

SECTION 5

CONCLUSIONS AND RECOMMENDATIONS

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5.1 Conclusions

The management of integrated land/water ecosystems of the lake environment requires a comprehensive identification and appreciation of the social, cultural and economic issues involved (Kada, section 2.1). An understanding of the interdependency of various elements based on the natural and social history of the environment of lakes and reservoirs is a prerequisite for good management.

The planning and implementation of water resource developments and management policies is, however, influenced by the wide range of perceptions and interpretations of particular issues by the interest groups involved (Nakagami, section 2.2). Moreover, competition and even conflict between communities, social groups and sectoral human activities over the use of water resources further complicates the management process. Such conflicts include those between agriculture and fisheries, up-stream and down-stream areas, local versus regional versus national interests and so on.

The local population and NGOs have an important role to play in water resource planning and management. Environmental and other pressure groups from outside the lake/reservoir or water development area can also play a key role by requesting further consideration of environmental matters and modification or suspension of development projects where unacceptable environmental effects can be anticipated. The case of Lake Shinji in Japan provides an example of how environmental groups can effectively participate in the decision-making process to prevent environmentally harmful projects from taking place. NGOs can also make a major contribution by functioning as a mediator to correct the sometimes biased power balance between pro- and anti-development interests groups. International NGOs are becoming increasingly involved in lake/reservoir environmental management issues (Jackson and Eder, section 2.3, Sendama, section 4.1).

A conceptual framework for the composition and dynamics of water resource management (Hufschmidt and McCauley, section 3.1) is an important part of the water resource planning process and provides a useful background when overviewing the problems posed by lake/reservoir management. Another prerequisite for effective planning, design and management of sustainable water resources is the availability of adequate and reliable data (Biswas, section 3.2). Unfortunately, at present, managers of lakes and reservoirs around the world have in many cases limited data on which to base their decisions. The mass media can play an important role here by providing a timely and useful analysis of the content of the information produced and its relevance to the decision-making process. In addition, education and information programs can work to raise the awareness of local citizens in relation to the quality of the lake environment and its importance.

When planning, managing and monitoring water resource developments it is very important to use the most up-to-date technology and scientific knowledge. However, it is also necessary to refer to traditional practices related to integrated land-water systems and their potential modern applications (Löffler, section 3.3). Public policy decisions for investment should be analyzed in a social benefit and cost analysis framework (see 3.4, Dixon). Alternative projects, design formulations and management strategies can be developed through the consideration of various options for cost allocation and sharing related to water resource development planning and implementation (Easter and Waelti, section 3.5). Furthermore, economic principles concerning the efficiency of resource allocation and social principles of equity, in the context of the distribution of benefits and costs related to water resource development and management, play an important role in determining the issue of cost sharing.

In the past significant economic and social losses have been incurred by communities in close proximity of major water resource developments. Large dam construction projects have failed, in some cases, to bring about anticipated major improvements in the socio-economic conditions of the local population. This has been clearly shown with the papers on African dams (Sendama, section 4.1), on compensation in Japan (Matsui, section 4.2) and on the problems of involuntary resettlement (Cernea, section 4.3). Many of the costs of dam construction and water resource developments, in general, have often not been correctly reflected in the project economic analysis and planning process. There is a lack of basic research on these problems and no clear social policy framework for water resource development projects.

Manpower development, recruitment policies and programs are vitally important at the project implementation and operation stages. Infrastructural development, project construction and operation can be achieved smoothly if capable manpower can be recruited. In the case of projects where bilateral assistance is involved a major weakness has been the failure to adequately provide funds for the operation and maintenance of the project once construction and installation is completed.

The issues related to brackish lakes were presented in four of the eleven lake profiles (Lakes Shinji/Nakaumi, Songkhla, Laguna and Kasumigaura) and in one of the main papers (see Harasawa, section 4.4). These lakes have very particular characteristics and the problems and experiences of brackish water lakes and desalinization projects are well documented in the papers presented in this volume. In addition, the other seven profiles show the range of socio-economic factors affecting lakes and reservoirs throughout the world and some of the associated lake/reservoir environmental management issues. Although each case is unique some interesting similarities can be observed for different stages of development and with a variety of different political, economic, cultural and social backgrounds.

5.2 Recommendations

The range of possible recommendations based on the papers included in this volume is very wide. Consequently, this section seeks merely to highlight some of the most important points raised. These are as follows;

[1] Alternative options for planning and management strategies for the lake environment should be derived through the identification of the different perceptions, conflicting interests and policies among the individuals and organizations involved.

[2] Policy decisions in relation to water resource developments and investment should be analyzed in a benefit/cost analysis framework.

The policies for cost allocation and cost sharing should be critically examined based on the criteria of economic efficiency, social equity and political feasibility. Guidelines should be developed to cover these matters with consideration of the tradeoffs which may be necessary.

[3] A more long-term view, one that includes the socio-economic costs, needs to be applied when determining the financial needs of the project plan. In addition, local agencies (with sufficient funding) need to be set up to manage the development project from the initial design stage, through implementation to operation and maintenance. If possible, administrative, management and technical functions should be delegated to these agencies.

[4] Public participation procedures are an essential part of the development process and of the integration of social, cultural and economic factors into policy-making. Farmers, fishermen, villagers, lake-shore residents and other water resource users, and those people affected by development projects should be encouraged to participate in the planning and design of local projects and in policy development.

[5] Institutional channels should be set up to handle local complaints and for the arbitration of pollution disputes within a lake/reservoir environment as a transboundary zone.

[6] Effective monitoring systems (hard and software) need to be developed to cover not only the physical quality and quantity of the water but also socio-economic and cultural parameters. The monitoring programs themselves should also be subject to periodic evaluation in terms of cost-effectiveness, data priorities, feasibility and sustainability.

[7] Environmental education programs should be targeted at schools, community groups and other pressures groups so as to increase the local citizens' ability to participate in the water resource development process.

[8] A legal framework for the rights of land ownership/tenure, water use, timber and fishing rights etc., needs to be developed by the national administrations involved. This should include detailed consideration of the method of compensation for any perceived losses. Relatively smooth implementation of the project can be achieved if the project planner, from the start of the initial design stage, aims to ensure that the affected population improve, or at least regain, their previous living standards and set up mechanisms to achieve this goal and to include socio-economic and cultural factors in their preliminary planning. These include adequate consideration of the following;

- * method of compensation,
- * quality of the new habitat,
- * social organizations of the resettlers,
- * interaction with the host population and environmental protection of the relocation area, and
- * creation of new employment and training opportunities.

All displacement and resettlement programs and costs must be integrated into the development program for the initial stage.

[9] Manpower development and recruitment policies and programs are an extremely important part of the successful implementation of a development project. Training programs need to be organized to overcome recruitment problems.