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PROSPECTS AND NEED FOR INTEGRATED WATER RESOURCES MANAGEMENT IN THE ESCWA REGION

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- The views expressed in this report are those of the author and do not necessarily reflect those of the United Nations Economic and Social Commission for Western Asia.

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I. INTRODUCTION

The aim of this paper is to question the prospects for adopting the integrated approach for water resources management. This has been done through:

- (1) Quick review of the present situation in the ESCWA region;
- (2) Identifying and analyzing the prevailing water resources constraints that limit their development and render them fragile and sensitive to man interference;
- (3) Instead of analyzing the practiced water management approaches in the ESCWA member countries, the current water resources problems prevailing in the ESCWA region have been identified and analyzed as an evident reflection and direct outcome of the adopted management practices and approaches.

Generally speaking, the short comings of inadequate water policies and management practices in most of the ESCWA countries are evident;

- (4) The concept of, and an approach for integrated water resources management (IWRM) has been given in response to the actual and existing problems and inadequacies.

Finally we have to question whether the IWRM can and should be adopted to the physical, environmental, cultural and socio-economic realities in the ESCWA region, or whether the only prospect for the adoption of such approach requires a wholesale change in attitude, awareness and intent in our policy and decision making, institutional, and cultural systems.

II. BACKGROUND

Although the total amount of water on Earth is generally assumed to have remained virtually constant during recorded history, periods of flood and drought have challenged the intellect of man to have the capacity to control the water resources available to him. Currently, the rapid growth of population, together with the extension of irrigated agriculture and industrial development, are stressing the quantity and quality aspects of the natural water resource system. Because of the increasing problems, man has begun to realize that he can no longer follow a use and discard philosophy in managing the natural resources in general and the water resources in particular. As a result, the need for a new and sound policy for the management of our finite water resources has become necessary.

Sound water management, however, should be founded upon a thorough understanding of water availability and water demand in time and space.

Most of the ESCWA countries are located within arid and semi-arid zones and they are facing more serious problems than ever before. Water shortages, desertification, and frequent intensive droughts are major challenges in these countries, as they may contribute to economic and environmental devastation. The drought-stricken countries all over the world portray the difficult problems being faced by arid regions. In addition, factors of higher temperature, less precipitation, and reduced soil moisture could worsen the current critical problems of water supply, agricultural production, and environment.

Fresh surface water resources are very limited in most of the ESCWA countries due to the prevailing climatological and hydrological condition, and where they exist there are enough problems of managing them as they are mostly shared by other countries. In addition, they are subject to contamination threat by uncontrolled discharges of municipal, industrial and agricultural drainage waste water.

On the other hand ground water is relatively widely spread in most of the ESCWA countries and they are easy and reasonably economical to develop. However there are critical natural constraints and characteristics for most of these ground water resources that limit the extent of their development, and render them environmentally fragile and subject to overdraft and quality deterioration. The most prominent and serious of these natural constraints is the fact that largest ground water aquifer in the ESCWA region are either non-renewable, or receive limited annual replenishment from rainfall and floods, as compared to the actual production rate or demand. In addition their quality is mostly marginal and subject to further deterioration as a result of over-pumping.

Generally, the renewable conventional water resources in the ESCWA Region are expected to be fully developed and exploited by the year 2000. In the Gulf countries, we in fact can not talk about renewable water resources, surface or underground, because these resources are so limited as compared to the demand. Therefore, great reliance have been placed on non-conventional sources, mainly desalinated sea water, and lately for specific uses, treated of waste water. Plans should be intensified for such new technologies.

These adverse conditions, combined with the rapidly increasing population and economic activities, have led to demands for water which greatly exceeds the available resources. The response over the past 30 years was the planning and construction of many medium and large-scale water development projects, with primary emphasis on irrigation and urban-industrial water supply in particular. Although the achievement of these large-scale water development programs were sometimes impressive, results were not always as expected. In many cases, serious social and environmental costs were incurred.

However, in spite of a wide range of water resources and water supply problems in most of the ESCWA member countries, good trials for the adoption of the integrated approach for water resources management could be recorded in some countries like Jordan, Egypt, Saudi Arabia, Kuwait, United Arab Emirates and others, but with varying levels of success. The limited successes in this region, in general, may be attributed to absence of well and clearly formulated policies for the water sector or the inadequacies of the existing ones. Weaknesses in the institutional framework in most of the countries is also a major limitation.

III. PROBLEMS, CHALLENGES AND NEED FOR IWRM

The scarcity of water in the ESCWA region should be looked at as a strategic problem which requires greater attention and intensification of government efforts.

Water scarcity and increased competition on water for different water uses are going to be some of the most prominent features in the 21st century, in many countries and regions all over the world and not only in the ESCWA region.

Success so far in this respect is still limited in spite of our realization of, and suffering from water supply shortages and inadequacies, and our closeness to the red lines.

Failure to solve this strategic problem, and alleviating the pressure on our water resources threatens their capabilities to continue yielding on sustainable basis.

The following water problems have been observed in some or all of the ESCWA countries, and they are clear evidences to the inefficiency and inadequacy of the adopted water resources management in at least some of the ESCWA countries:

- * The increasing gap and imbalance in the water balance equation (Resources versus demand) particularly for municipal and agricultural demands.
- * The pollution and quality deterioration of the fresh water resources, surface and ground waters.
- * Overdraft of the most important ground water resources

These problems are intensified by the increased complexities of the social and economic activities, and the growing competition on water demand. These aspects will continue to be some of the most striking features of the 21st century.

- The problem of over-development of ground water resources has become a common and serious problem in most of ESCWA countries, which has lead or will soon lead to serious social and economic impacts. Integration of these water resources with the total water resource system, and within an overall institutional and legislative framework seems the most promising option to protect, and conserve such resources and achieve their sustainability.
- Over pumping of ground water resources which receives little or no annual replenishment will soon affect the sustainability of these resources and the developments based on them.

The best way for managing such non-renewable resources would be by supplementing, and integrating them with other available renewable and/or non-conventional water resources such as treated waste water and desalinated water.

Augmentation of such non-renewable resources by water surpluses from other sources, during periods of high flows and water production and low water demands, is also an important practice for seasonal or long term under ground storage.

These problems are caused by some or all of the following reasons:

- * Lack of an official policy and strategy for the water sector or inadequacy of the existing ones.
- * Lack of or inadequacy of existing legislations, or inefficient implementation and enforcement.
- * Lack of awareness and intent for proper management particularly for the ground water resources.
- * Inadequate institutional frameworks, lack of coordination between concerned institutions and sometimes lack of sufficiently trained manpower.
- * Inefficiency in the used water systems particularly in the municipal and agricultural sectors.
- * Inappropriate assessment, evaluation and monitoring of the existing ground water resources in terms of their practical sustained yield.
- * Sometimes, lack of understanding of the concept of and approach for water management in general, and the integrated approach for management in particular.
- * Rapidly increasing population and consequent increase of water demand and food production
- * Rapidly increasing urbanization and consequently municipal water demand

- * Sharing of some of the largest surface and ground water resources, and in the mean time lack of agreement on the legal basis and understanding for managing these water resources, particularly in the absence of political harmony between the sharing countries.

In view of all these challenges, constraints, problems and complexities of the water resources, water sector, the traditional water resources management, and in many aspects, has become inadequate and inefficient to provide adequate solutions for the emerging problems and needs. Consequently, there is an urgent need for reconsideration of the current water resources development and management programs and policies, and the adoption of new concepts and approaches for water resources management, which would consider the whole spectrum of water resources, water uses, socio-economic development, and environmental aspects, in a comprehensive and integrated manner, rather than considering water as merely an input for a given type of use or development.

So far, the emphasis has been mostly on the technical aspects of combating the physical problems of development with not enough attention to related social, economic, institutional, environmental and political elements of water management.

IV. CONCEPT AND REQUIREMENTS FOR IWRM

CONCEPT:

Water resources management is defined as a set of actions taken to use and control natural resources inputs such as water to obtain outputs and natural system conditions useful to society. Water resources management is regarded as (1) a process involving planning and implementation, (2) a set of linked activities and tasks (e.g., water storage, transmission, distribution, and allocation), and (3) a set of physical measures (e.g., dams and canals), implementation tools (e.g., regulations and economic incentives), and institutional and legislative arrangements needed for proper implementation.

Integrated water resources management (IWRM) means a set of actions that takes appropriate account of the important physical, economic, social, and cultural linkages within the water system.

Physical linkages include the relationships between the various conventional and non-conventional water resources, the scarcity of water in relation to water demand, the suitability of water quality to the various water uses and the water quality requirements for such uses, the relationships between the various surface and ground water resources as well as the non-conventional water resources such as water desalination, municipal waste water, and irrigation drainage water.

The hydrological and hydrogeological regimes and relationships between the conventional and non-conventional water resources, and the water-land-Environment

relationships should also be clearly understood and considered. The economic linkages between water uses such as irrigation and hydroelectric power, and social linkages between water development and people who are benefited or adversely affected, should also be considered.

Emphasis should be placed on management approaches that will be relevant to water resources management problems likely to be encountered, on the short, medium and long terms.

OBJECTIVES

The goal for the integrated water resources management is to develop these resources and the related development sectors in a sustainable manner.

Sustainable water resources development aims at achieving certain social and economic objectives, and in the mean time, to maintain a balance between the available water resources and the water demand, as well as between water resources and other environmental resources.

Water is essential for the survival of mankind and every living creature. It interacts with almost every aspect of our life and greatly influences our social and economic development.

A good water management is that which successfully manages this relationship between water and development so that it maximizes the positive impacts and minimizes the negative ones.

The relationship between water and development must consider the long-term perspective. It also must be flexible to cope with the changing conditions and needs. In addition water management needs to be implemented at the appropriate time and in the right place through an appropriate set of legislation, laws and by-laws.

SCOPE

The scope for integrated water resources management may be viewed from various aspects as indicated in the following analysis:

A. Integration within the water sector:

- * Among the various water resources
 - conventional and non-conventional water resources
 - surface and underground waters
- * Among all water uses, municipal, industrial, agricultural, and recreational levels.
- * Integration at the various levels of planning, development and management .
- * Integration at the institutional level among the various institutions dealing with water resources and water uses, to ensure functional harmony, coordination and cooperation, and to avoid conflicts.

- * At the legislative level to assure harmony and conformity and to avoid contradictions and conflicts.

B. Integration at the physical boundary levels:

- * At the hydrological (surface water) and hydrogeological (groundwater) levels.
- * At the country level between the various and the total water systems: resources and uses.
- * At the regional level for the surface and groundwater shared basins and the related environmental problems of water pollution, waste discharges, and the interdependency between surface and groundwater resources in certain areas.

C. Integration at the sectoral level between all economic and social sectors dependent on, or related to water.

REQUIREMENTS:

A successful application of the IWRM can be achieved through applying an integrated set or system of procedures elements, and management tools, the achievement of which could become an important tool for successful coordination and cooperation between the various institutions which deal with water. In addition IWRM requires special technical and administrative skills and experience, good planning and appropriate institutional framework. Such institutional framework requires appropriate legislative control to properly assign duties and functions between the different institutions, and avoid conflicts of interests. In short, the

application of IWRM requires a good understanding and realization of the concept of integration and the use of an appropriate approach for implementation in all stages of planning and development.

- * The most important aspect is the adoption of an appropriate official policy for the water sector, with a set of specific social and economic goals and objectives.

Such a policy should be adopted within the context of the integrated and comprehensive approach. The same applies to the formulation of strategies and legislations which are the tools for achieving the policy goals.

- * In every country there are special institutions dealing with water management, and there are certain water laws and legislation. However, we may find conflicts, contradictions, and disputes between these institutions in one country.

Meanwhile, the existing legislation lack the flexibility and periodical review and updating to cope with ever-changing conditions, problems, objectives, and development plans.

- * IWRM requires placing more emphasis on the various means and tools for rational and efficient water use including the modern technologies in the municipal, industrial, and agricultural uses.

- * IWRM also requires considering both the quantity and quality of water for the different uses. Re-allocation of water resources for different water uses may be considered based on the suitability and availability of water for the various uses.

- * IWRM progresses in two parallel lines: water resources management and demand management.

Demand management means the application of certain direct and indirect rules and practices to reduce water consumption, minimize waste and prevent misuse.

- * Under IWRM, the management unit could be a river basin, a groundwater basin, a governorate or the whole country.

However, it is more difficult to apply for political unit than in a physical geographic area.

- * In arid and semi arid regions where natural water resources are limited, greater efforts should be placed on development of non-conventional water resources. Most important of these are: treated waste water, desalinated water, and agricultural drainage water. This can be achieved by integration with conventional water sources, reuse, and recycling.

- * Finally the environmental dimension in terms of impacts should be considered to achieve an over all sustainable development.