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INTRODUCTION

WORLD TRENDS AND NEED

GILBERT F. WHITE*

Most preparations for a great international gathering tend to paint threatening pictures as a means of arousing interest in the problems which it seeks to illuminate or resolve. For the organizers of the United Nations Water Conference to be convened during March 14-25, 1977 this poses a dilemma. It cannot be asserted with accuracy that the human race is running out of water or even that water in many sectors of the populated world yet constitutes a major limit upon human well being. That it does so in the future for most areas of the globe is undeniable. However, the need for international collaboration on water matters does not rest upon a forecast of an immediately threatening global thirst. Rather, it hinges on a more subtle and complex situation in which welfare in many regions will be degraded unless effective use is made of existing technology and managerial skills. This is a more difficult message to communicate. Public leaders find it easier to rally volunteers to fight a fire than to persuade people to organize their affairs so that no fire breaks out or so that fewer fighters will be required.

When the first United Nations Conference on Natural Resources was held at Lake Success in 1949 the heavy emphasis in the water resources field was on the data and modes of analysis needed for planning of irrigation, navigation, hydroelectric power, water supply, and flood control.¹ Nevertheless, a strong current of concern for integrated basin development had flowed during the preceding three decades from a combination of plans for single purpose management of entire basins and of multiple purpose projects, usually centering upon hydropower.

This interest later showed itself within the United Nations family through the report of a panel of experts on integrated river basin development in 1958.² The panel emphasized the concept of multi-purpose development, the technical considerations that attach to

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1. U.N., Dep't of Econ. Aff., Proceedings of the United Nations Scientific Conference on the Conservation and Utilization of Resources, Sales No. 1950. II. B. 5 (1951).

2. U.N., Dep't of Econ. and Soc. Aff., Integrated River Basin Development: Report of a panel of experts, Sales No. 58. II. B. 3 (1958).

such efforts, and the economic and social opportunities for using integrated river basin development as a tool for social change. It surveyed special problems attached to economic evaluation, financing, organization and administration, and citizen participation. In recognizing the need for and obstacles to cooperation in international basins, it took account of the inadequacy of relevant international law and the difficulties of establishing joint commissions and associated devices. Its recommended lines of action included improving basic services in hydrology, sharpening the tools for analysis, encouraging scientific and technical investigations, aiding countries in developing sectors of river basins, and laying the groundwork for reconciling conflicting interests over international rivers.

The next two decades saw an accelerated pace of public investment in water management and an expanded United Nations involvement in promoting national and international action. Several new aspects of water policy now command greater attention.³ The concept of integrated river development plays a less central part in thinking about water management than in the 1950's. The major changes have to do with perspective on what constitutes integrated development in the world context, a stronger recognition of the environmental impacts of water projects, deepened public concern for water pollution, and greater stress upon water management within metropolitan regions and in areas sharing common groundwater resources.

Water development now comprises the whole range of activities which might contribute to suitable development of water and related land resources for the public welfare. In an irrigation project, for example, this goes beyond the more conventional engineering techniques to take account of actions involving land use regulation, credit, marketing, feed supply, land cultivation practices, fertilizer, transport, and farm organization. The wider range of social tools includes management of water demand in contrast to management of supply, control of industrial production processes in contrast to effluent disposal, and planning of flood plain use in contrast to flood control. These and similar activities are seen as components of efforts at natural resource development in which the basic public decision has to do with the amounts of scientific research, data collection, planning, and the capital investment allocated to water in comparison with other programs serving national aims.

A few figures as to world water supply and demand help put the management problem in perspective. Out of a total volume of water

3. U.N., Dep't of Econ. and Soc. Aff., *Integrated River Basin Development: Report of a panel of experts*—Revised Edition, Sales No. E. 70. II. A. 4 (1970).

on earth of about 1.4×10^9 cubic kilometers, more than 95% is in the oceans.⁴ Of the remaining fresh water about 77 percent is stored in ice caps and glaciers, 22.4 percent is in groundwater and soil moisture, and .35 percent is in lakes and marshes. Allowing for 0.04 percent in the atmosphere, there is a bare 0.01 percent in streams.

Of the average annual runoff of roughly 40-47 thousand cubic kilometers, more than half is found on the Asian and South American continents, and less than 40 percent flows in Africa, Australia, Europe and North America. The volume of water stored in lakes is about four times the average yearly runoff from land areas. Only a relatively small part of the ground water in reserve, roughly one tenth of one percent, participates in the hydrologic cycle in an average year.⁵

Global water figures have little meaning unless related to specific regional conditions. A rough estimate of present rates of withdrawal of fresh water for major uses suggests that if suitable technical and administrative measures were applied, the total global supply of water could meet greatly expanded human needs. We all recognize that the supply is distributed unevenly over the face of the earth and that nations are confronted in greater or less measure with differences in the availability of water when and where it is needed.

The principal problems which stand out in international perspective are:

A. Unsuitable domestic water supply for a fifth of the urban population and three quarters of the rural population;

B. Increasing degradation of water quality due to waste disposal and non-point pollution;

C. Rapid increase in complexity and volume of industrial waste discharge, including enlarged mutagenic and carcinogenic effects of new substances;

D. Continued destruction of soil fertility through waterlogging, salinization, alkalization and erosion in agricultural areas;

E. Accelerated exhaustion of groundwater supplies;

F. Needlessly high cost for water used; and

G. Rising conflicts about water rights and priorities.

In the long run it is clear that the questions of future demand as they affect human health and welfare are influenced by economic and social conditions, administrative and judicial processes, the availability of funds, and the availability and suitability of technology as

4. U.N., Water Conf., Resources and Needs: Assessment of the World Water Situation, E/CONF.70/CPB1 at 10 (July 2, 1976).

5. *Id.* at 9.

it affects environment and human health. In the short run, the outlook as summed up in the United Nations background paper is that,

... the welfare of humanity is likely to be measurably affected by the success with which nations adapt their activities to the realities of available water supply and human needs in specific river basins or regions. With few exceptions, supply is highly variable in each region; information about water resources is inadequate, potential uses are multiple and involve tradeoffs in allocating supply; standards of quality tend to be determined by local or national preference; the application of scientific knowledge about water and its use lags far behind the findings of basic research.

Whatever the final agenda and the resulting plan of action growing out of the Water Conference, it must address in some fashion a few questions implicit in this statement of the outlook. A concrete response must be made to the request by the 1976 Habitat Conference that nations find ways of providing water of adequate quality to all their population by 1990. It must suggest steps to speed up the national efforts at water resource appraisal, planning, and operation. These no doubt will involve recommendations to national governments assisted by regional collaboration and by global cooperation in sharing research findings, technical advice, and financial support. A great deal of water knowledge, including that accumulated during the International Hydrologic Decade and the International Biological Programme, is not now applied effectively, and some of the well intentioned efforts are making matters worse.

The weaknesses and puzzles of water management in high income countries are displayed prominently in developing countries. Influenced by cultural transfer, bilateral aid, and multi-national organization, they abound in instances of excessively costly design and construction, of concentration upon technological measures to the disadvantage of community advancement, of casual neglect of social and environmental consequences, of legal systems inappropriate to natural environment and national aims, and of conflicts among administrative agencies with specialized missions.

Despite the stress that has been placed on new international instruments to deal with river basins or related regions, the progress has been slow indeed. It is sobering that with the exception of streams in North America, the lower Mekong and a few other streams in Europe there has been no large scale translation of plans into action in international basins. The Senegal and Plata efforts illustrate the opportunities as well as the severe handicaps.

If the Water Conference is to stimulate vigorous and constructive

action at national, regional and international levels it will need to take a hard look at what measures are genuinely appropriate to the developing countries, and what scientific, training, and financial policies will promote them. Much of the sophisticated systems analysis and economic evaluation of recent years has not yet fulfilled its promise in rich countries let alone among the poor. The record of weak coordination among national agencies in the Soviet Union and the United States is being repeated in many low income countries, and is magnified among the specialized inter-governmental agencies which, in turn, reinforce it at national levels.

The prospect that technological innovation or new discoveries of aquifers will change the basic situation is slim. More likely, answers will come from imaginative and practical changes in institutions and national policy. Even the heroic but practicable goal of providing adequate domestic water supply may be expected to be reached by a variety of national roads adjusted to local conditions and social process. The Water Conference confronts a crisis far more complex and far less dramatic than a global water shortage. It symbolizes a need to sort out and apply an immense number of water management techniques to local and national conditions that range from disaster to permanent enhancement but that in the aggregate cause widespread environmental deterioration and economic inefficiency.