



Global Water Partnership (GWP)
Technical Advisory Committee (TAC)
**Regional Meeting on Water Resources Management
in the ASEAN Countries**

Hosted by the Asian Development Bank
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DISCUSSION PAPER

**KEY ISSUES AND STRATEGIES ON
INTEGRATED WATER RESOURCES MANAGEMENT
IN THE ASEAN SUBREGION**

29 May 1997

**Global Water Partnership (GWP)
Technical Advisory Committee (TAC)**

GWP/TAC MEETING IN ASEAN REGION

**ADB Headquarters
Philippines, 10-11 June 1997**

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ABSTRACT

The paper focuses on three key issues and strategies on integrated water resources management in the ASEAN region, namely, (1) national strategies, (2) river basin approach, and, (3) water conservation and savings. The paper also provides a brief background on the Global Water Partnership (GWP) and the Technical Advisory Committee (TAC), a summary of the guiding principles and strategies, and some possible cooperative actions with GWP.

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1. BACKGROUND

1. The Global Water Partnership (GWP), launched in August 1996 at the initiative of the World Bank, the UNDP and Sida, is an international network of organizations involved in water resources development and management. These organizations include government institutions, UN agencies, multilateral development banks, professional associations, research institutes, NGOs, and the private sector.

2. The GWP, a non-political mechanism, is not a donor and does not run programs of its own. Its major mission, however, is to support countries in the sustainable management of their water resources. In particular, GWP will, through its various services:

- support integrated water resources management by collaborating with governments and existing networks, and by forging new collaborative arrangements,
- encourage governments, aid agencies and other stakeholders to adopt consistent and complementary policies and programs,
- build and reinforce mechanisms for sharing information and experience,
- develop innovative and effective solutions to problems common to integrated water resources management,
- suggest practical policies and good practices based on these solutions, and,
- help match needs to available resources.

3. The governance structure of GWP consists of four components, namely, (1) the Consultative Group (CG), (2) the Steering Committee, (3) the Technical Advisory Committee (TAC), and, (4) the Secretariat. The CG, the highest, policy-making body of GWP, is composed of the representatives of all the member organizations of the GWP. The TAC, a group of 12 internationally recognized scientists and professionals with experience in water management, is instrumental in translating the internationally agreed principles of integrated water resources management into operational programs and projects for consideration by the CG.

4. The TAC held a preliminary meeting in June 1996 at Copenhagen, Denmark and convened its first regular meeting in November 1996 at Windhoek, Namibia to consider the issues in the South African region. The second regular TAC meeting is being held in Manila, Philippines to consider the issues and concerns in the ASEAN region. The major objectives of the Manila meeting are to:

- Discuss how to translate the internationally agreed principles on integrated water resources management into operational instruments for addressing key water resources problems in ASEAN countries.
- Identify the role to be played by the GWP in assisting ASEAN countries in developing these instruments.
- Make recommendations for concrete action by the GWP in the region

5. It may be noted that the workshop presents a unique opportunity for improving water resources management in the ASEAN region in general and improving the necessary institutions and programs in particular. The objective of arriving at desirable and implementable projects and their successful conclusion, no matter how limited, would demonstrate the advantages of regional cooperation with the assistance of GWP. It is therefore imperative to arrive at a consensus on the projects that may be undertaken immediately.

2. GUIDING PRINCIPLES & STRATEGIES

6. Many conferences and workshops have been held in the past on various issues on water resources development and management. Among the more significant ones were those held at Dublin, Rio de Janeiro, and Manila where the guiding principles and strategies for integrated water resources management have been formulated.

7. In the international conferences on water and the environment in January 1992 at Dublin, Ireland and in June 1992 at Rio de Janeiro, Brazil, an international consensus has emerged on the four guiding principles for integrated water resources management as follows:

- Fresh water is a finite and vulnerable resource, essential to sustain life, development and the environment.
- Water development and management should be based on a participatory approach, involving users, planners and policy-makers at all levels.
- Women play a central role in the provision, management and safeguarding of water.
- Water has an economic value in all its competing uses and should be recognized as an economic good.

8. In a regional consultation workshop for Asia and the Pacific convened by the Asian Development Bank (ADB) in May 1996, at Manila, Philippines, a regional consensus has emerged on the strategies for effective water sector development and management as follows:

- Prepare and adopt a national water policy and action program.
- Invest to manage the country's priority river basins.
- Increase the autonomy and accountability of service providers.
- Develop incentives, regulation, and awareness for sustainable water use.
- Manage the use of shared water resources and develop cooperation.
- Enhance water information, consultation, and partnerships.
- Invest in capacity building, monitoring, and learning.

9. Based on these guiding principles and strategies, the Manila meeting will focus on three specific issues that need priority attention and translate these into operational programs and projects for possible cooperative action with GWP.

3. KEY ISSUES

10. The TAC convened a regional group of six scientists and professionals in water resources management on 31 March and 1 April 1997 at ADB, Manila to identify the key issues that would be the focus of discussions at the Manila meeting on 10 and 11 June 1997. Among the seven

general strategies that have emerged at the recent ADB workshop, it was the consensus to concentrate on three priority issues, namely, (1) the national strategies, (2) the river basin approach, and, (3) water conservation and savings. These issues have been discussed at length in the workshop so that only an elaboration of these issues is provided in this paper together with some relevant quotations from the proceedings.

11. While it is recognized that there are many more issues on water resources management, focusing on a limited number of issues would be a more pragmatic approach to achieve the objectives of the meeting. The chances of success are greater in providing the countries in the region with a tangible impact of cooperative action with GWP.

3.1 National Strategies

12. All countries in the region have invariably adopted some strategies on water resources development and management. These strategies were generally oriented towards irrigation as many countries were dependent on an agricultural economy. Thus, irrigation has always been the largest user of water accounting for as much as 90% of water withdrawals.

13. With an increasing urban population and a gradual shift to an industrial economy, some countries are already experiencing the competition among the different users of water. Water supply agencies are under pressure to look for new water sources that are far away from urban centers and industrial sites. Most of these water sources, however, have been tapped earlier for irrigation.

14. In order to avert the serious consequences of a water crisis, it is necessary for countries to reform their current strategies. The strategic reforms at the national level may be in the following areas: (1) national water policy, (2) water sector apex body, (3) water law, (4) institutions, (5) data and information, (6) monitoring, and, (7) capacity building. Among the reforms that may be prioritized are those concerning an apex body for integrated water resources management and the strengthening of the data and information system. Actions on these areas must be addressed as early as possible as they would take a long gestation period before their impact would be realized.

Apex Body

15. Many countries in the region have separate agencies that have been organized as to be responsible for only a limited aspect of water resources development and management. Thus, there are separate agencies dealing mainly with water supply, irrigation, hydropower, flood control, water quality, watershed management, navigation, etc. With such a narrow and limited mandate, planning and programming in each agency are usually undertaken with little or no regard for the concerns of other agencies. It is generally recognized that an apex body is necessary to coordinate and integrate the activities of all water agencies.

16. Each country would most probably have its own specific objectives for organizing an apex body. A common objective is that an apex body is primarily a **coordinating and regulatory agency** rather than a development agency. Among the responsibilities of such an apex body that may be mandated are the following:

- Formulate the national policy and strategy for integrated water resources development and management. The management should include water resource regulation of both quantity and quality as well as economic regulation.
- Administer and enforce the water laws on quantity, quality, and economic regulation. Some countries, however, may prefer to have three separate agencies for quantity, quality, and economic regulation. Others may opt for a single agency for both water quantity and quality regulation and another one for economic regulation. The apex body generally referred to in many discussions deals only with water quantity regulation.
- Economic regulation generally refers to water utilities in order to prevent these monopolies from earning excess profits and continuing inefficiencies. In a broad sense, economic regulation may also include the use of economic instruments to implement the policy that water is an economic good. One such instrument is the “users pay and polluters pay” principle.
- Allocate water rights and, if needed, reallocate existing rights to other users for greater beneficial use. Most of the reallocations would probably be from irrigation to water supply users for which the affected parties should be properly compensated.
- Coordinate and integrate planning and programming in water resources. This may be achieved by providing a framework for the orderly development and management of the nation’s water and related land resources so as to promote economic development and social equity, and ensure environmental quality and sustainability in the long-term. Plans and programs of the various agencies may be reviewed and approved on the basis of the framework plan.
- Settle the disputes on the competition among water users. Decisions of the apex body may be appealed to the higher courts of justice.

17. Some countries in the region have shared water resources. For these countries, the additional role of their national apex bodies would include international cooperation and coordination in the development and management of their shared water resources. It may be noted, however, that the successful experience of the Mekong River Commission provides a framework in resolving the issues among riparian countries.

18. There is no model structure for an apex body as this depends on the traditions and administrative structure of each country. The common types of structures are national committees, councils, boards, commissions, authorities, and ministries. Some countries in the region as well as in other parts of the world may provide some lessons learned in the operations

of similar apex bodies. The experiences of some ASEAN countries have been recently documented in the proceedings of the ADB workshop in May 1996 and are quoted hereunder.

19. "The Philippines was in many ways a pioneer in Asia when in the 1970s it adopted a water code (still thought to be a model) and created the National Water Resources Board with primary responsibility for administering the code. However, the Water Resources Board has failed to live up to its promise. It reports to a line department and the Board includes ex-officio members from other water-using ministries. Both these factors have compromised its independence. Its role in detailed regulation of water rights and uses has detracted from its policy, coordination, and planning responsibilities. And its small technical secretariat has been severely constrained by a shortage of funds and other factors."

20. "In Indonesia, a National Water Council is presently operating under the aegis of the National Planning Agency, but it remains dominated by a powerful Ministry of Public Works that is responsible for water resources management, irrigation, and water supply and sewerage."

21. "In Vietnam, a 1994 decree assigned the National Water Agency function to the then Ministry of Water Resources, whose main responsibilities were irrigation, drainage, and flood control. It was expected that this would be followed by an administrative restructuring to give national water resources management its comprehensibility and impartiality. However, the integration of the Ministry of Water Resources into the Ministry of Agriculture and Rural Development at the end of 1995 made the situation confused as it tied the function of a National Water Agency to the line department for irrigation and drainage."

22. "Thailand has established coordinating mechanisms in the Prime Minister's Office but it has not adopted a unified water resources legislation or created an apex water resources agency despite longstanding proposals to this effect. The complex interests and political imperatives associated with water have clearly complicated efforts to establish an effective apex body at the national level."

23. These lessons learned from the ASEAN countries as well as those from other countries indicate the desirable features in the structure of an apex body, among which are the following:

- Sufficient authority and the political will to implement its decisions. Some agencies that have been provided with broad powers have been ineffective simply because of the lack of political will to exercise its mandate.
- Reporting to government at a high and unbiased level. In the hierarchy of the government organization, the apex body should be at a higher level than the water resources agencies and should therefore report to a higher level office that is unbiased.
- Independent from major water users. There are some advantages in having the major water users represented in the apex body since some of the non-controversial decisions of the apex body may be implemented immediately by the water users. The greater disadvantage, however, is that a representative of a water user agency often exercises veto power over issues concerning his agency because of the consensus type

of decision making in the apex body. Moreover, he may not bring up policy issues that affect his agency.

- A wider base of representation in the apex body. In some organizations, the politicians are over-represented so that they tend to dominate the discussion and decisions of the apex body. There should also be independent and unbiased members in the apex body.
- Transparency in its operations and in considering the interests of all stakeholders. This will ensure that most of the issues have been thoroughly considered and that the decisions would be readily acceptable to all stakeholders.
- Financially self-supporting from water charges for its operations. Management of the water resources, like all other activities, would involve certain costs that should be passed on to the water users in the form of water charges or fees. This should justify the operations of the apex body without having to go the national government for the yearly budgetary allocation. In some countries, however, being funded by the central government ensures the neutrality of the apex body.
- Flexible in its structure to take into account the changes in the social, political, and economic environment. The enabling act creating the apex body should allow flexibility in revising its structure without having to go back to congress for amendments. For instance, the apex body may find it necessary to have field offices to carry out its duties and responsibilities more effectively.
- Adequately trained and motivated personnel. It has often been said that a well-structured organization is only as good and effective as its personnel.

24. Each of the countries in the region may consider the objectives of their own apex body and which of the desirable structural features mentioned are applicable to their own needs. They may well include some other features they may deem appropriate and unique to local conditions. The ultimate objective is to arrive at a structure for the apex body that would ensure an integrated management of the water resources of the country.

25. Notwithstanding the foregoing discussions on the need of an apex body, some countries may not consider the formal institution of an apex body as a high priority. Their current institutional framework is considered adequate to address the issues of integrated water resources management. Moreover, their water resources are considered to be abundant so that conflicts and competition in water use are not foreseeable in the near-term.

Water Data and Information System

26. It is axiomatic that adequate water data and information are essential for development and management of water resources. In a number of cases, however, plans and programs are prepared even with insufficient data. The result is that most of the completed projects fall short of the expectations.

27. Many countries in the region have expressed the need to strengthen their data and information system that includes not only hydrologic data but also social, economic, and environmental data. Among the problems mentioned are the following:

- The quantity and quality of available data is generally inadequate to assess the hydrological and environmental characteristics of the country.
- Much of the data collections are generally project-oriented. The observations in the data stations are generally terminated once the objectives of the projects are completed.
- The program to carry out long-term observations is generally inadequate. The coverage and density of observation stations is generally below internationally acceptable standards.
- Training of data collection technicians is inadequate. Many of the technicians are not aware of the significance of an accurate data collection.
- The budget for the data system in real terms has been decreasing over the years. Data collection agencies have to compete with development agencies for the scarce resources of government. In such a competition, the budget for data collection is usually of a lower priority. There is usually very little or no provision for expanding the network and upgrading instruments and equipment.
- Access to available data is generally inconvenient. This is more pronounced when there are many agencies collecting various types of data.
- There is a paucity of research to evaluate the significance and implications of the data collected. Water resources management is sometimes based on conceptual ideas rather than on the results of a rigorous analysis of data and information arising from research.

28. Countries in the region may consider reforms in the data system to address the problems mentioned. The apex body, if it is established, may initiate the reforms. Among the actions that may be taken are the following:

- Rationalize the design of the data network for long-term observations to ensure adequate coverage and density of observation stations. Some of the project-oriented data stations may be integrated in to the network.
- In cases where there are several data collection agencies, designate the lead agency for collecting each type of data. It is also necessary to adopt uniform standards for data collection.
- Design a computer-based wide area network that would electronically link the databases of the various agencies. With existing technology, it may not be necessary to have a traditional centralized data bank with an extensive document collection in hard copies.

- Develop a continuing training program for data collection technicians. This program has often been neglected and not given sufficient importance.
- Promote research on the significance and implications of the various types of data being collected. The results of the studies may be used as a basis for decisions and actions on integrated water resources development and management.
- Recommend to the national leadership the need for an increased budgetary allocation for data collection. The increase may be done in phases to correspond to the need to expand the network and to upgrade the instruments and equipment.

29. In the final analysis, the success of instituting the needed reforms in the national strategies depends on a strong political leadership at the highest levels of government. Without the support of the national leaders, the expectations from the proposed reforms would not be realized.

3.2 River Basin Approach

30. The formation of a River Basin Organization (RBO) is globally recognized as an effective means of planning and implementing an integrated water resources development and management program for a river basin. Its basic mandate is to coordinate and regulate the development and management of the water resources in the basin. Since many of the existing national and local agencies also have similar mandates, the structure of an RBO depends on the state of water resources development and management in the basin as well as on the national policies and traditions on the devolution of authorities and responsibilities. There are roughly three types of structures that are characterized for purposes of discussion in this paper as a coordinating council or committee, a commission, and an authority.

31. A River Basin Council is generally adopted for basins where the major projects and facilities for water resources development and management have been completed so that the major issues are on the management of these projects and facilities for sustainable development. It is essentially a regulatory body that resolves policies, strategies, and operating principles. There is a minimal devolution of authorities and responsibilities from the existing agencies involved in water resources development and management. The river basin organizations in France and the United Kingdom may be classified under this type although they are not formally named as “Councils”.

32. A River Basin Commission is generally adopted for basins where there is a significant number of development options as well as potential conflicts and competition for water use. In this case, the commission may take the additional role of developing an integrated macro plan for the basin in addition to its basic coordinating and regulatory role. Some of the macro planning responsibilities of the development agencies may be devolved to the commission. Implementation of the projects in accordance with the macro plan is generally undertaken by the existing development agencies. Examples of this type of structure are the River Basin Commissions in China as well as that proposed for the Dong Nai in Vietnam.

33. A River Basin Authority (RBA) is generally structured as a multi-purpose agency to undertake both development and as well as management activities within its territorial jurisdiction in addition to its regulatory role. This implies the devolution of most of the authorities and responsibilities of national and local government agencies operating in the basin to the RBA. This process of devolution has generally been mentioned as a major difficulty in the successful operations of an RBA since the interests of these agencies have long been entrenched. Moreover, the dual role of an RBA of being a developer and a regulator may be to the disadvantage of other developers. Among the examples of this type of structure are those adopted for the Tennessee Valley in the USA, the Snowy Mountains in Australia, the Mahaweli in Sri Lanka, the Brantas in Indonesia, and the Laguna Lake in the Philippines.

34. An RBO need not be an executive agency as described in the various types of structures above to be effective. It may also be structured as an advisory agency whose authorities and responsibilities are well defined. In fact, it may be more prudent to institute an RBO only when there is clearly a demand for such an organization. The major issue that should be considered is the need to coordinate, integrate, and regulate all water resources related activities in the river basin.

35. While there are many successful RBO models world wide, there are also those that have failed to live up to expectations and have become ineffective. The major problems identified by the River Basin Group in the ADB workshop are (1) institutional weakness, (2) inappropriate policy and regulatory framework, (3) inadequate data and information, (4) problems in coordination, and, (5) lack of community involvement.

36. *"Institutional Weakness.* The Group felt that this was an overriding issue. Legislation is often old or inappropriate. Institutional arrangements at the basin level are often nonexistent. Or where they do exist, they are inefficient with numerous agencies having overlapping functions. Staffs in these institutions are often quite demotivated and undertrained and have limited opportunity for specialization or other career benefits. Capacity building is thus critical to developing a work force that is motivated and knowledge driven."

37. *"Inappropriate Policy and Regulatory Frameworks.* The Group emphasized the need for an effective policy framework covering all natural resources issues to ensure their proper consideration in major catchment management, water reallocation, and basin management schemes. Other factors to be included are the balance between urban and rural interests, the needs of environmental flows, riparian vegetation and riverine health, and the maintenance of water quality standards and objectives. Moreover, the Group felt that an effective policy, regulatory, and coordination framework for water management was essential if the private sector was to commit to major water infrastructure projects. It is critical that resource management considerations be reflected in the legal contracts relating to any franchising or privatization proposal. Water in any basin needs to be properly regulated and priced, and those who lose or surrender rights need to be properly compensated."

38. *“Inadequate Data and Information.* The quantity and quality of data available is generally inadequate, a problem that is made more difficult because many DMCs tend to be less transparent and accountable than their developed counterparts. Two types of data that are needed are traditional types of hydraulic data, and data on nontraditional areas, such as social impact and the environment in relation to basin concerns. Success or failure in water resources development would depend in large measure on rectifying data deficiencies and in interpreting data in ways that inform decision making and provide an analytical underpinning to water resource planning and management.”

39. *“Problems in Coordination.* Even when appropriate institutional structures are in place, a prevalent problem is the lack of coordination and mutual consultation between agencies and interest groups. While the severity of the problem varies, many water resources projects are undertaken on a project-by-project basis and integration across jurisdictions, agencies, and activities is often weak.”

40. *“Lack of Community Involvement.* There was concern among the Group as to how greater degrees of community input and decision making could be achieved, when sometimes there may be a million or more people in a large river basin. However, there was strong support for the view that the community wants a greater say and wants to be informed. They believe that it is up to the bureaucracies and governments to find the best way of doing this in a manner appropriate to each circumstance.”

41. An RBO is essentially an office to which many of the functions of an apex body have been devolved. Thus, the desirable structural features of an apex body are also applicable to an RBO. In addition to being a coordinating and regulatory agency for the basin, however, an RBO may also be involved in some planning and development activities. Some additional desirable features specific to a successful RBO based on lessons learned are as follows:

- Sufficient size of the river basin with problems of competition and conflicts in water resources development and management as to justify a separate organization. For the small basins, the local agencies should be competent enough to develop and manage the water resources. Some of the basins may transgress several political boundaries, or even countries, that only an independent organization is appropriate. The Mekong River Commission is an example.
- Clearly defined authority and responsibility that would not override the prerogatives of the national and local agencies. These long-established agencies would not easily give up their traditional role. Moreover, the regulatory role of an RBO must not be compromised in undertaking its own development activities to the detriment of other development agencies.
- Adequately trained and motivated personnel. In addition to technical training, the personnel of an RBO should be sensitized to deal with the varied interests of all stakeholders in the basin.

- Adequate data, information, and modeling studies that would lead to sound policies and sustainable solutions. State-of-the-art modeling studies when based on adequate and good quality data would minimize the need to make arbitrary decisions.
- Full consideration of all issues on water and related land resources. This would inevitably include a thorough analysis of the trade-off among alternative plans.
- Effective procedures for community participation in the planning and programming of water resources activities. While the consultative process is generally slow and time consuming, the success of any undertaking depends to a large extent on arriving at a consensus among all stakeholders.

42. The local conditions in each country should determine the propriety of an RBO for some of its river basins where there are competing and conflicting uses of water. Some of the lessons learned may be considered in determining the appropriate structure of the RBO taking into account the social, political, and economic conditions of each country.

3.3 Water Conservation and Savings

43. The need for more water is usually attributed to population growth, urbanization, and industrialization. In addition to providing for domestic and industrial needs, more water is needed for irrigation to satisfy the food requirements of a growing population. The two basic approaches to the problem are on the supply-side and demand-side of water resources development and management.

44. The supply-side approach includes the development of new water sources. These developments, however, generally involves large capital expenditures which poses some difficulty for many countries. Moreover, some countries are at the stage where new sources may not be economical to develop.

45. The objective of meeting the demands may also be achieved with an efficient and effective water demand-management program. This would include water conservation measures as well as water savings from increasing the efficiency of existing facilities. The losses from old water supply systems have been reported to be as high as 50%. In irrigation systems, water losses of about 60% are not uncommon.

46. Efficiency in water use may be achieved by a combination of incentives, new technology, regulatory controls, and public information and education programs. Among the measures that may be adapted to effect water conservation and savings are the following:

- Subsidized funding for rehabilitation and improvement of water systems. This will provide incentives to the operators of these systems who find it more expeditious to increase water fees to meet operating costs rather than to reduce water losses.

- Privatization and commercial operations of water systems. The increased efficiency of a private enterprise over that of a government agency is well known. In as much as there is a natural tendency for water utilities to be monopolies, an economic regulatory agency of the government is essential to prevent the utilities from earning excess profits and continuing inefficiencies.
- Water tariffs and penalties. In theory, these economic instruments should be very effective in determining the economic value of water. More studies, however, are needed to determine the levels of tariffs and penalties that would have a significant impact on water conservation and savings. Some water users who can afford to pay the charges may not bother with reducing their consumption. In addition to the social, political, and economic factors, the tariffs should also consider the availability of water. There may be a different schedule of tariffs and penalties during drought conditions.
- Monitoring and metering systems. This will pinpoint the areas where corrective measures are needed to attain substantial water savings.
- Recycling of water, including treatment of wastewater for reuse. This should result in a reduction in the need for water with higher standards of quality. The incentive for this measure is the application of the “users pay and polluters pay” principle that would make it cheaper to use recycled water as well as to treat wastewater.
- Irrigation scheduling to better fit climate and rainfall patterns. This must be accompanied by forecasting studies on rainfall to attain substantial water savings and minimizing the possibility of crop failure due to lack of water.
- Crop diversification for efficient water use. The objective is to reduce water consumption by shifting to higher value crops that require less water as compared to rice. This is especially attractive in small land holdings that are traditionally planted to rice by providing opportunities for larger economic returns.
- Publicity campaigns and education programs towards reducing water consumption. The programs must be sustained and not a one-shot undertaking in order to have a change in attitude and practices in water use. These programs should result in substantial water savings.
- Wider use of water-saving devices. In addition to making available the information on these devices and to potential amount of water savings, incentives may be provided to replace existing devices that consume more water. In new projects, the use of some of the well-proven water-saving devices may be mandatory.
- Development of an attitude of “community ownership” of water facilities. As “owners” they have a greater stake to ensure the sustainability of the water facilities and the water supply.

47. All of these demand-management measures are intended to change individual and group behavior. It is recognized that addressing these measures in combination is more effective in changing behavior rather than implementing the measures separately. A pragmatic approach

would be to gradually institute these measures in phases so as to be socially, economically, and environmentally acceptable. For instance, water charges may be imposed gradually rather than implementing the full amount arrived at by economic analysis. Subsidies may also be gradually reduced. After a successful public information and education campaign, the full charges may be imposed and the subsidies withdrawn.

4. COOPERATIVE ACTION WITH GWP AND STRATEGIES FOR REFORM

48. There is a great potential for cooperative action with GWP in helping ASEAN member countries for implementing, in the long-term, many programs and projects in accordance with the Dublin guiding principles and the ADB strategies for integrated water resources development and management. The major role of GWP would be to catalyze action in the ASEAN member countries to examine and reform, if necessary, their current policies and strategies in water resources development and management. This role may also include assistance in strengthening regional cooperation in water resources activities like the Committee on Water Resources for the ASEAN Region. In the short-term, the GWP may assist in implementing the proposed priority measures mentioned in the foregoing discussions. Among the specific projects that may be undertaken at the regional level as well as for individual countries are the following:

49. Studies on the establishment and/or reforms of water sector apex bodies.

The major objective is to arrive at the appropriate structure of an apex body for a particular country that takes into account its traditions and administrative structure as well as the lessons learned in other countries.

50. Inventory of best practices in water data systems.

The major objective is to adapt the globally recognized best practices in water data systems to the various countries in the region. This includes a consideration of the appropriate equipment and instruments as well as the structure for efficient data storage and retrieval.

51. Design of a regional water information network.

The major objective is a sharing of information among the countries in the region on the various projects on water resources development and management. Countries in the region would be encouraged to document their experiences. The regional network may eventually be linked to an international network. The use of the Internet is a promising approach.

52. Capacity building for data collection technicians.

This involves the development of a continuing training program for technicians to ensure the quality and accuracy of data collection. It is envisioned that a corps of trainers would be formed in each country to sustain the training program in anticipation of the inevitable turn over of technicians as they move on to positions of higher responsibilities.

53. **Studies on River Basin Organizations.**

The major objective is to arrive at the appropriate structure of a River Basin Organization for the basin of a particular country that takes into account its traditions and administrative structure as well as the lessons learned in other countries.

54. **Studies on water demand management.**

The major objective is to develop an appropriate program of water demand management that includes measures for water conservation and savings for each country that is socially, politically, and economically acceptable and that takes into consideration the experience of other countries.

55. **Studies on community and women participation.**

The major objective is to develop an appropriate program for community and women participation for each country that is socially and politically effective and that takes into consideration the experiences of other countries.

56. It may be noted that most of the special studies and projects proposed may be considered as part of the "catalytic services" that the GWP may provide. These projects would also provide the mechanisms for increased regional cooperation. The ASEAN Regional Group that would be established under the auspices of GWP would play a key role for the provision of services in response to requests from ASEAN member countries.

57. The strategies for reform must be suited to the administrative structure and traditions in each country. In some countries, it may first be necessary to hold an introductory workshop under the auspices of GWP to sensitize the national leadership on the Dublin principles and the ADB strategies for integrated water resources development and management. For other countries, the workshop may deal specifically on the objectives and scope of some of the projects identified in this paper. Discussion papers would have to be prepared essentially along the lines of the ADB "blue book".

58. The major objective of the introductory workshop is to identify the special studies and projects that need to be undertaken. It may well be that some of the studies identified earlier in this paper may be part of the list identified in the workshop. The advantage of this process, however, is that the decision-makers have by themselves identified the projects for which there is a tacit approval for their implementation.

59. After the completion of the special studies, the complimentary policies and action plans may then be formulated. This would probably involve another workshop involving all players and stakeholders to develop the various parameters for implementation. The assistance of the GWP would be very helpful in all stages of the above-mentioned strategies.

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