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ON

ISSUES RELATED TO THE AVAILABILITY OF WATER
RESOURCES ASSESSMENT DATA IN
THE ESCWA REGION

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Introduction

The United Nations Water conference in 1977 recognized that in most countries there were serious inadequacies concerning the availability of data on water resources, particularly in relation to groundwater and water quality, and that little importance had been attached to its systematic measurement or to the processing and compilation of data.

As far as the ESCWA region itself was concerned, the report of the regional preparatory meeting for the conference, held in Baghdad in November 1976 (document E/ECWA/42/REV.1; E/ECWA/NR/CONF.3/2), stated that "almost everywhere in the ECWA region there is a shortage of meteorological data." As far as hydrological networks is concerned, the report stated that "while some countries in the region have no need for surface water measurements, and others have only a limited need, most other nations have an urgent need for hydrological stations and networks." In the case of hydrogeological networks, the data gathered from observation wells, was considered as hardly constituting a network since many observations were not recorded in a systematic way, and records were usually not sent to a central storage point for summation and interpretation.

The United Nations Water Conference in recommendation A of the Mar del Plata Action Plan stressed the importance of acquiring greater knowledge about the quantity and quality of water resources in order to improve their management. To this effect it stated that the "regular and systematic collection of hydrometeorological, hydrological and hydrogeological data needs to be promoted and be accompanied by a system for processing quantitative and qualitative information for various types of water bodies."

The conference made a number of recommendations for action at the country level, some of which are reproduced below as they pertain to the scope of this report:

"(a) Establish a national body with comprehensive responsibilities for water resources data, or allocate existing functions in a more co-ordinated way, and establish data banks for the systematic collection, processing, storage and dissemination of data in agreed formats and at specified intervals of time;

(b) Expand and extend the network of hydrological and meteorological stations, taking a long-term view of future needs, following as far as possible the recommendations of the United Nations specialized agencies on standardization of instruments and techniques and comparability of data, and use existing meteorological and hydrological data series for the study of seasonal and annual fluctuations in climate and water resources. Such analysis could also be used in the planning and design of networks;

(c) Establish observation networks and strengthen existing systems and facilities for measurements and recording fluctuations in ground-water quality and level; organize the collection of all existing data on ground water (borehole logs, geological structure, and hydrogeological characteristics, etc.) systematically index such data, and attempt a quantitative assessment so as to determine the present status of and gaps in knowledge; increase the search for, and determination of, the variables of aquifers, with an evaluation of their potential and the possibilities of recharge;

(d) Standardize and organize as far as possible the processing and publication of data so as to keep the statistics up to date and take advantage of the observations made in stations operated by different institutions"

The remainder of this paper endeavours to assess progress since the conference with regard to these recommendations. Most of the data used in the analysis is derived from WMO's 1987 edition of its Hydrological Information Referral Service - INFOHYDRO, as well as the 1977 edition entitled "Statistical Information on Activities on Operational Hydrology. Information for the countries in the region is rather spotty, and comparison through time is consequently difficult. Nevertheless, some general observations indicative of the existing situation are possible. This information has further been supplemented by data derived from a questionnaire sent to Governments in 1984 with a view to assessing progress in the implementation of the Mar del Plata action Plan.

I. Institutional aspects

So far as it can be determined the region as a whole is yet to follow recommendation (a) above concerning the establishment of a national body with comprehensive responsibility for water resources data or the allocation of a co-ordinating function. The available information indicates that only Lebanon and Jordan have so far allocated centralized responsibility to a single organization. A third country, Egypt, has formally allocated the co-ordinating function within one organization. In other cases co-ordination, if any, is carried out on an ad hoc basis. All of the seven countries replying to the 1984 questionnaire indicated that they were experiencing some degree of difficulty in co-ordinating data collection and analysis.

As far as data banks are concerned the 1987 INFOHYDRO information, as well as the replies to the 1984 questionnaire indicate that 5 countries in the region were known to have established computerized systems (Egypt, Bahrain, Jordan, Lebanon, Oman and Qatar) at least for partial use. It appears however that as of 1987 the amount of basic information stored remained relatively low, and that the amount of analyzed data is even lower. For the most part, it would appear that much of the information that is available is in the form of primary data as normally observed in the field or in laboratories (in the case of water quality), and not in the form of analyzed data including statistics of data such as averages, duration curves, unit hydrographs etc. Existing data is mostly stored manually in files and are not amenable to easy access. To the extent that this is the case this data remains of relatively little use for planning and management purposes.

II. Status of Networks

albeit spotty in nature, the available information suggests that it is very doubtful that any significant progress region-wise has taken place with regard to meteorological, hydrological and hydrogeological networks since the Water Conference.

Out of six countries replying to questions concerning the adequacy of areal coverage in the region, as contained in the 1984 questionnaire, one half of the respondents felt that such coverage was adequate in the case of surface waters, and 71 percent expressed satisfaction in the case of areal coverage for groundwater resources. Sixty per cent of the responses expressed satisfaction with the reliability of the coverage

As shown in the table below, however, confidence in the adequacy of observations networks for time independent and time dependent data on the whole was lower. Nevertheless, the higher percentage of replies showing plans for the expansion of networks was generally high.

Table 1: Status of Observation networks -1984

	Adequate	Reliable	Expansion of networks planned
<u>1. Time dependent data</u>			
Precipitation	71%	86%	57%
Evaporation	29%	57%	57%
Surface Water	40%	40%	80%
Groundwater	57%	71%	86%
Water quality	43%	71%	86%
<u>2. Time independent data</u>			
Physiographical	33%	66%	66%
Geological	57%	71%	100%
Hydrogological	43%	71%	86%
Boring description	43%	71%	86%
Well logs	43%	71%	86%

Source: Replies to the 1984 questionnaire on progress in the implementation of the Mar del Plata Action Plan

As far as the density of networks (Km² per station) for surface-waters in the North-Eastern part of the region is concerned (Egypt, Iraq, Jordan, Lebanon and Syrian Arab Republic), the information suggests that in the case precipitation and evaporation stations three out the five countries exceed the minimum density standards recommended by WMO. One country is within the standards, and one country is below them. Concerning hydrometric stations (stage and discharge) four out of the five countries in the subregion exceeded the recommended density standards for discharge, and one country is in within these minimum standards. In the case of observation stations for stage measurements one country may not have any facilities for such measurements.

The situation with regard to measurements concerning sediment discharge and sedimentation, as well as measurements for water quality appears to be serious. Two countries may not have any observation stations for either sedimentation or water quality; a third country may be within the minimum standards recommended by WMO, and only two countries might do better than these minimum standards.

Progress since the Water Conference, if any, has been extremely limited, particularly with regard to the ability to monitor surface water quality. In the Arabian Peninsula, Saudi Arabia appears to have made significant progress in most types of measurements. The situation appears to be the same in the case of groundwater resources, which may be particular serious with regard to the monitoring of water quality. The capability of the countries in the region with regard to the monitoring of groundwater quality seems to range for being very limited to non-existent.

III. CONCLUDING REMARKS

As emphasized by the United Nations Water Conference, the availability of suitable quantitative and qualitative hydrological and hydrogeological data is an indispensable element for the rational management and sustainable development of water resources from an economic, social and environmental point of view.

The existing data on the availability of surface and groundwater in the region, as well as estimates of current and future demands for water in its various uses, however, tentative they might be, clearly indicate that under current use patterns, the majority of the countries will be reaching a limit within the next 10 to 20 years if not sooner. Overpumping of groundwater is known to be taking place in many localities, and salt water intrusion into a number of important aquifers is already severe. A further degradation of surface and groundwater quality from agricultural and industrial pollutants is also likely to occur in the near future as a function of increased economic activity. At the present time the region does not have the capacity for the quantitative and qualitative assessment of surface and groundwater needed as a tool for decision-making in ensuring the water security of the region in terms of sustainable water resources development.

Parallel to efforts designed to increase the efficiency in the use of water for all purposes, and to increase its availability from non-conventional sources, including the re-use of waste water, there is an urgent need to increase the capacity of Governments to assess the availability of surface and groundwater resources, increase the pace of exploration programmes, and strengthen the capacity to monitor water quality.

In order to remedy the current situation a number of urgent actions suggest themselves for consideration:

1. A recognition by Governments of the importance of the systematic quantitative assessment and qualitative monitoring of surface and groundwater resources on a continuous basis. Activities in this regard need to be programme oriented rather than just specific project oriented;
2. A strengthening of institutions dealing with water resources assessment. In keeping with the recommendations of the water conference, Governments who have not already done so need to either establish a single organization in charge of the collection, processing and dissemination of data, or establish a co-ordinating mechanism empowered with the formulation and implementation of policies and actions designed to bring other organizations into a co-ordinated approach. This institution or co-ordination mechanism needs to establish strong Linkages with organizations dealing with water development and utilization, environmental departments or ministries and economic planning offices in order to ensure the relevance and timeliness of data;
3. The establishment of computerized data banks for the collection analysis and dissemination of data for those countries than have not already done so. This is becoming increasingly simple as a result of the rapid technological improvements in micro computers and personal computers, and the consequent lowering of costs, as well as the increasing availability of prepackaged computer programmes specifically designed for these purposes;
4. The training of personnel including middle-level technicians to deal with all activities related for networks and data banks, and the establishment of personnel policies designed to provide incentives to individuals to seek and keep their employment. To this effect, Governments may need to assess their manpower requirements for professional and middle-level technicians, and formulate training programmes designed to meet these needs. Such training programmes should be carried out, to the extent that it is possible, within the framework of a regional training network in the ESCWA region;
5. The formulation and implementation of a programme of action for a significant improvement of hydrological and hydrogeological networks capable of providing the necessary data in the framework of regional water security, as well as national sustainable water resources development designed to best serve the economic and social needs of the people in the region;

6. The formulation of programmes and approaches needed to bring about significant increases in financing from national and external support agencies. In this regard it is important for the relevant Government organizations to formulate phased programmes of action with definite time frames, objectives and costing for review by Governments and external support agencies.

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