TCD/SEM.87/1
INT-86-R36

UNITED NATIONS

DEPARTMENT OF TECHNICAL COOPERATION FOR DEVELOPMENT

FOLLOW-UP TO THE MAR DEL PLATA ACTION PLAN: REPORT OF THE MEETING

Interregional Symposium on Improved Efficiency in the Management of Water Resources
5-9 January 1987

TCD/SEM.87/1
INT-86-R36

UNITED NATIONS

DEPARTMENT OF TECHNICAL
COOPERATION FOR DEVELOPMENT

FOLLOW-UP TO THE MAR DEL PLATA ACTION PLAN:

REPORT OF THE MEETING

Interregional Symposium on Improved
Efficiency in the Management of Water Resources
5-9 January 1987

New York, 1987

NOTE

The designations employed and the presentation of material in this publication do not imply the expression of any opinion whatsoever on the part of the Secretariat of the United Nations concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.

TCD/SEM.87/1
INT-86-R36

IMPROVED EFFICIENCY IN THE MANAGEMENT OF WATER RESOURCES: FOLLOW UP TO THE MAR DEL PLATA ACTION PLAN

I. REPORT OF THE MEETING

1. The Interregional Symposium on Improved Efficiency in the Management of Water Resources: Follow-up to the Mar del Plata Action Plan, was held at United Nations Headquarters in New York from 5-9 January 1987. The meeting was convened following a request by the Ninth Session of the Committee on Natural Resources (later endorsed by the Economic and Social Council in Resolution 1985/49B), that the Secretary-General provide the necessary assistance in the preparations for and the organization of a meeting on the implementation of the Mar del Plata Action Plan, ten years after the United Nations Water Conference was held at Mar del Plata, Argentina.

2. The main purpose of the United Nations Water Conference in 1977, had been to promote a level of preparedness nationally, regionally and internationally which would help the world avoid a water crisis of global dimensions by the end of the present century. The Conference was to deal with the problem of ensuring that the world had an adequate supply of water, of good quality, to meet the needs of a global population which was not only growing, but was also seeking improved economic and social conditions. Despite the fact that considerable progress has been made in implementing at least some of the recommendations and resolutions of Mar del Plata over the last decade, there is no doubt that the major task of supplying the world with adequate quantities of acceptable quality water continues to face serious constraints. It would, for example, require the mobilization of greatly increased financial resources during a time of serious financial recession and heavy external debts. Inadequate cost recovery policies and lack of financial planning at the national level have added to the problem.

3. The required number and level of skilled workers available have also not been adequate to carry out the task. While some countries have faced severe skilled manpower constraints, others have had an excess supply of poorly managed professionals. Combinations of the two extremes could also be found

in many developing countries. Application of appropriate technology has been another critical issue. Stages of development and social, cultural and institutional backgrounds might require different approaches in choosing suitable technological alternatives.

4. Despite the importance of water quality both in environmental and health terms, deterioration has been occurring in many areas at a rapid pace. The process has affected surface and ground water, both at national and international levels. Finally, natural disasters, such as droughts and floods, have continued to cause considerable losses, both in human and economic terms. Therefore, it was considered time to review progress made and what still needed to be done.

5. The Symposium was attended by over 70 participants representing 30 developing and developed countries, the five United Nations regional economic commissions, eight United Nations organizations, two regional banks and five non-governmental organizations. The list of participants is attached as Annex I, and the list of background documents is attached as Annex II.

6. The meeting was inaugurated by Mr Xie Qimei, Under-Secretary-General of the Department of Technical Co-operation for Development. He stated that the purpose of the symposium was to determine ways to make greater progress in a number of key problem areas which had constrained the attainment of the goals outlined in the Mar del Plata Action Plan. He noted that water was closely tied to the food production cycle and that it was a critical input to other social and economic activities. The world economic recession of the early 1980s had severely reduced the funds available for the implementation of water resources programmes and policies. This was particularly unfortunate at the time of severe drought in Africa, as it was clear that water shortages were one of the most severe constraints to development. Climatic and financial shortcomings exacerbated by inadequate management of water resources and lack of trained manpower had given rise to rigidities and difficulties in the development of this vital resource. It was appropriate that such issues

should be discussed at the symposium by some of the world's leading water experts.

7. Mr James P. Grant, Executive Director of the United Nations Children's Fund (UNICEF), then addressed the meeting on the subject of water and sanitation for child survival and development. From 1975 to 1985, UNICEF had expended an accumulated total of US$ 550 million, corresponding to 75 per cent of the total expenditure of the United Nations system in the form of grants for water supply and sanitation. UNICEF's share of grant assistance to the water supply and sanitation sector had amounted to between 10 and 20 per cent of the total provided by bilateral, non-governmental and other donor organizations over the 10-year period. He mentioned the importance of focusing on low-cost technical alternatives, of getting confirmed government and donor commitments and ensuring the community's willingness to take overall responsibility for water supply and sanitation projects, particularly with respect to maintenance of the systems. He also pointed out that safe drinking water supply and basic sanitation should be among the human requirements protected from economic cutbacks since abundant safe water was of benefit to everyone.

8. Mr G. Arthur Brown, Associate Administrator of the United Nations Development Programme and Chairman of the Inter-Agency Steering Committee for the International Drinking Water Supply and Sanitation Decade (IDWSSD), focussed his remarks on the Decade as an important aspect of water resources management. While the Decade had raised consciousness and stimulated programmes in drinking water supply and sanitation, rapid population growth had limited the progress made. Thus, the number of individuals unserved at the end of 1985 was probably the same as at the end of 1979. Without the Decade effort, however, the situation would have been much worse.

9. Mr Brown cautioned that rapid expansion of developing countries' urban areas and slums would render solutions in the 1990s more complex and costly in terms of technology choice and availability of water. He suggested that the following solutions be considered during the symposium:

1. Banks, donors and developing countries still needed to be convinced that low-cost technologies represented viable solutions. The psychological blockage that low-cost technology was only second-rate remained to be overcome in many countries.

2. While cost recovery - in whole or in part - was a controversial issue, it had to be addressed realistically because governments could not afford to provide water free of charge. There was a cost to water which must be recovered through taxation or other innovative means including local (user) participation.

3. Capital investments would be wasted if no adequate provision were made to meet the recurrent costs of maintenance. Donors would do a disservice to developing countries if they did not ensure that recurrent costs were an integral part of capital and technical assistance programmes.

4. Investments in the water sector must reflect country priorities rather than individual donor priorities. There should be one water sector development programme per country to which external donors contributed in a co-ordinated fashion.

10. Mr Nicky Beredjick, Director of the Natural Resources and Energy Division, DTCD, noted that the Division had introduced measures to assist governments in overcoming rigidities which hampered the attainment of the goals of the Mar del Plata Action Plan. Such measures included: elaboration of pre-investment studies as a means to mobilize financial resources; regional training centres for training in high-technology fields and on-the-job training of skilled workers and technicians in the water resoures field; the introduction of some modern technologies to make planning and management tasks easier, and the encouragement of local manufacture for basic equipment; and the development of ground water resources to combat poor water quality and drought conditions in many areas.

11. The six technical sessions which followed covered the following topics: (i) Management of financial resources; (ii) management of human resources; (iii) management of technology; (iv) management of water quality; and (v) management of natural hazards, comprising floods and droughts. Each session was introduced by a consultant who presented an overview of the topic in plenary. The participants then divided into working groups and discussed potential solutions to overcoming constraints in each given area. Chairmen of the working groups presented their findings at wrap-up plenary sessions, which concluded with additional comments and discussion. Final conclusions and suggestions for action were drawn up on the basis of working group findings. These conclusions are summarized below.

II. CONCLUSIONS OF THE MEETING

A. IMPROVED EFFICIENCY IN THE MANAGEMENT OF FINANCIAL RESOURCES

12. In dealing with the subject, the participants noted that the existing level of funding is but a small fraction of the estimated requirements for water resources assessment, irrigation and drainage, supply and sanitation, and other uses. They agreed that developing countries need to make significantly increased allocations of financial resources for water resources development, especially from national sources of revenue. Although most governments were reluctant to incur additional external debt, except where projects were obviously self-supporting, well prepared water resources projects and programmes were likely to receive financial and technical assistance support.

13. With regard to the efforts of the developing countries themselves the participants emphasized the need for governments to improve their assessments of immediate and longer term needs, to step up their efforts for the development of water resources and to formulate phased programmes on the basis of carefully designed projects which should include effective and reasonable cost recovery schemes wherever practical. The need was also recognized for a better integration of water resources management policies into overall government policies.

14. The participants agreed that the questions of cost recovery, institutional efficiency, and active participation from the outset by the local communities to be affected needed particular emphasis. Moreover, an increased role for private sector and autonomous entities should be given serious consideration with a view to the mobilization of additional resources, improved efficiency, flexibility and response to local, regional and basin conditions and needs.

1. National Level

a. Cost recovery

15. The meeting laid stress on the proposition that water must no longer betreated as a free good. Even in cases where for cultural reasons the resource itself has to be considered as "free", the costs of development, treatment, delivery and management could be charged for and should be an integral part of the calculations for project financing. The meeting recognized the importance of further improving the financial performance of those agencies which had always had cost recovery as part of their mandate, such as urban water utilities.

16. Accordingly, the participants agreed on the necessity of formulating and implementing cost recovery policies and the importance of the imposition of reasonable charges directly upon the beneficiaries, according to ability to pay, as a means of ensuring their interest and support, as well as ensuring the long term sustainability of projects. To this end, the project formulation process should include realistic cost recovery schemes commensurate with local socio-economic conditions, at least for the provision of labour and materials. At the same time, project formulation should be preceded by sound evaluation of costs and benefits, based not only on expenses and revenue, but also on the gap between the revaluation of foreign financing and the devaluation process affecting the currencies of many developing countries. Cost recovery schemes should take into account costs for: operation and maintenance; data collection and analysis; training and administration; as well as the retirement of the initial investment debt (the latter wherever and whenever feasible).

17. The need for flexibility in the formulation and implementation of cost recovery policies was emphasized. One of the possibilities cited was the practice of cross-subsidization of non-revenue producing uses by revenue producing ones, such as from the sale of electricity.

18. It was recommended that the cost of intermediate services such as data producing and dissemination activities should be recovered also, with the proceeds channelled to the responsible agencies. It was further suggested that external financial support for projects should contain provisions for the support of data generation and technical and social studies.

19. The use of revolving funds at the disposal of the implementing agencies, was cited as a desirable mechanism, designed to cover recurring costs, such as repairs, spares inventory, data base updating, inspection, testing and evenexpansion. It was pointed out that the implementation of cost recovery policies would facilitate favourable consideration by lending agencies, both national and external. Such revolving funds, initially funded by grant aid or soft loans, could be of particular importance in the case of rural water supply and sanitation projects, as well as many other projects, which traditionally suffered from a severe shortage of financial resources. However, it was noted that revolving funds utilizing foreign currencies could be quickly depleted. On the other hand, the utilization of local currency would provide certain safeguards in this respect. Therefore, the development of local inputs for water projects was encouraged.

b. Improved Financial Management

20. The importance of enlisting the support of beneficiaries, and in particular community participation was recognized. The three measures suggested below were considered particularly relevant.

21. First, a more thorough assessment and selection of water projects was needed to identify those that could be implemented and maintained, totally or in large part, through meaningful community participation, to include the supply of labour and materials. Collection of rents or tariffs in cash, adjusted to willingness as well as capacity to pay, was shown to result in greater respect for and conservation of the resource.

22. Second, expansion of public information campaigns and educational curricula could be used to explain the health, labour-saving and other justifications for the country's water programme. It was considered that water and water-related services would then be more highly valued by the people as a whole and by those directly affected, even those adversely affected, by individual projects.

23. Third, the involvement of women in all facets of water sector activities, including planning and management, would bring to bear the concerns and insights of women often found lacking when policies, projects and programmes were devised and implemented.

24. In connection with institutional aspects of the question, the participants stressed the need for greater collaboration among local, district or regional, national and international agencies concerned, and between the various water sector agencies and those responsible for health, land use, and rural and urban development. Such collaboration should culminate in sound national plans for development and environmental protection (for example, reafforestation) with adequate attention to all facets of water conservation and water-related services. Policies needed to be fully articulated and periodically reviewed with attention to comprehensive analysis of inter-sectoral impacts. The participants also agreed on the need for a clear definition of responsibilities and for coordination between all national ministries concerned and authorities charged with river basin development and management, where they existed.

25. Respect for existing traditional and institutional systems was important, even though their functions and attitudes may need, in due course, to be brought into conformity with overall policies and project and programme administration.

26. In some countries, market mechanisms might be helpful in reducing institutional constraints. The participation of the private sector, carefully monitored by the national authorities, might also be economically more

efficient than other approaches. In this connection, the participants suggested that the provision of incentives, such as through the tax regime, and guarantees, such as for the security of equity investment and the necessary returns on capital, warranted careful consideration.

27. The urgent need to improve the management of water resources projects was cited as necessary to make more effective use of limited financial resources. Priority should be given to the proper functioning and rehabilitation of existing systems prior to undertaking new projects. In this respect, it was felt that the strengthening of operation and maintenance capabilities and procedures at the project level, along with close auditing of the financial and technical support provided (including the training of personnel at all levels), was essential. For each project the needed capabilities and procedures should be incorporated expressly at the time of project formulation. New projects should not be undertaken unless administrative and financial capacity for their efficient operation was available or assistance to that end were assured. In addition, project performance overall must be systematically monitored, through integral ex-post analysis. As in the matter of cost recovery, the role of users was stressed. In both cases, it was felt that the organization of the local people, for example, by way of co-operatives or managerial committees, was indispensable.

28. The meeting likewise emphasized the importance of using low cost, suitable technology whenever practicable as a means of facilitating operation and maintenance and of lowering financial requirements. With regard to this latter point, it was noted that since the purchase of equipment usually required foreign exchange, local manufacture should be undertaken whenever possible.

29. It was also suggested that governments, financial institutions and international agencies could consider the use of the unemployed or underemployed labour force as a potential input in the implementation of

water programmes. The selection and use of labour-intensive techniques would not only reduce costs, but would also promote employment in the construction and operation and maintenance phases of programmes and thus facilitate the redistribution of income in given regions.

2. International Level

30. The meeting noted recent efforts by the international community to step up both technical assistance and financial support, particularly in the field of drinking water supply and sanitation. The group expressed the hope that such co-operation would not only continue, but be expanded. In particular, attention was drawn to the needs of the African region. It was also felt that the needs of rural areas everywhere clearly require greater attention.

31. The estimations of needs prepared for the united Nations Water Conference or since then, should now be updated and extended at least to the year 2000.

32. The participants acknowledged the importance of the role played by the international community, not only in assisting governments in the formulation of projects, but also in the conduct of consultative meetings among specialists from multilateral and bilateral organizations and policy makers from concerned governments. The UNDP Round Tables, World Bank Consultative Group Meetings and the WHO/GTZ Country Consultations were cited as very useful examples; such meetings should be encouraged.

33. According to the group, the international community could play a catalytic role in assisting governments in devising suitable cost recovery and operation and maintenance schemes and procedures, in the implementation of priority projects (such as for training and institutional development), and the achievement of meaningful user and community participation.

34. It was suggested that if the international community would collect and

disseminate information concerning cost recovery practices, along with analyses of the reasons for success and failure in particular instances, the results would be extremely helpful to other governments struggling with the problem.

35. The representatives also requested the international lending agencies to facilitate or simplify the procedures they required before giving a loan or a grant to a developing country.

B. IMPROVED EFFICIENCY IN THE MANAGEMENT OF HUMAN RESOURCES

36. Participants recognized that human resources were the key to successful programmes. The efficiency of water resources activities depended largely on the availability and quality of human resources, which in turn were a function of, inter alia, appropriate education, training and human resource management policies. Therefore, countries should be able to develop programmes aimed at improvements in those areas.

37. Participants emphasized that training and human resources management should be given a high priority in water resources development, and should be an integral part of national plans.

38. They felt that the recommendations contained in the Mar del Plata Action Plan were still valid. The challenge was to focus on priorities and develop specific approaches to meet the most pressing requirements. Implementation mechanisms would have to be devised to ensure that those requirements could be met.

1. National Level

39. The participants suggested some prerequisites to setting up meaningful training programmes at the national level.

40. First, the gap between the supply and demand of trained personnel should be remedied in those countries and disciplines where a gap existed. It was felt that national surveys were needed, covering requirements, existing skills and existing and potential training institutes which could be used to train water resources personnel at various levels, in order to define needs in training and management.

41. Skilled workers and technicians were in great demand and training of them was the top priority in many countries.

42. It was felt that a process must be created to increase awareness among policy-makers, scientists and professionals, and the local community as to the essential nature of human resources development for water-related functions. Interaction among such groups was necessary to create the conditions to formulate and implement an action plan for development.

43. The need to create training plans was stressed. They should follow a logical sequence going progressively from primary and secondary education to the creation of regional training networks.

44. The participants felt that it would be best to establish or strengthen permanent training structures at the national level, based on existing institutions where possible. It was considered important to review and ensure the quality of those institutions.

45. It would be most cost-effective to train trainers first and prepare them to train skilled workers.

46. Water programmes which required skilled workers should establish contacts with institutions which provided training such as technical schools, training centres and universities. The training institutions should ideally be able to design and adjust their programmes according to the actual needs as assessed by agencies concerned with water resources development and management.

47. Special delivery systems could be introduced for programmes which require basic but necessary skills, such as those related to maintenance and repair of simple mechanical equipment. These systems might include mobile facilities and teams, as well as distance learning techniques. The diffusion of basic knowledge would also be helped by programmes designed to be disseminated by mass media. The types of technology used, including low-cost options, must be given their full weight in setting up the training programmes.

48. Special efforts were needed to identify womens' needs and to recruit their participation in water project activities. Priority should be given to training women in technical and managerial skills for project development, operation and maintenance, health and education. Awareness building and exchange of information regarding water project development should centre on the crucial role of women in community, rural and peri-urban areas.

49. New approaches to the management of human resources could be considered based on private sector approaches which could include self-reliance, decentralization and greater delegation of authority. Some programmes could be modelled after methods used by industrial and commercial firms.

50. The need to develop structures for human resources management within relevant agencies was also stressed. Actions based on these structures should aim at informing, training and organizing human resources.

51. Several participants stressed that priority should be given to training in technical and managerial skills with emphasis on practical and professional aspects. It was suggested that the legal structure of international construction contracts could require contractors to provide essential training in the operation of facilities to the client's personnel.

52. Training materials should be appropriate to practical needs and should be of a type which may be widely disseminated. The UNDP/World Bank low cost technology training modules on water supply and sanitation represented a serious attempt to produce and disseminate such materials. The INSTRAW/ILO/Turin Centre prototype on women, water supply and sanitation was cited as another good example.

53. For training of high level engineers or technicians using sophisticated technologies, regional and interregional training centres could be used to cater to the needs of several countries. In addition, regional interchange of technicians among developing countries was of special interest as a low-cost alternative training method.

54. At the project level, it was suggested that a systematic pre-evaluation should be made of the requirements for human resources development, including training, education and personnel policies.

55. The project could be a realistic entry point for developing technical education and training methods to be introduced within existing national institutions of learning. Moreover, specific projects could be developed at the national or regional level for training in certain aspects of water resources development.

International Level

56. It was felt that the international community was in a good position to promote awareness of the priority for human resources management and training and to support efforts for implementing corresponding measures.

57. It was necessary to coordinate interagency and bilateral efforts in training and human resources development. It would be possible for certain agencies or donors to specialize in training personnel in those areas in which they have the most competence. To such end, they might support the creation of regional training centres.

58. Donors should require an assessment of human resources availability and skills, including aspects of personnel policy, as a prerequisite to project and programme financing. The training requirements should be clearly stated. Priority must be given to financing of the training component of projects.

C. IMPROVED EFFICIENCY IN THE MANAGEMENT OF TECHNOLOGY

59. It was recognized that improvement of technological practices was not just a technical matter. It also involved social issues such as community involvement, compatibility with social and cultural conditions, and attitudinal and structural orientations within implementation agencies. The latter might need to upgrade their competence in social areas such as community participation, involvement and development.

60. There was growing recognition that all technologies adopted for implementation must be appropriate for the situation in which they are to be used. Thus, a computer-operated water treatment plant or hydropower facility might be appropriate in a region with well-developed supporting infrastructure, while a village handpump or a simple scheme for flood irrigation might be most relevant in a poor area lacking the resources to support more sophisticated projects. What is needed is to reverse the idea that appropriate technology means "second best" or "low-status" technology. There can only be either appropriate or inappropriate technology. Both national agencies and external donors must avoid the tendency to select a technology because it is "state of the art" and instead, seek solutions that best meet the development need at hand.

61. Appropriate technology also meant adopting equipment and processes that were within the competence of national agencies to implement, maintain, and, where necessary, modify and produce the adapted equipment.

62. Curricula and training programmes should be oriented towards developing technical skills relevant to national problems. Thus, arid countries without surface water sources needed hydrogeologists, well drillers, and pump mechanics far more than dam designers or hydropower technicians. Countries should tailor technical education to serve national needs. At the same time, developing countries should recognize that the primary audience for technical education and training was the individual who one day would be working for a national agency.

63. Over the years, severe problems had resulted from the requirements for "tied aid" in many donor agencies. Tied aid often resulted in a proliferation of equipment such as pumps, generators, drilling rigs, etc., which tended to overwhelm the capacity of a national agency to manage, operate and maintain them. The problem arose from overly-restrictive requirements within donor agencies to provide certain equipment from the donor country, as well as the inability of national agencies to insist upon standardization of equipment. Too often, the problems were worsened because there existed too many separate channels of negotiations between donors and national agencies. By channeling such communications through a single national body, such as a National Action Committee for water and sanitation activities or a National Irrigation Authority, developing countries should be able to control the proliferation of different types of equipment, encourage technological standardization, and thereby contain technological choices within the capability of the country to support them.

64. Donors needed to allow sufficient time for national agencies to go through the process of project identification and planning to ensure that there would be adequate community and local participation.

1. National Level

65. The participants recommended that an assessment be made of the relevance of the professional and technical curricula to the requirements of the water resources sector in a given country. Where found lacking, curricula could be modified to reflect national requirements and the needs of the low income population. The curricula review and identification of steps to upgrade engineering training need not be costly or time consuming. Similarly, curricula modification need not require revamping of training programmes but rather should incorporate the needed interdisciplinary components into existing curricula.

66. Aid donors who had in the past offered "tied aid" should provide appropriate products which respond to national needs, as determined by national agencies in the water resources sector. Standardization of

technologies should be considered a priority. Local water authorities could survey, document and introduce their own local, simple and successful technologies to foreign consultants or donors for consideration with other alternatives in their feasibility studies.

67. Every attempt should be made to improve the project specific data base before design of water projects. The cost to a government agency of generating project-specific data for design purposes was far less than the cost of over-designed technology which incorporated safety factors to overcome the lack of information needed for cost-effective design.

68. Technology assessment should be a prerequisite to project approval and implementation. This would entail specifications related to the technology, such as that it should be compatible with existing technology, that spare parts should be readily available, that operation and maintenance manuals be prepared in the local language, etc. Pre-project appraisal should include existing infrastructure, previous project experience, availability of resources, and assessment of the likely sustainability after project completion. Post-project evaluation should include efficiency and effectiveness and, in some cases, impacts. Such assessments should be carried out by trained staff who were not directly involved with the project itself and who could take as impartial a position as possible. Sufficient time would have to be allowed in the project cycle to carry out such investigations. Evaluation methodology should be standardized and simple.

69. The need for strong community development, communications and educational components in projects was recognized. Social scientists should be given real responsibility and authority in working alongside the engineers in project planning and implementation.

70. User beneficiary groups should be brought into stronger participatory and decision-making roles at all stages of the project: identification, feasibility study, approval, detailed design, implementation, operation, maintenance, cost recovery and evaluation.

71. The group recognized the considerable potential which women offered as resources in support of project in the water sector, and the importance of involving them in planning and decision making capacities throughout the stages of the project. This applied particularly to project management and maintenance of equipment at the community level.

2. International Level

72. Sectoral information centres should investigate with national governments and adopt ways by which technology dissemination could be made more aggressive and widespread. In particular, modern publishing and marketing techniques used by the private sector could be incorporated into dissemination programmes, enabling them to better reach project-based staff in the developing countries.

73. International agencies in cooperation with local authorities and/or local consultants, could undertake a specialized programme for the propagation of improved management of water resources; this programme should focus on dissemination of successful technologies and approaches among the deveoping countries requiring them. Its objectives should be:

1. To assess and document existing examples of full-scale successful projects incorporating appropriate technology, community participation, and revenue generation;
2. To define clearly those methods and tools within such projects to facilitate their adaptation and adoption by projects in other countries.

74. Such a programme could be executed by one of a number of international agencies but would require strong and imaginative leadership and a considerable degree of independence from inter-agency politics to succeed. The cost of such an activity would be relatively small compared to its extraordinarily high returns. To this end, countries were encouraged to support the creation of the above Programme for Sharing Experiences in Technology Management which would make other experiences available to their own programmes as required.

75. International donor agencies should clearly outline their existing or planned policies on appropriate technologies, community involvement, hygiene education, subsidies and financial viability, operation, maintenance and tied aid. In turn, developing countries should attempt to prepare sector policy statements setting out general and specific goals, optimum strategies, and basic development priorites.

76. International organizations had a strong influence over technology choices. Their personnel should therefore, be given an opportunity to learn first hand about successful technologies and approaches before encouraging their acceptance and use. A series of in-house seminars could be held within the bilateral and multilateral agencies for such a purpose. It was also recommended that bilateral donors review and share their experiences in commodity loans and grants with a view to expanding such forms of assistance, through regional meetings, where appropriate.

77. International agencies might assess the constraints on technology development that are being imposed by bureaucratic controls. These could be reduced to an absolute minimum. Likewise, the use of expatriates for project management should be tempered wherever possible.

78. International agencies could encourage increasing both quality and number of project evaluations. There was a need for a uniform set of guidelines for monitoring and evaluation of water projects. The United Nations agencies were encouraged to take a more active role in ensuring that more comprehensive and meaningful evaluations were carried out within water sector projects.

D. IMPROVED EFFICIENCY IN THE MANAGEMENT OF WATER QUALITY

79. Participants confirmed that appropriate priority should be given to water quality management worldwide. However, the resource constraints facing developing countries often prevented them from dealing with water quality as a priority issue. All water uses should be considered when assessing water quality issues, including industrial, agricultural, domestic and other uses. The need for environmental protection of coastal lagoons, estuaries and other water sources was stressed by the group.

1. National Level

80. The group considered a series of actions which could be initiated as a programme to tackle water quality problems at the national level.

81. First of all, laws concerning the pollution of water should be amended to make them consistent with economic realities; drinking water standards should be re-evaluated in light of existing socio-economic conditions. Laws which were simple, easy to implement and flexible would be the most effective.

82. Water quality legislation should be enforceable. An adequately staffed and equipped monitoring system was indispensable to effective enforcement. In addition, the political will to prosecute violators should be created and maintained at every level of government. Appropriate government standards on production process effluents should be adopted, and discharge levels of certain substances into water courses limited. Government planning procedures could be employed under which permits would be issued only to economic activites using "clean" processes or located in areas with adequate environmental assimilative capacity.

83. Participants suggested that, within the context of legislative actions, water quality control might include some of the following:

- Designation of protected areas or hydrological regions and aquifers;
- Requirements for special designs or construction;
- Prohibitions against discharging specific contaminating substances;
- Requirements for industry to treat effluents or to protect ground water through adequate design;
- Control of production, processing, transportation and storage of water pollutants.

84. The group noted that mechanisms for co-ordination of water quality mangement programmes were required in order to reduce duplication of efforts among national, regional, state and local agencies. Such mechanisms might include frequent interagency meetings and the hiring of liaison staff.

85. Environmental impact assessments should be required by the public and private sectors where they are not used, and improved where they are already used in environmental planning.

86. The government had a responsibility to organize and operate efficient and well-equipped emergency services and warning systems in the event of accidents involving water pollutants. Planning groups needed to recognize trade-off options and communicate them to the affected people.

87. Participants suggested that programmes be developed to: train specialists in water quality planning and management; teach environmental issues in schools; and focus on and place high priority on public education. Mass media techniques could be used to inform the public on environmental issues. Environmental interest groups could be used for co-ordinating information programmes and should be encouraged.

88. As for financing arrangements, it was suggested that monetary incentives could be considered with care, and assessed with respect to their efficacy and redistribution impact. User and effluent charge systems could be used as regulating tools and sources of pollution control funds. Approaches should reflect the specific cultural, social, economic, and technological conditions of individual countries, and charges should be updated when appropriate.

89. Local governments should assure a safe water supply for agricultural and other uses in rural areas through such measures as development of shallow aquifer springs and desalination of brackish water using solar energy.

90. Water quality monitoring needed to be developed in many countries, to include physical, chemical and biological parameters. Water quality monitoring should be combined with hydrological assessments; monitoring networks could be strengthened to include both quality and quantity in a data base. The number of ground water monitoring stations should be expanded in all regions.

2. International Level

91. Appropriate management of water quality was necessary at the international level because of the nature of transboundary pollution. Improvements in water quality could be strongly influenced by the actions of international organizations or negotiations among governments. Therefore, it was important for international organizations to support and promote national efforts to control water pollution.

92. Increased international funding was required for expanded water quality monitoring networks for assessment in developing countries, as well as for controlling water pollution across boundaries of all countries. Monitoring data could, moreover, be communicated through the international network.

93. International funding organizations could require environmental impact assessments before financing water resources projects. These assessments might be based on both technical and economic criteria. The cost of protective measures required as a result of a project should be recorded as a future commitment at the time when the project was appraised.

94. International organizations providing technical support to governments might provide assistance on the strengthening of national capabilities to

assess particularly sensitive and complex issues, such as groundwater quality. International organizations should provide information on current research so that limited resources were not used to duplicate what had already been done.

95. International organizations should recognize the need for, and promote, differential standards for case specific needs. This was particularly important in the case of water supply systems, especially those serving low income communities where sophisticated technologies were not feasible at present. Differential standards might be appropriate in situations where they expedited realistic, affordable goals and encouraged the expansion of water services to communities which would otherwise not receive them. The role of the international organizations should be to provide guidance and to act as a source of information to national standard-setting bodies.

96. Technical assistance should be accompanied by training programmes at regional and national levels to train water resources personnel in the crucial aspects of water quality management. Training of local personnel should be an integral part of all new and continuing projects. Training of women for technical and management positions was viewed as very desirable.

97. International agencies must strengthen their programmes for dissemination of information on water quality issues. Such programmes could include workshops, meetings, conferences, newsletters, demonstrations, and training by organizations within the United Nations system. Consultation with users, polluters and environmental interest groups, including consumer and women's organizations, should be carried out.

98. More sharing of experiences - successes and failures - might be achieved through a compendium-type document. A conference (or workshop) to address water quality issues could be developed to permit detailed consideration of developed versus developing country needs, community vs. rural, drinking water vs. other uses, etc.

99. International organizations could and should promote the development of low-cost, site-oriented technologies for the control of water quality problems, particularly as they related to toxic and hazardous wastes, and could assist in preventing the transfer of negative impacts in projects related to international rivers and lakes.

100. The transfer of pollution across national boundaries was a growing international concern which should be monitored and controlled. International organizations could co-ordinate and assist in achieving co-operation of affected nations. Principles for equitable and rapid redress, including appropriate compensation, and procedures for forecasting events, could be developed as joint national-international efforts.

101. Significant pollution might originate in agriculture from land drainage (acids, salts, fertilizers, and pesticides), and from erosion and mining (silt) as well as from direct industrial discharges. Protection against, and appropriate response to, accidental spills and other sources of pollution was desirable at international and national levels.

E. MANAGEMENT OF NATURAL HAZARDS: DROUGHT AND DESERTIFICATION

102. The group pointed out that, over large parts of the world, recurring periods of drier-than-average conditions had led to various forms of drought, often with disastrous consequences. At the height of the recent drought in Africa at the end of 1984, for example, 30 million people in 20 countries were desperately dependent on food aid. There were breakdowns of agricultural and pastoral systems, widespread dislocations of communities and large losses of human lives and of livestock.

103. The social and economic consequences of the climatic phenomenon in many areas had been successfully reduced by efficient drought management systems. There was a clear need, therefore, to improve the efficiency of drought management in vulnerable developing countries to mitigate the effects of climatic drought using the accumulated experience of countries which had successfully managed this phenomenon together with appropriate technological solutions tailored to individual countries' needs.

104. At the same time, accelerating environmental degradation - essentially man-made - including desertification and soil erosion, exacerbated and compounded the effects of rainfall deficits. Human disturbance of fragile ecosystems could be countered by a wide range of measures to restore ecologically-sound agricultural and pastoral systems.

105. The interrelationship between drought and desertification called for integrated programmes, of which water resources development and conservation were one facet. The huge scale of the problem demanded immediate and effective intervention by both national and international agencies.

1. National Level

106. A number of suggestions were made for action at the national level. Contingency plans for implementing emergency measures for the supply of food, water and medical assistance should be prepared. Efficient information

systems for the rapid collation and dissemination of data on emergency situations were essential.

107. National institutions should be strengthened to improve their ability to implement effective drought and desertification programmes and to monitor land use changes. Co-ordinating bodies could be established to plan, manage and monitor drought and desertification programmes.

108. The information base on climatic conditions and surface and ground water resources, needed to be improved. More research was needed on meteorological, hydrogeological and agricultural problems associated with drought and desertification, as well as early warning systems and climatic forecasting.

109. Comprehensive soil and water conservation programmes should be implemented, with emphasis on technologies which could be carried out by community self-help organizations in traditional agrarian and pastoral societies.

110. Water supply and sanitation programmes needed to be accelerated in drought-prone areas to provide safe and reliable drinking water during emergency situations for both human and livestock populations.

111. The adoption of ecologically sound land use systems and desertification control measures needed to be encouraged in harmony with prevailing social and cultural traditions; firm policy decisions needed to be formulated by governments on problems such as deforestation, overgrazing, land tenure and demographic changes.

112. Further investigation was needed on the conjunctive use of ground water and surface water to alleviate drought conditions.

2. International Level

113. Acknowedging the important role of the international community in supporting measures to improve the efficiency of management of drought and

desertification, it was felt, nevertheless, that better communication and co-ordination among external support agencies and between those agencies and the national governments would lead to more effective intervention. The tendency of donor agencies to support the exploitation of natural resources without due regard to conservation and the difficulties arising from certain project appraisal techniques had led to conservation programmes coming out second best in the allocation of financial resources. The question of setting aside funds for combating drought and desertification deserved attention.

114. The international community could play a major part in financing research and development. There should be continuing support for hydrological and meteorological research and for agricultural research on appropriate land-use systems, including improved estimates of the carrying capacity of rangelands and to special problems of marginal lands.

115. Other research and implementation activities could relate to providing assistance in the linking of national programmes for drought management to targetted water demands. This could include research aiming to: assess current water needs; determine priorities and establish minimum levels of satisfaction; assess cost-effective options; and implement, operate and maintain the measures and facilities required to meet the targeted needs.

116. It was generally agreed that the provision of food aid, although necessary in the emergency phase, is a short-term contingency measure, and one of the least effective types of external assistance in the long run.

117. A whole range of technological systems was available, many of which required application in specific regions. It was felt that a number of pilot schemes demonstrating the successful application of packages of measures such as comprehensive soil and water conservation schemes, small-scale irrigation and rangeland management, might assist in accelerating the spread of ecologically-sound management.

118. Finally, it was recognized that combatting drought and desertification often required co-operation among a number of countries and the support of intergovernmental bodies.

119. The Permanent Interstate Committee on Drought Control in the Sahel (CILSS) and the Intergovernmental Authority for Drought and Development (IGADD), in Africa could contribute to the implementation of comprehensive programmes of action.

F. IMPROVED EFFICIENCY IN THE MANAGEMENT OF NATURAL HAZARDS: FLOODS

120. The recommendations of the Mar del Plata Action Plan on flood loss management were based on the assumption that floods were part of nature's order. The Plan, therefore, emphasized the need for decreasing flood losses by comprehensive structural and non-structural precautions and by organization of emergency services, including an expansion of hydrological services to aid in forecasting flood and related events. The Conference also noted with concern the tragic losses of life and crippling damages caused by floods that frustrated the heroic efforts of many developing countries to break the vicious cycle of poverty. In this context, it was observed in the conference that "the negative economic impact of water related natural disasters in developing countries was greater than the total value of all the bilateral and multilateral assistance given to these countries."

121. Though the techniques for minimization of flood losses were well known, the frequency and intensity of floods since the Mar del Plata Conference have not changed significantly. Flood devastations were not confined to developing countries alone; the developed countries were also severely affected. Deaths were caused by flood not only in Asia, Africa and Latin America, but also in North America and Europe. The widespread effects of flood phenomena made the discussion of the subject one of the significant issues of the meeting.

1. National Level

122. The group considered that both structural and non-structural measures for flood mitigation should be executed within the framework of a comprehensive, long term and integrated land and water development plan. Within the broad outlines of a long term plan, a number of suggestions were made.

123. Very often, structural and non-structural measures were complementary to each other. Wherever an option was available, non-structural measures should be preferred to structural measures because they happened to be less capital-intensive and more beneficial from the ecological point of view. Experience showed that structural measures by themselves were not always adequate for flood mitigation, and should be supplemented by non-structural measures.

124. The components of a comprehensive land and water development plan could be disaggregated into regional plans. Within the broad framework of the comprehensive plan, local level planning and execution of projects could be encouraged.

125. In the short run, structural measures were immediately necessary in many flood-prone areas where natural hazards like floods were contributing to a process of pauperization of small and marginal farmers. However, adequate resources should also be available to remedy the external diseconomies and harmful effects of such structures.

126. Adequate funds were needed for satisfactory maintenance of all flood protection works. Special care should be taken to ensure the safety of dams.

127. In order to minimize economic losses, flood mitigation measures could be given priority in cities, towns, villages and industrial areas.

128. Emphasis was also given to effective institution-building to cope with ever-increasing flood hazards. Specific suggestions on measures to be considered are listed below:

1. People's participation in flood mitigation projects should be encouraged by giving proper weight to local views and by motivating the people.

2. There should be effective horizontal and vertical integration of all agencies dealing with flood prevention. Civil defence measures in case of emergency should be strengthened.

3. Flood mitigation projects should be flexible so that feedback from errors could always be taken into account.

4. In certain deeply flooded areas, immediate mitigation of floods might be neither feasible nor desirable. Attempts should be made to minimize flood losses by undertaking research for improving varieties or deep water crops as well as for improving the housing and sanitary conditions in those areas.

129. To minimize flood losses, the machinery of flood warning, evacuation and relief might be strengthened. To this end, it would be desirable to

- Increase the forecast lead time by strengthening the flood forecasting and warning system through installation of effective equipment for collection of hydrological and meteorological data and through adequate training of related personnel;

- Set up an efficient system for the dissemination of flood warnings;

- Encourage the introduction of zoning laws;

- Educate the public about flood hazards, especially through development of flood-risk maps;

- Include disaster relief and preventive health measures in development programmes;
- Experiment with flood insurance wherever possible to reduce the burden on the national budget and to encourage small farmers to invest in modern inputs.

2. International Level

130. Close interstate cooperation should be actively promoted in relation to the use, management and development of shared water resources in accordance with the principles enunciated in the Mar del Plata Action Plan.

Specifically, the following measures could be taken:

- Enunciation of principles for equitable and just sharing of flood risks by co-riparian states;

- Establishment of mechanisms and methods for compensation in cases where new flood risks are created;

- Establishment of effective linkages between flood forecasting agencies of a region;

- Undertaking joint programmes for structural and non-structural flood mitigation measures;

131. Since the threat of flood cannot be eliminated overnight, it is essential to undertake long-term research and provide technical cooperation for minimization of flood losses. In this conection, such activities should be encouraged and intensified by intergovernmental and international organizations.

132. Adequate hydrometeorological data and continuous monitoring of dynamic changes in flood hazard occurrence should be collected. Legal and economic issues associated with environmental changes occurring as a result of floods should also be studied in depth and the information disseminated.

133. Models for flood forecasting should be developed and national professionals trained in their application. Appropriate technologies for flood mitigation measures should also be disseminated. Studies should be carried out on conditions for effective community participation with successful examples of community participation in flood mitigation projects.

134. Other measures suggested were to provide adequate training and to establish a focal point within the United Nations system for research and monitoring of floods on a long term and continuous basis.

ANNEX I. LIST OF PARTICIPANTS

ARGENTINA

Ricardo H. Rebagliati
Project Co-ordinator
Secretariat of Growth Promotion
Undersecretariat of Special Projects
Arz. Espinosa 1586
3º Capital Federal (1268)
Buenos Aires, Argentina

BELGIUM

Johan Van Mullem
Medical Doctor, Belgian Agency for Development Co-operation
Medical Service
Marsveldplein 5 Brussels, Belgium

BRAZIL

Goki Tsuzuki
Director for Water Resources Control Division
National Department of Water and Electric Energy
W3SUL-SRTV
Edificio Palácio do Radio Bloco 1 3º Andar
CEP70330 Brasilia D.F.
Brasil

BURKINA FASO

Pascal T. Dianda
Water Wells Works Manager
Ministry of Water
P.O. Box 7025
Ouagadougou, Burkina Faso

CANADA

Ismail Najjar
Water Resources Consultant
Canadian International Development Agency (CIDA)
200 Promenade du Portage
Hull, Quebec K1A 0GA, Canada

CHINA

Wu Guochang
Deputy Director
Office of Water Resources
Ministry of Water Resources and Electric Power
P.O. Box 2905
Beijing, China

DENMARK

Torkil Jonch-Clausen
Technical Adviser
Danish International Development Agency (DANIDA)
Ministry of Foreign Affairs
2, Asiatisk Plads
1448 Copenhagen K, Denmark

FRANCE

Mireille Jardin
Chargé de Mission
Ministère de l'Environnement
14 Bd du Général Leclerc
92524 Neuilly
France

H. Le Masson
Caisse Central de Co-operation Economique
37 rue Boissy d'Anglais
75008 Paris, France

Dominique Peter
Chargé de Mission
Ministère de la Coopération
20 rue Monsieur
75700 Paris, France

Jean Francois Stuyck-Taillandier
Deputy Director
Dept. for Scientific & Technical Co-operation
Ministry of Foreign Affairs
34 Rue la Peroux
75016 Paris, France

GERMANY, FEDERAL REPUBLIC OF

Klaus Erbel
Head, Division on Water Economy
Deutsche Gesellschaft für technische Zusammenarbeit (GTZ)
Postfach 5180
D-6236 Eschborn 1
Federal Republic of Germany

Helmut Lauterjung
Adviser for Water Economy
Deutsche Gesellschaft für technische Zusammenarbeit (GTZ)
Postfach 5180
D-6236 Eschborn 1
Federal Republic of Germany

Christian Neumann-Redlin
Ministry of Economic Co-operation
Unit for Geology and Mining
Karl Marx Strasse 4-6
D 53 Bonn 1, Federal Republic of Germany

GHANA

Nii Boi Ayibotele
Director
Water Resources Research Institute (CSIR)
P.O. Box M32
Accra, Ghana

GREECE

Spyridon Papagrigoriou
Adviser to the Minister
Ministry of Environment, Physical Planning and Public Works
17 Amaliados Str.
Athens, Greece

GUATEMALA

Estuardo Velasquez
General Director
INSIVUMEH
7a Ave. 13-67 Zona 13
Guatemala Ciudad, Guatemala, C.A.

HUNGARIAN PEOPLE'S REPUBLIC

János Zákonyi
Head, Dept. of International Relations
National Water Authority
1011 Budapest, Fö u. 48-50
Hungary

ISLAMIC REPUBLIC OF IRAN

Hadi Bijan Ghaempanah
Senior Engineer in Water Planning and Hydraulic Structures
Tehran Regional Water Board
Hejab Ave
Tehran, Iran

ISRAEL

Theodore Herman
Director, East Africa Operations
Tahal Consulting Engineers, Ltd.
P.O. Box 11170
Tel Aviv, Israel

ITALY

Lucio Ubertini
Director, Agricultural Hydraulics Institute
Perugia University
06100 Perugia, Italy

JAMAICA

Thorant Hardware
Managing Director
Underground Water Authority
Hope Gardens
P.O. Box 91
Kingston 7, Jamaica

THE HASHEMITE KINGDOM OF JORDAN

Omar M. Joudeh
Director, Study and Water Research Dept.
Water Authority of Jordan
P.O. Box 2412
Amman, Jordan

MOROCCO

Mohammed Jellali
Directeur de la Recherche et de la Planification de l'Eau
Administration de L'Hydraulique
Rue Hassan Benchekroun Agdal
Rabat, Morocco

NETHERLANDS

L.J. Mostertman
International Institute for Hydraulic and Environmental Engineering
Schiekade 506
3032 AX Rotterdam
Netherlands

POLAND

Zdzislaw Kaczmarek
Prof. Dr.
Polish Academy of Sciences
Palace of Culture and Sciences
00-901 Warsaw, Poland

PORTUGAL

Antonio Miguel Cavaco
Deputy Director General for Natural Resources
Av. Gago Coutinho, 30
1000 Lisboa, Portugal

Francisco Nunes Correia
Director General for Natural Resources
Av. Gago Coutinho, 30
1000 Lisboa, Portugal

Rui Roda
Adviser to the Secretary of State for the Environment and Natural Resources
Av. Gago Coutinho, 30
1000 Lisboa, Portugal

SUDAN

Y.A. Mageed
Managing Partner
Associated Consultants and Partners
P.O. Box 2960
Khartoum, Sudan

Kamal Ali Mohamed
Director General, Nile Waters Dept.
Ministry of Irrigation and Hydropower
P.O. Box 878
Khartoum, Sudan

SWEDEN

Ingvar Andersson
Senior Programme Officer
Swedish International Development Agency (SIDA)
S 10525 Stockholm, Sweden

SYRIAN ARAB REPUBLIC

Aziz Ghadban
Director of Irrigation
Directorate of Irrigation, Ministry of Irrigation
Malkie Street
Damascus, Syria

THAILAND

Anek Chandarawongse
Acting Expert on Water Resources Development
Office of the National Water Resources Development Committee
National Economic and Social Development Board
962 Krung Kasem Road
Bangkok 10100, Thailand

TURKEY

Ozden Bilen
Head of Planning Department
General Directorate of State Hydraulic Works (DSI)
Yücetepe
Ankara, Turkey

UNITED KINGDOM

T.D. Pike
Chief Engineering Adviser
Overseas Development Administration
Eland House
Stag Place, London SW1E 5DH
United Kingdom

UNITED REPUBLIC OF TANZANIA

William Balaile
Senior Principal Hydrologist
Ministry of Lands, Water, Housing and Urban Development
Box 35066, Dar-es-Salaam, Tanzania

UNITED STATES OF AMERICA

Dennis B. Warner
Deputy Project Director
Water and Sanitation for Health (WASH) Project
US Agency for International Development (USAID)
1611 N. Kent St., Room 1002
Arlington, VA 22046
United States

VIET NAM

An Le Quy
Professor, Chairman of National Committee for Water Supply and Sanitation
State Commission for Science and Technology
39 Tran Hung Dao Street
Hanoi, SR Viet Nam

Nguyen Xuan Ang
Viet Nam Mission to the United Nations
20 Waterside Plaza
New York, NY 10010

INTERNATIONAL ORGANIZATIONS

UNITED NATIONS

Department of International Economic and Social Affairs (DIESA)

Pierre Najlis
Senior Programme Officer for Water Resources
Office for Programme Planning and Co-ordination
Dept. of International Economic and Social Affairs
UN, New York, NY 10017

Department of Technical Co-operation for Development (DTCD)

Xie Qimei
Undersecretary-General
Department of Technical Co-operation for Development (DTCD)
United Nations, New York, NY 10017

Nicky Beredjick
Director, Natural Resources and Energy Division (NRED)
DTCD, United Nations, New York, NY 10017

Marcia Brewster
Economic Affairs Officer, Water Resources Branch (WRB)
NRED, DTCD, UN, New York, NY 10017

Peggy Cullimore
Research Assistant
WRB, NRED, DTCD, UN, New York, NY 10017

Enzo Fano
Chief, Water Resources Branch
NRED, DTCD, UN, New York, NY 10017

Miguel Solanes
Interregional Adviser on Water Law
WRB, NRED, DTCD, UN, New York, NY 10017

Consultants

Asit K. Biswas
President, International Society for Ecological Modelling
76 Woodstock Close
Oxford, England

Mohamed El Kassas
Department of Botany
Faculty of Science
Cairo University
Giza, Egypt

Akbar Ali Khan
Member, Directing Staff
Bangladesh Public Administration Training Centre
Savar, Bangladesh

Nina McClelland
President, National Sanitation Foundation
3475 Plymouth Road
Ann Arbor, Michigan 48105

Michael McGarry
President, Cowater International Inc.
416 Lochaber Avenue
Ottawa, Canada K2A 3X9

J.P. Mounier
Director General, CEFIGRE
B.P. 13 Sophia Antipolis
06561 Valbonne, CEDEX 1, France

REGIONAL ECONOMIC COMMISSIONS

K.A. Edwards
Chief, Water Resources Unit
Economic Commission for Africa (ECA)
P.O. Box 3001
Addis Ababa, Ethiopia

C. Lopez-Polo
Director, Environment and Human Settlements
Economic Commission for Europe (ECE)
Palais des Nations
1211 Geneva 10, Switzerland

Terence Lee
Economic Commission for Latin America and the Caribbean (ECLAC)
Edificio Naciones Unidas
Avenida Dag Hammarskjöld
Vitacura, Santiago, Chile

Cengiz Ertuna
Chief, Water Resources Section
Economic and Social Commission for Asia and the Pacific (ESCAP)
United Nations Building
Rajdamnern Avenue
Bangkok 10200, Thailand

Ahmad Radjai
Chief, Natural Resources, Science and Technology Division
Economic and Social Commission for Western Asia (ESCWA)
P.O. Box 27
Baghdad, Iraq

UNITED NATIONS DEVELOPMENT PROGRAMME (UNDP)

G. Arthur Brown
Associate Administrator
UNDP
One United Nations Plaza
New York, NY 10017

Frank Hartvelt
Programme Officer
Division for Global and Interregional Projects
UNDP
One United Nations Plaza
New York, NY 10017

Mike Sacks
Senior Health Adviser
UNDP (DSIP)
Rm FF 12-102, One UN Plaza
New York, NY 10017

UNITED NATIONS ENVIRONMENT PROGRAMME (UNEP)

Laszlo David
Senior Programme Officer
Environmental Management Service
UNEP
P.O. Box 30552
Nairobi, Kenya

UNITED NATIONS CHILDRENS FUND (UNICEF)

James P. Grant
Executive Director
UNICEF
866 United Nations Plaza, 6th Floor
New York, NY 10017

Martin Beyer
Senior Policy Specialist, Water Supply and Sanitation
UNICEF
866 United Nations Plaza, 6th Floor
New York, NY 10017

SPECIALIZED AGENCIES

FOOD AND AGRICULTURE ORGANIZATION (FAO)

Robert Thomas
Senior Officer, Water Resources
Land and Water Development Division
FAO
Villa delle Terme di Caracalla
00100 Rome, Italy

INTERNATIONAL LABOUR ORGANISATION (ILO)

A. Könye
Focal Point on Water
International Labour Organisation
4, route des Morillons
CH-1211 Geneva 22, Switzerland

UNITED NATIONS EDUCATIONAL, SCIENTIFIC AND CULTURAL ORGANIZATION (UNESCO)

S. Dumitrescu
Deputy Assistant Director General
UNESCO
7, Place de Fontenoy
75700 Paris, France

WORLD HEALTH ORGANIZATION (WHO)

L. Laugeri
Financial Analyst
Community Water Supply and Sanitation Unit, WHO
20 Avenue Appia
1211 Geneva 27
Switzerland

Antonio Rivera-Cordero
Regional Adviser Pollution Control
Pan American Health Organization (PAHO)
525 Twenty-Third Street N.W.
Washington, D.C. 20037

Alexander H. Rotival
UNDP/WHO IDWSSD Coordinator
EHE Division
WHO
Geneva, Switzerland

UNITED NATIONS INTERNATIONAL RESEARCH & TRAINING INSTITUTE FOR THE ADVANCEMENT OF WOMEN (INSTRAW)

Dunja Pastizzi-Ferencic
Director, INSTRAW
César Nicolás Penson 102-A
P.O. Box 21747
Santo Domingo, Dominican Republic
Telex 4280 WRA SD

REGIONAL DEVELOPMENT BANKS

AFRICAN DEVELOPMENT BANK

M. Kometsi Khotle
Sanitary Engineer
African Development Bank
P.O. Box 1387
Abidjan 01, Cote d'Ivoire

WEST AFRICAN DEVELOPMENT BANK

Coulibaly Issa
Hydrogeologic Engineer
West African Development Bank
B.P. 1172
Lomé, Togo

NON-GOVERNMENTAL ORGANIZATIONS (OBSERVERS)

Terrence Thompson and Luis T. Castillo
Interamerican Associaton of Sanitary and Environmental Engineers (AIDIS)
USA Section
P.O. Box 7668
Silver Spring, MD 20907

Dante Caponera
Chairman, International Association for Water Law
Member, Water Resources Research and Documentation Center (WARREDOC)
Via Montevideo 5
00198 Rome, Italy

Robert Hayton
Professor
International Association for Water Law
113 Cat Rock Road
Cos Cob, CT 06807

James D. Birkett
President, International Desalination Association (IDA)
P.O. Box 387
Topsfield, MA 01983 USA

Glenn Stout
Secretary General
International Water Resources Association (IWRA)
c/o University of Illinois, 208 North Romine
Urbana, Illinois 61801

A.R. Doshi
Chairman, Committee for Co-operation in Development
International Water Supply Association (IWSA)
c/o Construction House
Walchand Hirachand Marg
Ballard Estate
Bombay 400 038, India

ANNEX II. LIST OF DOCUMENTS

	Title	Author
MDPFU/SYMP/1	IMPROVED EFFICIENCY IN THE MANAGEMENT OF WATER RESOURCES: AN OVERVIEW	A. K. Biswas → ISN = 4583 callno. 202.6 86IM
MDPFU/SYMP/2	IMPROVED EFFICIENCY IN THE MANAGEMENT OF FINANCIAL RESOURCES	DIESA
MDPFU/SYMP/3	IMPROVED EFFICIENCY IN THE MANAGEMENT OF HUMAN RESOURCES	J.P. Mounier → ISN = 4582 callno. 133 86IM
MDPFU/SYMP/4	IMPROVED EFFICIENCY IN THE MANAGEMENT OF TECHNOLOGY: TECHNOLOGIES APPROPRIATE TO THE NEEDS AND RESOURCES OF DEVELOPING COUNTRIES	M.G. McGarry → ISN = 2632 callno. 161 86 IM
MDPFU/SYMP/5	IMPROVED EFFICIENCY IN THE MANAGEMENT OF WATER QUALITY	N. McClelland → ISN = 4581 callno. 240 86IM
MDPFU/SYMP/6	IMPROVED EFFICIENCY IN THE MANAGEMENT OF NATURAL HAZARDS: DROUGHT AND DESERTIFICATION	M. El Kassas
MDPFU/SYMP/7	IMPROVED EFFICIENCY IN THE MANAGEMENT OF NATURAL HAZARDS: FLOODS	A.A. Khan
MDPFU/INF/1	SOME PRACTICES IN WATER RESOURCES DEVELOPMENT AND MANAGEMENT IN CHINA	G. Wu
MDPFU/INF/2	IMPROVED EFFICIENCY IN THE MANAGEMENT OF HUMAN RESOURCES AND TECHNOLOGICAL APPLICATION IN TANZANIA: A CASE STUDY IN FIVE ADMINISTRATIVE REGIONS	W. Balaile
MDPFU/INF/3	FLOOD MANAGEMENT IN INDIA	M.A. Chitale
MDPFU/INF/4	IMPROVED EFFICIENCY IN THE MANAGEMENT AND MOBILIZATION OF FINANCIAL RESOURCES FOR WATER SECTOR DEVELOPMENT PROJECTS	O. Bilen
MDPFU/INF/5	VIET NAM: WATER RESOURCES AND THEIR UTILIZATION	A. Le Quy
MDPFU/INF/6	WATER RESOURCES OF THE REPUBLIC OF THE SUDAN	
MDPFU/INF/7	MANAGEMENT OF THE HYDRAULIC RESOURCES IN GUATEMALA	E. Velásquez
MDPFU/INF/8	MANAGEMENT OF WATER RESOURCES IN MOROCCO: PRESENT SITUATION, PROBLEMS AND FUTURE PROSPECTS	M. Jellali
MDPFU/INF/9	COUNTRY PAPER OF THE REPUBLIC OF GHANA	N.B. Ayibotele

MDPFU/INF/10	EDUCATION, TRAINING AND DEVELOPMENT OF HUMAN RESOURCES IN THE FIELD OF WATER RESOURCES	UNESCO
MDPFU/INF/11	HUMAN RESOURCES DEVELOPMENT IN THE FIELD OF WATER RESOURCES IN THE ESCAP REGION	ESCAP
MDPFU/INF/12	PROGRESS IN THE ECLAC-GTZ, HORIZONTAL CO-OPERATION IN WATER MANAGEMENT IN LATIN AMERICA AND THE CARIBBEAN PHASE I	ECLAC
MDPFU/INF/13	REVIEW OF THE SITUATION WITH REGARD TO THE DEVELOPMENT OF WATER RESOURCES IN THE DROUGHT STRICKEN COUNTRIES OF THE AFRICAN REGION	ECA
MDPFU/INF/14	WATER RESOURCES DEVELOPMENT IN THAILAND	A. Chandarawongse
MDPFU/INF/15	SHALLOW SEWER SYSTEMS	HABITAT
MDPFU/INF/16	WATER RESOURCES: MOST RELEVANT FEATURES OF WATER RESOURCES MANAGEMENT IN BRAZIL	Office of Water Resources Mgt. Co-ordination
MDPFU/INF/17	MANAGEMENT OF WATER QUALITY IN GREECE	S. Papagrigoriou
MDPFU/INF/18	SOME FEATURES OF DEVELOPMENT OF THE WATER MANAGEMENT IN HUNGARY, IN THE LIGHT OF THE MAR DEL PLATA ACTION PLAN	J. Zákonyi
MDPFU/INF/19	COMMUNICATION DE LA BOAD AU SYMPOSIUM INTER-REGIONAL SUR LA GESTION DES RESSOURCES EN EAU	Banque Ouest Africaine de Développement
MDPFU/INF/20	WATER RESOURCES DEVELOPMENT AND MANAGEMENT, THE ISRAELI APPROACH	TAHAL consulting Engineers Ltd.
MDPFU/INF/21	FAO's ACTIVITIES RELATED TO THE MAR DEL PLATA ACTION PLAN	FAO
MDPFU/INF/22	REVIEW OF INTERGOVERNMENTAL AGREEMENTS/ACTIVITIES OF THE PEOPLE'S REPUBLIC OF HUNGARY IN THE FIELD OF WATER	J. Zákonyi
MDPFU/INF/23	TOWARDS ENVIRONMENTALLY SOUND WATER MANAGEMENT	A.K. Biswas L. Dávid W.R.D. Sewell
MDPFU/INF/24	FLOOD DAMAGE CONTROL: FRESH DEVELOPMENTS IN FRANCE	A. Jacq
	FRENCH COOPERATION IN THE FIELD OF WATER	Ministry of Foreign Affairs/Ministry of Cooperation