) the management plan has to focus on the way how to keep unchangeability in aquatic ecology of the whole lake areas. Boundaries among freshwater, brackish water, and salt water have to locate as it used to be in the past, 2) regulation of summer flow and wet flow has to be conducted. Resources management of upstream areas and headwater sources must be relied on conservation concept, 3) wash out of soils must be avoided with care. The management plan about how to keep water in soil and how to keep soil place must be applied. Sedimentation of the lake must be refused as soon as possible, 4) contamination in water, sediment, plants, and animals must be eliminated and managed under national standard in order to prevent the hazardous food chain.

In other words, resources management in the upstream areas (lowland, upland, and highland or headwaters must be taken with care for any watershed management activities such as timber harvesting, method how to convert forest to be para rubber plantation, pare rubber plantation management, mining activities, human resettlement and urbanization, industrialization, road construction, recreation, and commercialization.

Social Impacts of the Proposed Salinity Barrier in Songkhla Lake

by Chatchai Ratanachai, and Rapeepun Suwannatachote

This paper presents the concept of a salinity barrier across the Songkhla lake and its history. The background of the Songkhla Lake Basin, emphasizing on its poverty area, is briefly discussed. The authors review the prefeasibility study of the salinity barrier, focusing on four issues: Availability of water; Agriculture and irrigation; Fisheries and aquaculture; and social and political issues. Finally, comments are made centering around the social-impact-related issues.

ANNEXES

**OUTLINE OF THE SECOND WORKSHOP ON RIVER/LAKE BASIN APPROACHES TO
ENVIRONMENTALLY SOUND MANAGEMENT OF WATER RESOURCES:
FOCUS ON POLICY RESPONSES TO WATER RESOURCES MANAGEMENT ISSUES AND PROBLEMS**

Background and Objectives

As the pace of development accelerates in developing countries, many river/lake basins tend to encounter a number of water resources management issues that cannot be dealt with solely in the context of specific water-related programmes and projects, but need to be addressed on a basinwide scale as integral part of local and regional planning and development.

In the meantime, it is widely recognized among policymakers and administrators in developing countries that there is an urgent need to develop training programmes capable of furnishing planners and natural resources managers with knowledge and skills required to respond to the complex policy issues involved in water resources management.

In view of the situation, UNEP and ILEC in 1987 jointly started a project entitled "Promotion of environmentally Sound Management of Lakes." As an integral part of the project, nine case studies on lake/reservoir basins of the world have been undertaken since 1987 in collaboration with UNCRD. The output from the first-year study served as a major input in the first expert group workshop on River/Lake Basin Approach to Environmentally Sound Management of Water Resources held from 9 to 18 February 1988 in Otsu and Nagoya, Japan.

The Second Workshop is an integral part of UNEP/ILEC Project "Promotion of Environmentally Sound Management of Lakes (FP/9101-87-92)", and organized jointly with the International Lake Environment Committee (ILEC), the United Nations Environment Programme (UNEP), the United Nations Centre for Regional Development (UNCRD), the Office of the National Environment Board (ONEB) Government of Thailand, and the Prince of Songkhla University (PSU). The workshop is aimed at focusing on policy responses to water resources management issues, inter alia:

- (1) To review the findings of the second-year case studies and related resource papers undertaken by collaborating institutions and experts;
- (2) To examine strategies and approaches to water resources development and management in a river/lake basin context with special focus on institutional and organizational arrangements in which management strategies and policy instruments are formulated and implemented; and
- (3) To suggest, on the basis of the workshop deliberations, an operational framework for developing curricula and materials that can be adopted by developing countries for training development planners and water resources managers.

The case studies undertaken as part of the project have focused on the three issue domains in water resources management, which deserve special attention from the view point of river/lake basin planning and management, viz.:

Issue domain I: Environmental and social effects of water resources development schemes such as dam construction for hydropower generation, irrigation, and water supplies for industrial and domestic uses: e.g., involuntary resettlement, disruption of freshwater fishing, spread of water-borne diseases, spread of aquatic weeds, etc;

Issue domain II: Environmental and social problems resulting from water-land use interfaces: e.g., water quality deterioration by upstream land use activities; destruction of watershed ecological functions by indiscriminate forest clearing and expansion of cultivation on steep slopes giving rise to in the problems of increased floods, drought and sedimentation in the down stream communities, etc; and

Issue domain III: Conflicts among competing water uses and users in terms of the quantity and/or quality requirements: e.g., issues associated with water allocation among regions, sectors and social groups; socio-political problems arising from the juxtaposition of customary water rights/fishing rights and formal institutions determining the access to water resources, etc.

Focus of Discussion

The second workshop will be organized as a follow-up to the first workshop on the basis of the output from the second-year research activity. The workshop will focus discussion on the following interrelated questions:

- (1) What policy actions have been taken to respond to the water resources management issues and problems (particularly those delineated and analyzed through the first-year case studies) in terms of management strategies, policy tools and instruments for putting the strategies into effect, and institutional and organizational arrangements for policy formulation and implementation?
- (2) How and to what extent has been environmental and social assessment information reflected at the various stages of water resources development and management (both at the stages of plan formulation and implementation)? What procedures and mechanisms were adopted?
- (3) What institutional and organizational arrangements have been adopted to facilitate the integration of land-use decisions with water resources management?
- (4) How and to what extent have been conflicts associated with water use and allocation mitigated and resolved? What strategies and policy tools were used?
- (5) What mechanisms have been adopted to facilitate local community

participation in the process of water resources management?

- (6) What have been the major anticipated and unanticipated consequences -- economic, social, and political -- of the water resources management policy efforts?

Material for Discussion

Three types of papers will serve as material for discussion at the workshop:

- (1) Resource papers on key policy issues involved in water resources management (which are to be relevant to the focus of the second-year case studies), including:
 - a) A review of the limitations and critical deficiencies of the conventional EIA procedures and institutional arrangements currently being followed in developed and developing countries: focus on water development schemes;
 - b) A review of institutional and organizational mechanisms required to integrate land-use plans and decisions with water resources management;
 - c) A review of strategies and policy instruments for managing and mitigating conflicts in water use and allocation;
 - d) A review of approaches for facilitating local community participation in the management of water and land resources in river/lake basins;
 - e) A review of training approaches and curricula for water resources managers with special focus on their relevance and effectiveness to meeting the needs of developing countries.
- (2) Case study reports on the analysis of policy responses to water resources management issues. They will be grouped into the following:
 - a) Case studies on policy responses to environmental and social effects of water resources development schemes:
 - Saguling dam and its watershed, West Java, Indonesia;
 - Robo-Broa reservoir and its watershed in Sao Paulo and hydro-power development in the Amazon Basin, Brazil; and
 - Lake Biwa and its basin, Japan.
 - b) Case studies on policy responses to environmental and social problems resulting from water-land use interfaces: focus on water quality management:
 - Dianchi Lake and its basin, Yunnan Province, China;

- Winam Gulf of Lake Victoria and its watershed, Kenya; and
 - Yahagi River Basin, Japan.
- c) Case studies on policy responses to conflicts in water use and allocation:
- Traditional fishermen and modern fishpen operators in Laguna Lake, Philippines;
 - Salinity barrier project in Songkla Lake, Thailand
 - Water resources development in Kasumigaura Lake, Japan.
- (3) Review papers on strategies and approaches to water resources management with special focus on the Songkla Lake Basin, Thailand (a pair of papers each on the following topics will be arranged: one from Thailand and another from elsewhere for discussion during part II of the workshop);
- Water resources development: focus on environmental and social effects of irrigation and salinity barrier projects;
 - Water quality management in relation to urban and industrial development programmes; and
 - Watershed management in relation to agricultural and rural development programmes.

The topics for review papers will be further elaborated by the Organizing Committee of Thailand.

Organization and Workshop Programme

The workshop will be organized in two parts as follows:

Part One: Policy Responses to Water Resources Management Issues (16-21 January 1989, Bangkok, Thailand). This part will involve, among others, the following activities:

- (1) Presentation and discussion of resource papers, theme papers, and case studies. Resource papers and case study reports will be grouped commensurate to the three major themes:
- Theme I: Policy responses to environmental and social effects of water resources development schemes;
 - Theme II: Policy responses to environmental and social problems resulting from water-land use interfaces; and
 - Theme III: Policy responses to conflicts in water use and allocation.

- (2) Group discussion on selected topics (special attention will be directed to the delineation of an operational framework for the preparation of training curricula and materials on the basis of theme papers and case study reports prepared for the workshop);
- (3) Preparation of a workshop (part I) report; and
- (4) Field visit.

Part Two: In-depth Review of Strategies and Approaches to Water Resources Management: Focus on the Songkla Lake Basin, Thailand (23-25 January 1989, Hat Yai, Thailand). This part will involve, among others, the following activities:

- (1) Presentation and discussion of review papers;
- (2) Intensive discussion on selected topics for preparation of a workshop report (part II); and
- (3) Field visit in and around the Songkla Lake.

Details of the proposed programme is given in annex I.

Participants

The participants will include:

- (1) Researchers and experts who contribute resource papers and theme papers for the workshop;
- (2) Members of case study teams from Brazil, China, Indonesia, Japan, Kenya, Philippines, and Thailand (two members per case study team);
- (3) Relevant experts and researchers from agencies and institutions concerned in Thailand; and
- (4) Other relevant experts and researchers from national and international institutions.

Part one of the workshop (16-21 January 1988, Bangkok) will be attended by all the participants above while part two will be attended by selected participants from among (1), (2), (3) and (4) above and participants from Thailand.

Expected Output

It is hoped that the workshop will:

- (1) Provide a forum for an exchange of experiences and ideas to participating planners, administrators, and researchers dealing with water resources development and management;

- (2) Lead to a better understanding of the processes and mechanisms of managing water-related activities in a river/lake basin context;
and
- (3) Generate new ideas with regard to strategies and approaches to institution building and manpower development in the field of water resources management in a river/lake basin context.

KEYNOTE ADDRESS

**REGIONAL DEVELOPMENT AND WATER RESOURCES MANAGEMENT:
THE NEED FOR, AND PROMISE OF, A RIVER LAKE BASIN APPROACHES**

**Hidehiko Sazanami, Director
United Nations Centre for Regional Development**

Distinguished participants, ladies and gentlemen, it is indeed a pleasure to address you this morning on the occasion of the opening session of this expert group workshop. I am privileged to be able to share with you some thoughts on the significance of the theme of the workshop, namely: River/Lake Basin Approaches to Environmentally Sound Management of Water Resources. This theme is multidimensional in its policy implications for the central concern of UNCRD, i.e., how to promote local and regional development in an economically viable, sociopolitically acceptable, and yet environmentally sound manner in the face of rapid socioeconomic changes in developing countries.

The regional approach to planning and development has been widely adopted in many developing countries since the 1960s as a strategic instrument to facilitate national integration and development. Regional development, as conceived by many governments, is understood as a process of structural change pertaining to particular parts of a country, called "regions." The main thrust of this approach lies in its policy emphasis on the mobilization of local resources towards improving the quality of life, especially among the less privileged groups in society. This approach also aims at achieving spatially balanced development by way of creating effective linkages between urban and rural areas.

Water resources development has been viewed as one of the priority areas in regional development, particularly in the developing countries. This is primarily because water is the single most important factor determining the performance of productive activities as well as the quality of life. In addition, the range of water-based requirements is quite wide, including agricultural, industrial and domestic needs, energy production, fisheries, transportation, flood control, and outdoor recreation. Hence, an integrated approach has increasingly been adopted and elaborated with the aim of achieving interrelated development goals.

As the pace of socioeconomic changes accelerates in the developing countries, however, many river/lake basins have become increasingly susceptible to various pressures and forces which tend to give rise to a number of complex water management problems that cannot be dealt with solely in the context of specific water-related programmes and projects, but should be addressed in a broader socioeconomic context on a basinwide scale. At the same time, it has come to be recognized among policymakers and planners in developing countries that there is an urgent need to strengthen national capabilities to effectively respond to the complex policy issues involved in water resources development and management.

In perceiving the challenges we are facing, permit me to focus on four policy issue domains which, I believe, deserve special attention. These

are: (i) Promoting integrated management of land and water resources; (ii) facilitating community participation in water quality management; (iii) managing conflicts over the use of water; and (iv) integrating environmental and social concerns in the process of water resources development.

Promoting Integrated Management of Land and Water Resources

One of the common, and perhaps foremost concerns among regional planners and water resources managers in countries around the world is how to promote integrated management of land and water resources in a river or lake basin context. This concern has resulted from the recognition that watershed land-use practices have led to the problems of increased deforestation and soil erosion, which have, in turn, given rise to a variety of negative effects on the communities downstream, including accelerated siltation in reservoirs and riverbeds with adverse effects on irrigation and power production as well as the increased incidence and severity of flooding or drought. These watershed problems are more acute in developing countries where growing populations are exerting intense pressures on increasingly scarce land and water resources.

In response to these problems, a number of countries have recently begun to implement, on a large scale, programmes designed to promote the management of watersheds. The main thrust of these programmes has been to encourage upland farmers to adopt more appropriate watershed land-use practices with emphasis on slope stabilization and reforestation for the purpose of preventing off-site damages. The required measures for managing watersheds are already well known, but their implementation has been largely unsuccessful. The reasons for this may be many and varied, depending upon the prevailing social, economic, and political circumstances in which the programmes are brought into effect. But it appears possible to identify some common factors that have a strong bearing on the performance of watershed management programmes.

First, we have to pay special attention to the institutional factors that determine the behaviour of people within the watershed area. In many developing countries, most uplands and forests are defined as public properties, and the residents within them have limited rights to the land. Therefore, farmers in the watersheds are compelled to live and work under an extremely insecure situation as they are considered by the government to be illegal occupants. Under these circumstances, there is hardly any incentive on the part of upland farmers to undertake the required practices to manage watershed lands and conserve water. This points to the need for intensifying our effort to search for viable institutional systems that will assure the occupancy and use of watershed lands and at the same time encourage upland farmers to invest in future-oriented watershed management measures.

Second, it appears essential to understand the special feature of resource management in a watershed context. Under the prevailing social and institutional circumstances, the costs for watershed management are basically to be borne by upland farmers and residents, while most of the benefits accrue to populations downstream. Although reforestation and slope stabilization may be beneficial to upland farmers, the greatest benefit is captured by the downstream communities in the form of reduced

siltation in reservoirs and irrigation systems and/or in the form of reduced damage from flooding. Watershed communities therefore have little incentive to invest in watershed management. For this reason, it is crucial for water resource managers and regional planners to have a fuller understanding of the size and division of benefits and responsibilities between upstream and downstream communities. This understanding may lead to the development of institutional arrangements that will promote social interaction on a reciprocal basis between upstream and downstream communities, which may in turn lead to the establishment of a financial scheme that assists upland farmers in undertaking watershed management activities.

Third, it appears important to analyze the organizational aspects of watershed management. In general, formal responsibility for watershed management rests with forestry, soil conservation, water resource development, and power generation agencies. The roles of these agencies are usually defined according to physical variables related to forests, forest lands, soil, and water for the benefit of downstream communities. This sectoral pattern of organizational arrangements raises serious problems of coordination both at the plan formulation and implementation stages. At the same time, in order to achieve desired goals of watershed management, it is essential to ensure proper integration of various sectoral programmes activities commensurate with the specific conditions of the respective river/lake basins.

Facilitating Local Community Participation in Water Quality Management

Deterioration of water quality in rivers and lakes is another priority area of concern among regional planners and water resources managers. Water pollution becomes increasingly serious as the density of human activities intensifies with continued expansion of water-use. In semi-closed water systems such as lakes and reservoirs, the problem of water pollution is much more serious due to the fact that inflow pollutants accumulate in the water bodies. The social and economic implications of water pollution are many and varied, including the increased cost of water treatment for domestic use, damage to agriculture and fishery activities, and the reduction of recreational and aesthetic values.

In many respects, the problem of water quality deterioration is similar to that of watershed management. First, human activities upstream adversely affect downstream communities. Second, there is little incentive among the upstream water users to take account of the costs they are imposing upon the downstream water users. This uni-directional cause-effect relationship makes it quite difficult to effectively respond to the problem of water quality deterioration. An exception to this is the water-use practices along lake shore areas where water users are polluters and at the same time victims of pollution. Third, there is a great need to develop an organizational structure where sectoral agencies charged with water quality management can work together towards common goals within an integrated basinwide policy framework.

Perhaps the basic requirement for water quality management is to develop an institutional system whereby the responsibilities of water users for the adverse consequences they bring about for others are strictly observed on the basis of "polluter-pays-principle." Of course, this

institutional system has to be complemented by research and development in regulatory measures and appropriate technology for water pollution prevention.

One of the issues that often bothers water resources managers is how to judge what water is of good quality. Water quality requirements vary from one use to another. Judgment on the quality of water often involves culture-specific preferences and values. It is therefore theoretically not possible to determine the water quality requirements applicable to all water-use activities.

It would, however, be fair to assume that water which meets the following criteria is generally of good quality: (i) Water that can be used for drinking purposes after simple treatment; (ii) water that can be used for irrigation purposes without any treatment; (iii) water that assures the healthy growth of aquatic fauna and flora; and (iv) water that causes no harmful effect on human beings when aquatic life is used for food.

Water bodies which meet the above criteria ensure the normal functioning of aquatic ecosystems, and also tally with the common sense of good quality water. The basic goal of water quality management is therefore to maintain such quality standards in the water bodies, and in cases where water bodies do not possess such standards, efforts must be made towards improving water quality.

Today, a wide variety of scientific methods and indices have been developed and made available for purposes of measuring the quality of water. Water quality monitoring using such methods and indices, undertaken however precisely, does not automatically assure the improvement of water quality. Hence, suitable measures, both software and hardware, have to be developed using monitoring data, and operationalized in tackling the problems of water pollution.

The conventional approach to water quality management, which largely relies on such measures as the installation of waste water treatment plants coupled with the enforcement of effluent standards, has been successful in controlling the incidences of serious water pollution, such as those caused by industry. However, as past experiences reveal, this approach has been not so effective in achieving an overall improvement in water quality. This is primarily because non-point sources such as domestic waste water and effluents from farmland contribute a great deal to the deterioration of water quality in rivers and lakes. In addition, the technology and legal measures hitherto developed for water quality management are designed primarily to deal with point sources which are comparatively easy to control, while technology and the necessary measures required to deal with non-point sources have so far not been adequately developed.

In view of the complexity of water pollution problems caused by non-point sources, drastic policy measures may have to be adopted in order to effectively respond to them. A societal movement may also have to be initiated to transform lifestyle as well as methods of production so as to significantly reduce the total volume of effluent discharged into the water systems. This implies the need to create an institutional system that will encourage all water users, including individuals both in urban and rural areas, to participate in the process of water quality management. In this

connection, provision of relevant information is considered vital to enable water users to appreciate the problem structure of water pollution in relation to their lifestyle and productive activities.

Finally, it should be noted that the reduction of the absolute amount of water used by various sectors in a river or lake basin community would significantly contribute to the improvement of water quality. Reduction of water use, which could be achieved by way of promoting circular water-use or recycling of water, would lead to the reduced discharge of effluent. The water thus saved could be used for diluting contaminated water, thus facilitating the natural process of water purification. Hence, this approach would be effective not only in responding to the problems of water pollution but also in mitigating the problems arising from water shortages.

Managing Conflicts Over the Use of Water

The third policy issue domain to which both water resources managers and regional planners have to direct their attention is concerned with the management of conflicts over the use of water. As the densities of population and industries increase in a river or lake basin, competition or sometimes conflict among different water uses or users intensifies.

In general, three types of conflict over water may be identified. The first type of conflict (i.e., quality conflict) is found where one activity makes the quality of water unfit for use by, or causes damage to, other activities. The second type of conflict (i.e., quantity conflict) occurs where excessive use of water by one entity or sector precludes other uses. The third type of conflict (i.e., mixed quality and quantity conflict) is found in highly developed metropolitan areas where the supply-demand of water is very tight. These conflicts emerge between sectors in the same area or between upstream and downstream communities.

Resolution of these conflicts usually involves a political process guided by the country- or region-specific culture. At the same time, government plays a vital role in preventing and mitigating such conflicts. For instance, additional public investments may be made to increase water supply so as to respond to the water quantity conflicts, or policy efforts may be made to tighten regulatory mechanisms coupled with increased public investment to mitigate the severity of conflicts arising from water quality deterioration.

These policy responses are effective only in situations where the rule of water use as well as the rights and responsibilities of water users are clearly established and socially observed. In many developing countries, however, the rule of water use is not clearly defined. In many cases, customary or traditional systems persist at the local community level in parallel with formal legislation at the national level. Frequently there is no relationship between what legislation requires and what actually occurs. Under these circumstances, the use of water tends to be monopolized by those who have access to capital and technology without due regard to the social and economic repercussions on others, thus causing social conflicts among water users. A case in point is the proliferation of pens and cages for fish cultivation in Laguna Lake in the Philippines, which has had adverse effects on the livelihood of traditional fishermen who live on open lake fishing. This has resulted in a serious conflict

between traditional fishermen and fishpen cultivators.

In order to avoid or resolve such conflicts, it may be indispensable to develop an institutional framework that defines the rights and responsibilities of water users. The customary systems for water use that prevail at the local community level may also have to be formally recognized as legitimate elements within the institutional framework. At the same time, the accountability of government agencies concerned needs to be improved as they are expected to play a vital role in managing conflicts over water in developing countries.

Integrating Environmental and Social Concerns into the Process of Water Resources Development

The fourth and last policy issue domain I would like to highlight is concerned with the environmental and social effects of water resources development. As revealed by many country experiences, the past planning approach for water resource development has tended to concentrate on major construction projects such as dams and reservoirs, with little consideration being given to environmental and social effects on the basin communities. Modification of a river system by construction of a man-made lake, coupled with the impoundment of a large extent of land above the dam, causes a variety of other changes in the river basin environment.

Although benefits accruing from water resources schemes are many and in many cases substantial, a whole series of problems are associated with the benefits, including forced resettlement and its associated problems of adaptation to environmentally different sites on the part of the displaced population, the aggravation and spread of water-borne diseases, the spread of aquatic weeds, and the changes of hydrological systems resulting in disruption of freshwater fisheries.

In view of these adverse environmental and social effects of river basin development projects, increasing emphasis is now placed on preventive planning based on environmental impact assessment (EIA). This approach, if properly applied, may contribute to the significant reduction of the majority of ecologically adverse effects. However, many policy issues are yet to be resolved, such as the problem of forced resettlement and the question of whether a large-scale water resources development scheme is more meaningful and beneficial to the society as a whole when compared to a series of well-linked small-scale schemes. In this connection, allow me to specifically focus on two policy issues.

(1) Implementation of EIA

The first policy issue is concerned with the question of how to ensure proper implementation of environmental impact assessment. It is generally pointed out that the effectiveness of EIA implementation in developing countries is low on account of the fact that: (i) EIA is implemented only to meet the requirements of funding agencies; (ii) impact mitigation measures are not properly implemented; (iii) EIA is undertaken at a stage where the results of EIA cannot be reflected in project decisions; (iv) institutions for environmental management are weak, together with the limited availability of trained personnel for EIA; and (v) data available for EIA is poor and insufficient.

There appear to be many aspects of an effective EIA implementation. They may be grouped into three areas:

(a) Procedural compliance is recognized as a major vehicle for an effective EIA implementation. This refers to the procedures used by an agency to follow what is prescribed in the legislation, rules, or requirements of a formal EIA programme. Project planners and EIA personnel are expected to act commensurate with the step-by-step requirements for a complete EIA.

(b) Technical completeness is another important aspect of an effective EIA implementation. EIA itself is a relatively recent and technically oriented method, especially for developing countries. It requires considerable professional involvement of technical staff in the project planning process. The judgments of the planners, which stem from their professional knowledge and ethical standards, may constitute the major factor which leads to improved EIA implementation. The competence and conscience of the technical personnel, methods of assessment adopted, as well as the scientific techniques employed in the EIA process, are all vital to an effective EIA implementation.

(c) Influence on decision making: The third major aspect of effective EIA implementation can be referred to as influence on decision-making. It is widely recognized that EIA is a procedure which opens up the decision making process for review by the public and any concerned parties. Since it involves the weighing of various predicted impacts to evaluate alternative actions, the EIA process will be complete and effective only if outside inputs can be incorporated into the planning process. Consideration of alternative plans, adoption of outside inputs, and adjustment of the original proposal in relation to reasonable comments are all necessary conditions of an effective EIA implementation.

(2) Planning and implementation of involuntary resettlement schemes as integral parts of regional development

The most difficult policy issue involved with water resources development projects is the question of how to deal with the problems of forced resettlement. Although compulsory resettlement is by no means desirable, there are many public projects such as dam construction which inevitably involve the displacement of people. In general, these projects are conceived as essential parts of a national development plan, and in many cases, alternatives are hardly available. They frequently come into conflict with interests of those local communities affected by the projects. Therefore, in order to ensure that their effective implementation, preventive measures must be taken at an early stage in the project planning process, so as to reconcile conflicting interests as well as to avoid or minimize the adverse effects of forced resettlement.

Those people who suffer from the adverse effects of the project are rarely those who enjoy the project benefits. Forced resettlement often results in the impoverishment of the displaced people. Hence, it is the decision makers and planners involved in the projects who must be responsible for providing resettled population with opportunities to restore and improve their productive activities and living standards.

On the basis of an extensive review undertaken by the World Bank of the past resettlement experiences in various countries, a number of lessons have been drawn, among others: (i) Much attention must be directed to the development of a policy framework as well as operational mechanisms and procedures that are sensitive to the problems and issues associated with forced resettlements; (ii) the quality of planning and implementation of resettlement schemes must be improved, particularly in terms of their scope and contents, taking due account of the conditions and needs of displaced population; (iii) increased efforts must be made to develop economically and socially viable options for improving the productive activities of displaced population; (iv) mechanisms must be developed to ensure effective participation of the resettled population in the planning process; and (v) an effective system of monitoring and evaluating the implementation of resettlement schemes must be institutionalized. It appears that all these lessons point to the need to deal with issues and problems associated with forced resettlement within an integrated policy framework of local and regional development.

Concluding Remarks

What I have just mentioned represents the challenges we are facing in promoting environmentally sound management of water resources in a river/lake basin context. Over the next few days, the workshop will present resource papers on selected topics relevant to the main theme of this workshop as well as a series of case studies from a variety of countries. The region-specific perspectives offered in these case studies are the basis for an in-depth understanding of some of the policy issue domains just outlined.

In closing my address, let me reiterate the major questions which everyone in the workshop is expected to keep in mind in exchanging views and ideas. They are:

- (1) What policy actions are required to effectively respond to the selected policy issues in water resources management in terms of management strategies, policy tools and instruments for putting the strategies into effect, and institutional and organizational arrangements for policy formulation and implementation?
- (2) What institutional and organizational arrangements are required to promote integrated management of land and water resources in a river/lake basin context?
- (3) How can we effectively deal with conflicts over water among competing users? What mechanisms are required to avoid or resolve such conflicts?
- (4) What mechanisms and procedures are required to ensure proper integration of environmental and social effects of water resources development?
- (5) What mechanisms are required to facilitate local community participation in the process of water resources management? And finally;

(6) What specific strategies and actions are needed in order to strengthen national capabilities in water resources management?

The deliberations at the plenary sessions of the workshop will, I am sure, pave the way for concrete recommendations of benefit to decision makers, planners, managers, and professionals involved in development planning and water resources management. We at the secretariat of the workshop will make every effort to see that the central message of the workshop's findings are disseminated to interested national and international organizations. With this pledge, in anticipation of a very stimulating exchange of ideas and views, I wish the workshop every success.

Thank you.

KEYNOTE ADDRESS

MANPOWER DEVELOPMENT AND TRAINING IN LAKE ENVIRONMENT MANAGEMENT

Michio Hashimoto
Vice Director-General
ILEC Foundation

Ladies and gentlemen, it is my pleasure to address you this morning on the occasion of the opening session of the Second Expert Group Workshop on River/Lake Basin Approaches to Environmentally Sound Management of Water Resources: Focus on Policy Responses to Water Resources Management Problems and Issues.

Scope of Education and Training

I am requested by the workshop secretariat to deliver a keynote speech, focusing specifically on training and educational aspects of the subject of this Expert Group Workshop. I will not touch on topics related to formal education in higher educational institutions, but focus on training and education for professionals, administrators, decision-makers and the general public who are involved in, and/or concerned with, the subject of this Expert Group Workshop.

At the November 1986 workshop organized jointly by ILEC, UNEP and UNCRD, I had a chance of presenting a short paper on education and training in the context of "Environment and Development," and introduced a macro framework for identifying the scope and target groups of training in environmental planning and management for local and regional development (table 1). According to this framework, five target groups of education and training are identified, namely: policy makers, planners, administrators, technical officers, and scientists.

When we consider training in the subject of "Environmentally Sound Management of Water Resources: Focus on Policy Responses to Water Resources Management Problems and Issues," the scope of training for the respective target groups may remain more or less the same as those given in the macro framework, but the subject areas to be dealt with should be made more specific to the "River/Lake Basin Approaches to Environmentally Sound Management of Water Resources".

The Three-Year Case Studies

Last year, UNCRD/ILEC/UNEP initiated a three-year case study project with a view to working out, on the basis of the analysis of the experiences in the nine case study regions, a set of guidelines on the general and common as well as country- or region-specific strategies and directions to be adopted for promoting environmentally sound management of water resources.

A review of the first-year case studies has identified three types of water resource management issues. Those are:

- (1) Environmental and social effects associated with water resources development and management;
- (2) Environmental and social effects resulting from land-water use interaction; and
- (3) Conflicts of interests among water users arising from water use and allocation.

On the other hand, approaches and policy responses required to deal with these water resources management issues are classified into two categories. These are;

- (1) Management aspects, including:
 - a. Institutional structures and mechanisms
 - b. Planning/organization
- (2) Technical aspects, including:
 - a. Environmental impact assessment
 - b. Monitoring
 - c. Technical management

Therefore, training and education will be discussed, taking account of this matrix between the policy issues on one hand and the required policy responses on the other (table 2).

An Overview of the Basinwide Approach

Since the river/lake basin approach to environmentally sound management of water resources involves a variety of diversified but interrelated factor domains composed of numerous elements and their dynamic relations, let us try to have a brief overview of the factor domains and their dynamics (chart 1).

Institutional Processes for Environmental Considerations

Meanwhile, it is important to have an appropriate orientation of institutional structures and processes required to promote environmentally sound management of water resources. It is also crucial to identify the phases of interaction among laws, regulations, procedures, technical requirements, operations, and social relations at the various stages and processes along the institutional structures and dynamics. A diagram illustrating these relationships is given in chart 2.

It is important to remember that the three-year case study is designed not merely for research sake but for working out a set of general as well as specific conclusions that will enable us to produce, towards the end of the three-year study, a set of recommendations for promoting river/lake basin approaches to environmentally sound management of water resources management. It is also important to remember that our aim is to produce, on the basis of our learning from the three-year study, a set of relevant materials and information that can be used for training and education purposes at the respective case study locations, as well as for further promoting the planning and implementation of environmentally sound management of water resources.

In this connection, I am pleased to inform you that ILEC is planning to produce after 1990, on the basis of the valuable outcome of the three-year case studies, a guide-book on the subject of social and economic issues for lake environment management, as a product of the joint programme among UNCRD/ILEC/UNEP.

Three Important Experiences

Since 1987, we have had three important experiences in the field of water resources development and management.

The first one is the case of Lake Toba in north Sumatra of Indonesia, where the water level had been drawn down to such an extent that was far short to the minimum accepted water level. Hydroelectric power generation had to be cut down by 20 per cent. At the same time, the operation of an aluminum smelter had also been cut down by 20 per cent. In addition to the decrease in rainfall, there were some controversial issues involved with the causal relation.

The siting of a pulp factory on the upstream of the regulator of the hydroelectric power plant has also brought about environmental concerns. In a sense, this is an outcome of development. Watershed management has also come to be seen as an important challenge for future water resource management.

The second experience is the case of recent suspension of the Nam Choan dam project. The Thienchai Committee has concluded that very little is known about the environmental impact of the project in order to make a concrete judgment.

The third experience is the case of Nakanoumi Lake in Japan. In spite of the completion of land reclamation and water gate construction to change salt water to fresh water with a total investment of 99 billion yen in the past few decades, it was decided to suspend the test closure of the water gates in response to the opposition of environmentalists and fishermen groups supported by LDP, the leading party of Japan.

An in-depth analysis of these three experiences would provide important implications to be taken into account for considering future policies of water resources development and management. It should be also noted that the problems associated with all the three cases can be attributed to the social and economic impacts of water resources development and management. At the same time, they reveal that the complex institutional mechanisms and processes that were involved in these cases were closely linked with a variety of complex scientific and technical findings and judgments.

A New Design of Training and Education Programme

After the completion of our three-year case study, it is expected that programmes for training and education in river/lake basin approaches to environmentally sound management of water resources will eventually be developed, in order for us to go one step further.

The training programmes we are searching for should be those that enable practitioners to understand and appreciate the interface between technical and scientific aspects and institutional and policy aspects involved in the various phases of development and management of water resources.

It is clear that the task of promoting environmentally sound development and management of water resources requires the involvement and participation of a wide range of government agencies, experts from a variety of scientific and technical disciplines, and the general public with different interests and concerns. It also requires a long-term perspective, as well as a better understanding of the complex social and economic interaction between communities upstream and upstream, and of the forces and pressures cutting across the watershed boundaries. In the case of international river/lake basins, water resources management issues are not confined to the individual countries, but have to be addressed from a wider international perspective.

Design and formulation of training and education programmes in water resources management should therefore take due account of these complex issues involved. At the same time, differential approaches have to be adopted with an appropriate sense of orientation, co-ordination and integration for identifying target groups of training, as well as for the preparation of training inputs and materials in accordance with the requirements of each training programme. Training inputs concerning general and specific policy issues; theories, principles and practices; and required knowledge, wisdom and skills should be carefully differentiated and then assorted commensurate with specific training requirements.

Systems Approach with An Understanding of Behavioral Science

The three-year case study will generate both quantitative and qualitative information concerning the state of the art of water resources management in the respective river and lake basins. This will provide a concrete basis upon which we can analyze the jurisdictions, functions, responsibilities, and planning and managerial capacities of agencies involved in water resources management, which would in turn enable us to identify in a situation specific manner manpower development requirements.

In designing training programmes, special attention must be given to the perceptual aspect of water resources management. It should be made clear that there is a wide difference in perception over the goals of water resources management among natural resource manager, development planners, administrators, scientists, and the general public. This aspect should be deliberately incorporated in training programmes.

In addition to the systems engineering approach, due attention should be given to the need for understanding the behavioral aspect of water resources management in formulating training programmes in river/lake basin approaches for environmentally sound development and management of water resources.

Concluding remark

This second Expert Group Workshop in Bangkok has a number of important

tasks to be accomplished. One is to explore a new perspective of manpower development and training in river/lake basin approaches to environmentally sound development and management of water resources.

We are also expected to deliberate on, and identify, ways and means to promote integration between institutional organizational strategies and technical aspects of water resources management, primarily on the basis of the nine case studies.

I believe the outcome of this workshop will form a concrete step towards the achievement of environmentally sound management of inland water and sustainable development.

Thank you for your kind attention.

PROGRAMME

Second Expert Group Workshop on River/Lake Basin Approaches to
Environmentally Sound Management of Water Resources:
Focus on Policy Responses to Water Resources Management Issues and Problems

VENUE

Part I: 16-21 January 1989--Ambassador Hotel, Bangkok
Part II: 23-25 January 1989-- JB Hotel, Hat Yai

ORGANIZED BY

United Nations Centre for Regional Development
International Lake Environment Committee Foundation
United Nations Environment Programme
National Environment Board, Government of Thailand
Prince of Songkla University, Thailand

NOTES FOR PARTICIPANTS

The workshop secretariat has taken the liberty of formulating the workshop programme as well as assigning participants to serve as chairpersons, discussants, and/or rapporteurs. In order to be both efficient and fruitful, your kind cooperation and assistance, particularly in the following, is greatly appreciated:

- (1) Each chairperson is kindly requested to moderate the session in accordance with the time schedule given in the programme;
- (2) Each speaker (or each group of speakers for case study report presentation) is kindly requested to restrict his/her presentation to a time allotment of no more than 40 minutes and to highlight the major thrusts of his/her paper or report;
- (3) Each speaker is encouraged to utilize visual aids such as OHP and/or slides. Transparency sheets and colour pens are available at the workshop secretariat;
- (4) Each discussant is kindly requested to restrict his/her presentation to a time allotment of no more than 10 minutes;
- (5) Each speaker/discussant is kindly requested to prepare a summary of his/her presentation/discussion (500-1,000 words) and submit it to the workshop secretariat for typing by the beginning of the first session of the following day; and
- (6) Each rapporteur is kindly requested to prepare a rapporteur's report (1,500-2,000 words) and submit it to the workshop secretariat by end of the workshop.

Part I: Policy Responses to Water Resources Management Issues

16 January (Mon)

9:00- 9:30	Registration MC: Sittiporn Kajornatiyudh
9:30-10:00	Opening Session for Part I of the Workshop Opening Speech: Hidehiko Sazanami Director, UNCRD Opening Speech: Tatu Kira Chairperson, Scientific Committee ILEC Foundation Opening Speech: Kazunobu Onogawa Deputy Representative UNEP Regional Office for Asia and the Pacific Opening Speech: Sanga Sabhasri Permanent Secretary Ministry of Science, Technology and Energy
10:00-10:30	Coffee/tea break
Session 1: Keynote Addresses	
10:30-11:30	Chairperson: Arthorn Suphapodok Regional Development and Water Resources Management: A River/Lake Basin Approach by Hidehiko Sazanami Manpower Development in the Field of Lake Environment Management by Michio Hashimoto
11:30-13:30	Lunch break
Session 2: Strategies for Water Resources Management in a River/Lake Basin Context	
	Chairperson: M. M. Hufschmidt Rapporteur: A. Attanayake
13:30-14:30	A Strategic Concept of River/Lake Basin Management and Planning by Ken'ichi Nakagami Discussant: D. S. McCauley
14:30-15:30	Methodology and Application of Watershed Classification in Thailand by Kasem Chunkao

Discussant: H. Harasawa
15:30-16:00 Coffee/tea break
16:00-17:00 Risk Management in Developing Countries
by Masahisa Nakamura
Discussant: F. P. Fellizar
18:00- Reception at the Ambassador Hotel

17 January (Tue)

**Session 3: Policy Responses to Environmental and Social Problems Resulting
from Water-Land Use Interfaces**

Chairperson: H. Hashimoto
Rapporteurs: D. Mshila
M. Ando

8:30- 9:30 Institutional and Organizational Mechanisms for
Integrating Land Use Decisions with Water Resources
Management
by Maynard M. Hufschmidt
9:30-10:00 Coffee/tea break
10:00-11:00 Institutional Analysis for Water Resources Management in
Dianchi Basin, China
by Zhang Jiqiang
11:00-12:00 Policy Response to Water Resources Management Issues and
Problems: Kenya's Lake Victoria Basin
by Stephen M. Machooka
12:00-13:30 Lunch break
13:30-14:30 Consideration of Management System and Consensus Forming
in River Basin Management II: An Analysis of the Roles
and Functions of the Yahagi River Method
by R. Naito, and Y. Niki
14:30-15:00 Coffee/tea break
15:00-16:30 General Discussion: Identification of Issues Arising
from the Day's Presentations and Discussions
Discussants: M. M. Hufschmidt
E. P. Pacardo
A. B. Jauro

18 January (Wed)

Session 4: Policy Responses to Conflicts Among Competing Water Uses/Users

Chairperson: K. Nakagami
Rapporteurs: F. R. Francisco
K. Oya

8:30- 9:30 Institutional Arrangements for Water River/Lake Basin Management with Emphasis on Managing Conflicts
by James E. Nickum

9:30-10:00 Coffee/tea break

10:00-11:00 Basin Approach to Laguna Lakewater Resources Management: Policy Responses
by Enrique P. Pacardo F. Francisco, and F. P. Fellizar

11:00-12:00 Water Resource Management in the Songkhla Lake Basin: Focus on the Proposed Salinity Barrier
by Surin Setamanit, Sunthorn Sotthibandhu, and
Wiwatana Pratoomvieng

12:00-13:30 Lunch break

13:30-14:30 Comprehensive Development of Lake Kasumigaura and its Environmental Management
by Hideo Harasawa and Takehiko Fukushima

14:30-15:00 Coffee/tea break

15:00-16:30 General Discussion: Identification of Issues Arising from the Day's Presentations and Discussions

Discussants: J. E. Nickum
A. Attanayake
Lim Teik Keat

19 January (Thu)

Session 5: Policy Responses to Environmental and Social Effects of Water Resources Development Schemes

Chairperson: C. H. D. Magadza
Rapporteurs: J. M. Branski
I. Suzuki

8:30- 9:30 Policy Responses to Environmental and Social Effects of Water Resources Development Schemes
by Saburo Matsui

9:30-10:00	Coffee/tea break
10:00-11:00	Environmental Impact Assessment for the Porteira Hydroelectric Project by Joel Mayer Branski
11:00-12:00	Policy Responses to Water Resources Management Issues and Problems: A Case Study of Saguling Dam and Its Watershed, West Java, Indonesia by Herman Haeruman
12:00-13:30	Lunch break
13:30-14:30	Lake Biwa Case Study: Evolution of the Lake Biwa Water Resources Management and Environmental Conservation Policies by K. Imai, M. Akiyama, and M. Nakamura
14:30-15:00	Coffee/lunch break
15:00-16:30	General Discussion: Identification of Issues Arising from the Day's Presentations and Discussions Discussants: S. Matsui M. Nakamura Ho Yueh Chuen

20 January (Fri)

Session 6: Group Discussion

8:30-12:00	Group Discussion
	Group I: Policy responses to environmental and social problems resulting from water-land use interfaces
	Chairperson: M. M. Hufschmidt Rapporteur: F. P. Fellizar
	Group II: Policy responses to conflicts among competing water uses/users
	Chairperson: J. E. Nickum Rapporteur: F. R. Francisco
	Group III: Policy responses to environmental and social effects of water resources development schemes
	Chairperson: S. Matsui Rapporteur: J. M. Branski

Group IV: Manpower development in the field of water resources management

Chairperson: M. Hashimoto
Rapporteur: E. P. Pacardo

12:00-13:15 Lunch break

13:15-14:45 Group Discussion (continued)

14:45-15:00 Coffee/tea break

15:00-16:30 Presentation and Discussion of the Group Reports

Chairperson: Sunthorn Sotthibandhu

Group I
Group II
Group III
Group IV

16:30-17:15 Closing Session (Part I)

Closing Speech: Arthorn Suphapodok
Deputy Secretary General, ONEB

Closing Speech: H. Sazanami, Director, UNCRD

21 January (Sat)

8:30-17:00 Field visit to Chao Phraya River

22 January (Sun)

Move from Bangkok to Hat Yai

**Part II: In-depth Review of Strategies and Approaches to Water Resources
Management: Focus on the Songkla Lake Basin, Thailand**

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23 January (Mon)

8:30- 9:00 Registration

9:00- 9:30 Opening Session for Part II of the Workshop
 MC: Visit Kasempimolporn, PSU

 Opening Speech: Tatuo Kira, Chairperson
 Scientific Committee, ILEC Foundation

 Opening Speech: Chid Nilpanich
 Governor, Songkhla Province

 Opening Speech: Phasook Kullavanij
 Rector, Prince of the Songkhla University

9:30- 9:45 Coffee/tea break

Session 7: Presentation and Discussion of Review Papers

9:45-11:45 Session 7-1: Analysis of Environmental and Social Effects of
 Water Resources Development Schemes

 Chairperson: Edy Brotoisworo
 Rapporteur: Pichai Taneerananon

 Environmental and Social Effects of the Proposed
 Salinity Barrier in Songkhla Lake
 by Chatchai Ratanachai and Vachira Lheknim

 Development and Management of Brackish Water Zones:
 A Review of the Land Reclamation and Salinity Barrier
 Project in Lakes Nakaumi and Shinji, Japan
 by Takehiko Hobo

 Discussant: F. P. Fellizar

11:45-13:00 Lunch break

13:00-15:00 Session 7-2: Lake Basin Approach to Water Quality Management

 Chairperson: A. B. Jauro
 Rapporteur: Chatchai Ratanachai

 Water Quality Management for SLB Development
 by Pichai Taneerananon

 Comprehensive Development of Lake Kasumigaura and Water
 Quality Management
 by Hideo Harasawa

Discussant: E. P. Pacardo

15:00-15:20 Coffee/tea break

15:20-17:20 Session 7-3: Voluntary Presentations

Chairperson: S. M. Machooka
Rapporteur: Sunthorn Sotthibandhu

Feasibility Study of Flood Monitoring System
by Wanai Sae-chew

Accelerated Mahaweli Development Programme, Sri Lanka
by A. Attanayake

18:30-20:30 Reception

24 January (Tue)

8:30- 9:30 Briefing on the Field Visit
by Panichi Tinnimit

10:00-18:00 Field visit around Songkhla Lake (Ranote Irrigation
Project, Kuku Nature Reserve, Deep-sea Port)

25 January (Wed)

8:30- 9:30 Session 7-4: Water Resources Management in a Lake Basin
Context

Chairperson: E. P. Pacardo
Rapporteur: Chris H. D. Magadza

Watershed Management as Related to Songkla Lake Basin
by Kasem Chunkao

Discussant: M. Akiyama

9:30- 9:45 Coffee/tea Break

9:45-12:00 Panel Discussion

Theme: Development and Management of Brackish-Water
Areas -- Lessons from the Songkla Lake Basin

Chairperson: Kasem Chunkao
Rapporteurs: Sunthorn Sotthibandhu
S. Matsui

Discussants: F. P. Fellizar
K. Nakagami
J. E. Nickum
Surin Setamanit

12:00-13:30

Lunch break

13:30-14:30

Closing Session for Part II of the Workshop

Chairperson: Siripongse Sribhibhadh
Rapporteur: Sunthorn Sotthibandhu

Presentation of the Outcome of Part II of the Workshop

Speakers: Sunthorn Sotthibandhu
S. Matsui

Closing Speech: Tatuo Kira
Chairperson, Scientific Committee
ILEC Foundation

Closing Speech: Siripongse Sribhibhadh
Vice President
Prince of Songkla University

List of Papers

1. Hidehiko Sazanami Keynote Address:
Regional Development and Water Resources
Management: The Need for, and Promise of,
a River/Lake Basin Approach
2. Michio Hashimoto Keynote Address:
Manpower Development and Training in
Lake Environment Management
3. Ken-ichi Nakagami A Strategic Concept of River/Lake Basin
Management and Planning
4. Nipon Tangtham
Kasem Chunkao Methodology and Application of Watershed
Classification in Thailand
5. Masahisa Nakamura Policy Analysis Perspectives in Environmental
Planning and Management in Developing
Countries: Risk Analysis Issues and
Perspectives in Developing Countries
6. Maynard M. Hufschmidt
David S. McCauley Institutional and Organizational Mechanisms
for Integrating Land Use Decisions with
Water Resources Management
7. Liu Hongliang
Zhang Jiqiang Institutional Analysis for Water Resources
Management in Lake Dianchi Basin
- A Case Study Report on River/Lake
Approaches to Water Resources Management:
Phase II
8. S. M. Machooka
David L. Mshila
Morris A. Omondi Focus on Policy Responses to Water Resources
Management Issues and Problems:
Case Study on the Kenya's Lake Victoria Basin
9. Yahagi River Team:
Renzo Naito
Aichi Sano
Ryoji Harashima
Yoshiro Niki Consideration of Management System and
Consensus Forming in River Basin Management
Part II
-- An Analysis of the Roles and Functions
of the Yahagi River Method
10. James E. Nickum
K. William Easter Institutional Arrangements for River/Lake
Basin Management with Emphasis on
Managing Conflicts
11. Francisco P. Fellizar Jr.
Enrique P. Pacardo
Frolo R. Francisco
Ma. Victoria O. Espaldon
Dolora N. Nepomuceno
Celso F. Espaldon Policy Responses to Fishery Conflict in
Laguna Lake: A Case Study

12. The Thai Case Study Team The Development Planning of the Songkhla Lake Basin with Particular Reference to the Proposed Salinity Barrier Project
13. The Kasumigaura Study Team: Comprehensive Development of Lake Kasumigaura and Its Environmental Management
 Kohji Muraoka Part III. Policy Responses to Kasumigaura Comprehensive Development
 Morihiro Aizaki Part IV. Limnological and Socio-economic Comparison with Laguna Lake and Lake Songkhla
 Takehiko Fukushima
 Hideo Harasawa
 Yasuo Kawaia
 Masao Yokota
 Yukiyoshi Fukazawa
14. Saburo Matsui Policy Responses to Environmental and Social Effects of Water Resources Development
15. J. M. Branski Environmental Impact Assessment for the Porteira Hydroelectric Project
 J. P. de Avila
 R. L. L. Lopes
 A. J. T. Goncalves, J. G. Tundisi
16. Herman Haeruman Js. Policy Response to Water Resources Management Issues and Problems: Case Study of Saguling Dam, West Java, Indonesia
 Edy Brotoisworo
 Doddhy Poetranto
 Sudaryono, Tina Artini,
 Wiwik Wikoyah, Arief Yuwono
17. Koichi Imai Lake Biwa Case Study of 2nd Year -- Evolution of the Lake Biwa Water Resources Management and Environmental Conservation Policies
 Tukihiro Kondo
 Yoji Ito
 Taichiro Uda
 Takashi Otsuka, Shigekazu Ichiki
 Masahisa Nakamura, Michio Akiyama
 Kiyoshi Nomura, Motokazu Ando
18. Vachira Lheknim Ecological Effects of the Proposed Salinity Barrier in Songkhla Lake: A Review
 Pimonpan Leelawathanagoon
19. Chatchai Ratanachai Social Impacts of the Proposed Salinity Barrier in Songkhla Lake: A Review Paper
 Rappepun Suwannatachote
20. Takehiko Hobo Development and Management of Brackish Water Zones: A Review of the Land Reclamation and Salinity Barrier Project in Lakes Nakaumi and Shinji, Japan
21. Pichai Taneerananon Water Quality Management for Songkhla Lake Basin
 Narong Na Chiangmai
 Sunchai Klinpikul
 Winai Sae-Chew
22. Kasem Chunkao Watershed Management as related to Songkhla Lake Basin

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Somsak Boromphanarat	
Reungchai Tanasakul	
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Wilaiwan Boromthanasarat (Ms.)	
Winai Sae-Chew	

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(including partial participants)

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