UNITED NATIONS WATER CONFERENCE
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Water and Energy: A Symbiotic Marriage

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The United Nations Water Conference, which will be held in Mar del Plata, Argentina, between 14 and 25 March 1977, will deal with all the aspects of the world's use of water: for community supply, agriculture, industry and the thousand and one other ways in which water meets our urgent needs. High on the list of these is energy production.

Energy and water have been intimately linked ever since the dawn of time. The first propulsion of human beings, even before the discovery of sail, was on ocean and river currents. Water provided an early source of power for the milling of grains. Characteristically it was water transmuted into steam that ushered in the industrial age. Not only was water used in the generation of power; when Newcomen and Savery built an engine running on steam, its first use was to operate a water pump.

Hydro-electric works are an important supplier of energy, and the oil price rise, which has sent planners scurrying to find lower-cost alternatives to fossil fuels, has given water power an important boost. It is likely to become increasingly prevalent as developing countries' energy consumption rises to levels which justify the relatively high investment required by hydro-electric installations. Increasingly, one hopes, these will be part of integrated water development schemes in which many different purposes are tackled.

A well-conceived river development project can provide industry with power, agriculture with irrigation works, villages and towns with electric light and drinking water, and the country's transportation net with a navigable waterway. It can also preserve life and property through flood control.

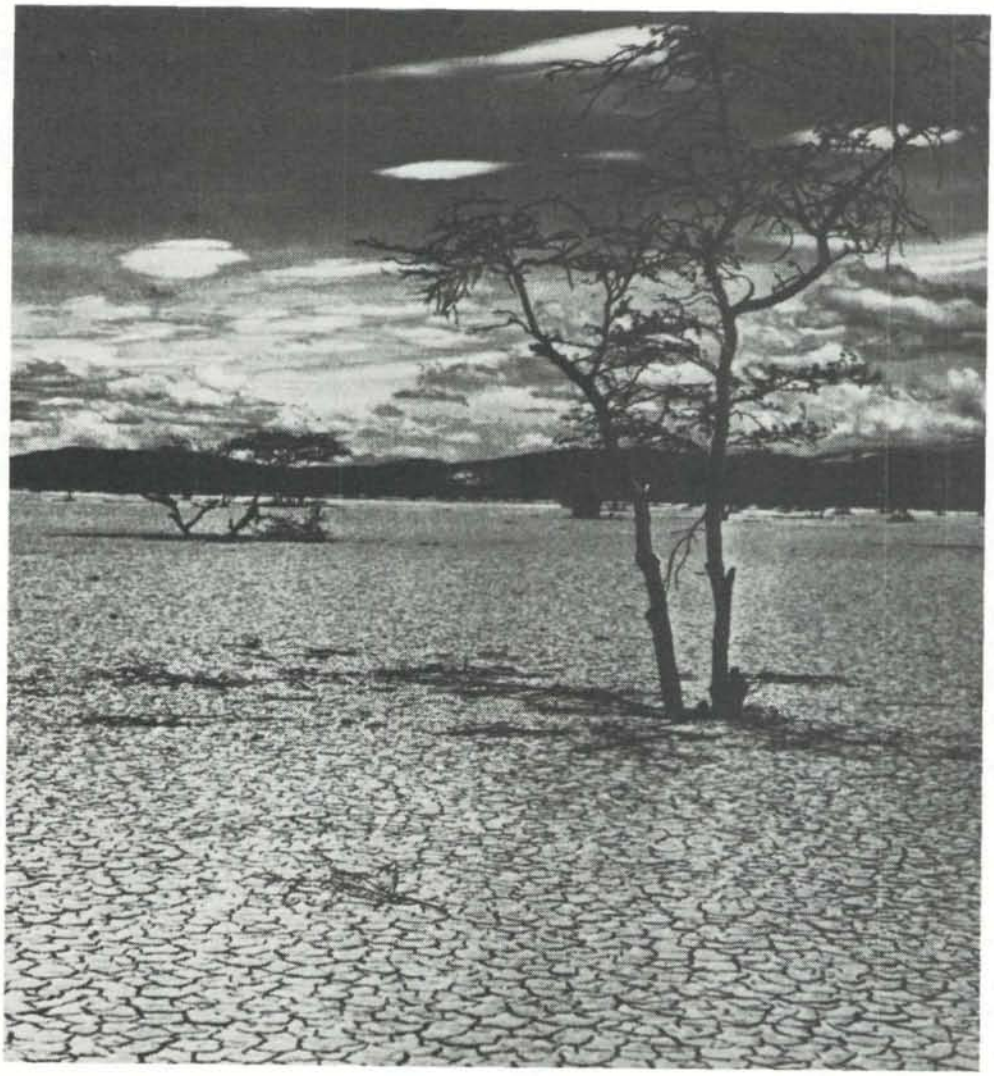
The symbiosis between energy and water carries over into the atomic power field. Nuclear reactors are both users of water on a gigantic scale and, potentially at least, important sources of new and much needed additions to the total fresh water supply of the world. Nuclear energy's claim on our water resources comes about as a result of its urgent need for large amounts of water to cool the electric generating units and to evacuate large quantities of heat. Its promise as a potential benefactor of many who are now suffering from acute shortages of fresh water derives from its possibilities as a provider of sufficient heat on a large enough scale and at low enough cost to operate desalination processes capable of making salty ocean water both drinkable by human beings and by animals and usable for irrigation on agricultural lands. Desalination's life-giving ways, which are already helping to transform once arid areas such as Kuwait, cannot fulfil their ultimate promise until the cost of the required power and heat is greatly reduced. Nuclear power may hold the key to this development which, to many who are now deprived of adequate water supplies, must seem like the coming of a golden age.

It is clear that with so many common concerns and common problems, and with such mutual dependence on each others' work, those dealing with the peaceful uses of atomic energy and those charged with assuring our water supplies should be working in close co-operation. But more is needed than just well-meaning exhortation. In many places the strain on water resources is reaching the crisis point, and the energy supply could be affected. In several European countries the greatest current obstacle to the construction of new power facilities is a shortage of available water. Sites for suitable hydro-electric development have for most practical purposes been used up, and water as coolant for thermally generated power from coal and oil must compete with other water uses and is in critically short supply. Similar limits to energy expansion will shortly be reached in many other parts of the globe. In still other areas the problems are of a different nature. The natural water endowment of the region may be low, or its reserves so difficult to get at, or so expensive to tap with conventional means that the resulting water stringency stifles development and even life. In such regions new solutions to an old problem must be found.

The purpose of the United Nations Water Conference is three-fold: To call the attention of all concerned governments, opinion leaders, and the public at large to the looming water crisis; to establish once for all that the world's water problems cannot be solved by the lone water engineer or the community water board, or even the scientist or administrator, but can be tackled with any hope of success only through a broad collaboration not only among all of these but of environmentalists, farm leaders, industrialists, and above all by governments, their planners, their budget officers and their political leaders.

It is important that the statesmen of the world understand that without effective action to provide and allocate sufficient water, some of our most urgently needed development programmes may not be implemented. There is an enormous growth in the absolute demand for water in every phase of our contemporary life. Population growth, rising living standards in the industrial countries, the pent-up drive for development in the emerging nations, the need to increase food supply, the use of new varieties of grains and the introduction of sophisticated fertilizer and insecticides — intensive agriculture, industrialization on a broad scale — all place enormous demands on our available water.

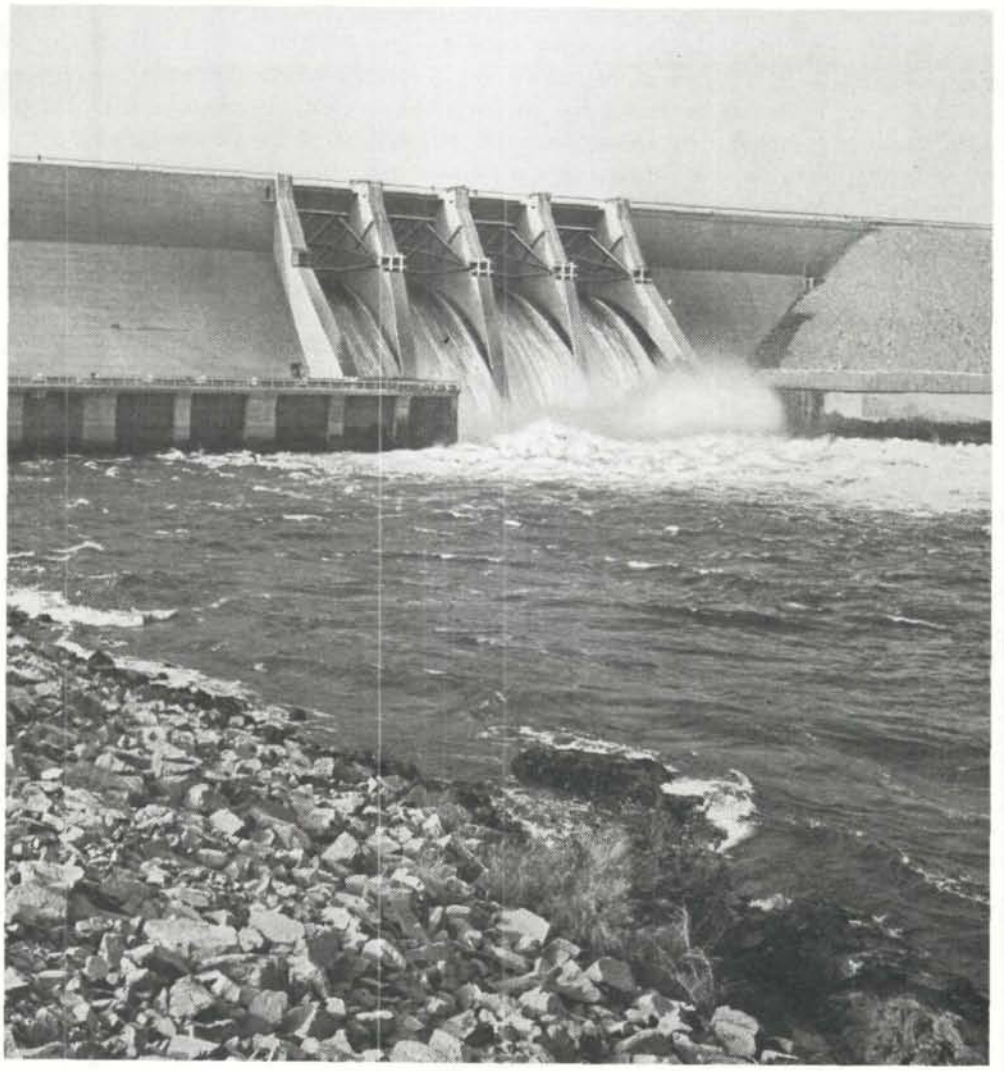
The end of this explosive rise in water demand is nowhere near in sight; in fact an argument can be made that the phase of most intense demand is only now beginning to get underway.



Arid zone in Venezuela. (Photo Guilde du Livre).

Two-thirds of the world's people live in developing countries, most of them at unacceptably low living standards.

Just to provide minimum standards of public sanitation and hygiene will require an extraordinary effort in organization, capital, political will – and in the provision of water. It is generally held that reasonable supplies of drinking water are unavailable for at least one-fifth of the world's city dwellers and for three-quarters of its rural people; in the poorest countries the proportions of those receiving adequate service are of course much smaller. The rectification of this deplorable situation must have first call on our resources. This was recognized by HABITAT, the Conference on Human Settlements, which met in



Kainji Dam on the Niger River in northern Nigeria. Photo: UN

Vancouver in May 1976, and in a strongly worded resolution adopted unanimously, the attending nations called on the Water Conference to set in motion forces which will assure that all the world's people will have an adequate supply of drinking water by the year 1990. The cost of such an effort is tentatively estimated at $60 billion – provided the necessary water can be found.

One reason for the current stringency in many areas is the over-use of known resources; another is pollution. Not only is pollution spreading wildly, it is becoming increasingly difficult to treat. Many industrial wastes are not formed through organic processes; therefore there are no natural organisms or processes for their decomposition; moreover new

chemicals and new technologies are introduced in such large numbers and at such a rapid pace that there is little possibility to devise counter-measures. While pollution in agricultural areas (through the use of insecticides, for example) is usually limited by the number of inhabitants in the area and ecological considerations, no such constraints inhibit industry. Unfortunately quasi-industrial agriculture based on high levels of chemical utilization, which has begun to make its appearance, is more akin to industry than agriculture in this respect.

The Water Conference, I hope, will mark the beginning of a concerted worldwide effort to accelerate the capture of water from sources which are under-exploited or, as the case may be, untapped, and, even more important, effect economies in the way water is currently used. Much of the additional water we need will inevitably have to come from water saving and water conservation.

The wastefulness of current water practices is often staggering. In some urban areas as much as one half of all the water stored and pumped is lost through leaks in pipes and faucets. Industry treats water as a cheap convenience, often contaminates large quantities for relatively small benefits. Huge water savings can be achieved through improved process designs, in-plant recycling and improved factory housekeeping procedures. In some cases, such as the use of coolants, sea-water may be substituted for fresh.

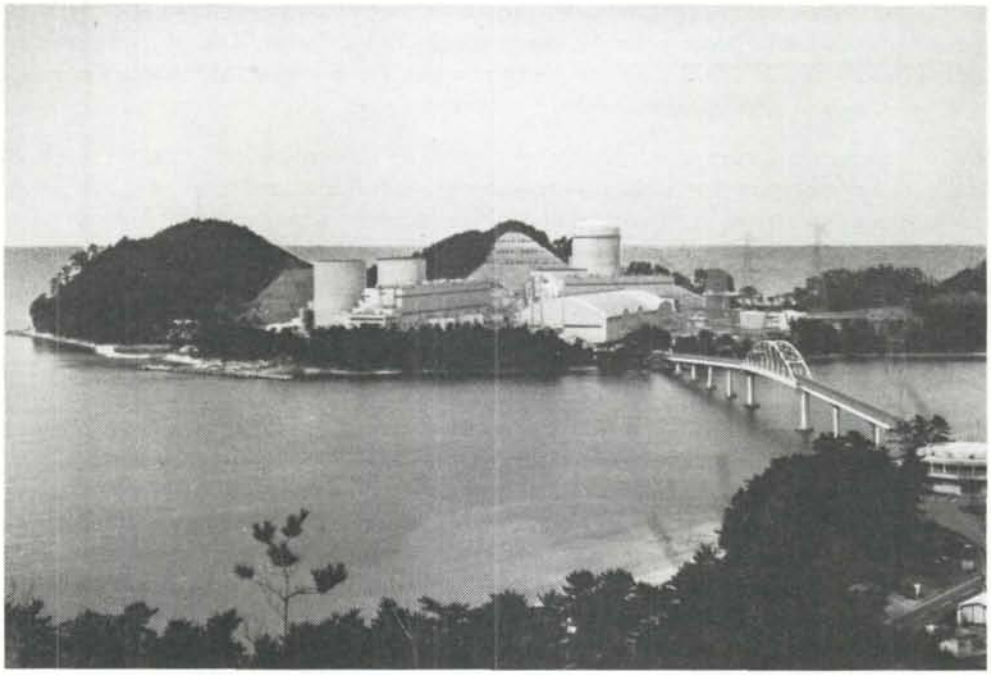
But perhaps some of the greatest opportunities exist in agriculture. It is almost certain that most current estimates of water needs for irrigation purposes are grossly overstated. Over-watering, where water is plentiful, is endemic. Irrigation efficiencies are generally low and often wasteful. There are many instances of irrigations schemes that are deteriorating through reductions in productivity or outright abandonment because of water-logging, salinization and alkilinization, unsuitable drainage and over-application or under-application of water.

There is urgent need for improved water application efficiency, better overall water management, and the rehabilitation of outmoded water schemes.

Similar improvements can also be made in ground water utilization. Too often water is "mined" and aquifers run dry because of over-use.

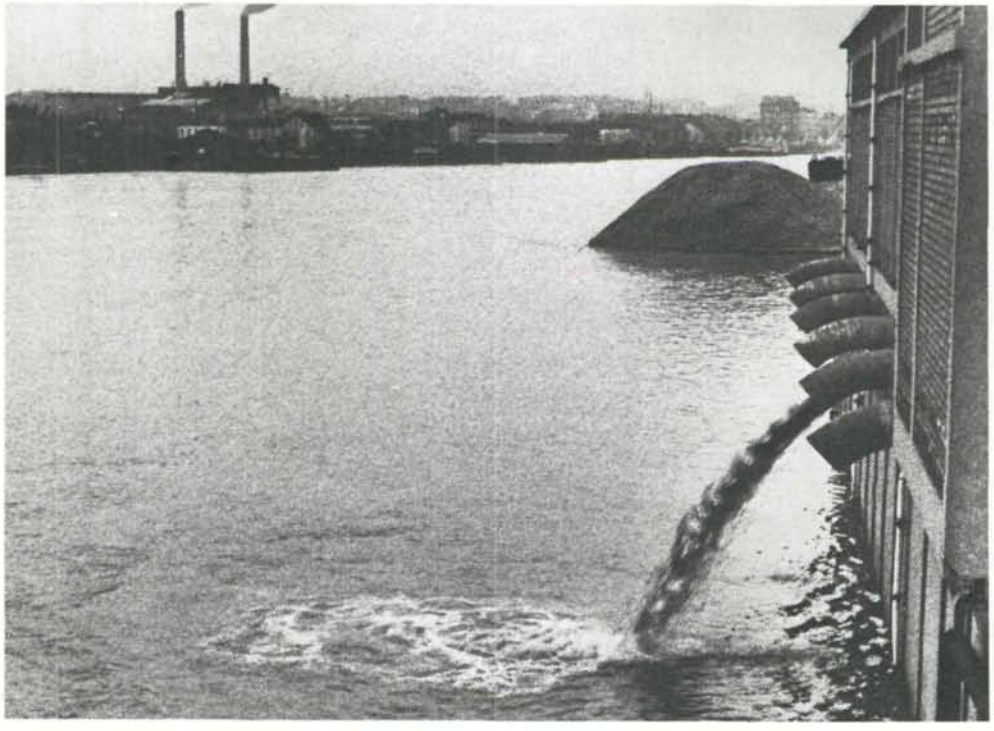
The impetus for most of the required action will have to come from national governments, but the actual projects will often have to be carried out at the local level. Their success will depend on the degree of popular participation and support they command in villages and small towns. Long ingrained habits and privileges will have to be modified. Time-honoured customs, some dating back centuries, will have to be brought up-to-date. Water laws will have to be rewritten and their teaching emphasized. In many cases institutions engaged in water administration will have to be overhauled, competing jurisdictions eliminated, narrow specialization replaced by interdisciplinary teamwork, and the capacity of central decision-making strengthened.

The need for new initiative and reform spills into the international arena. There is need for renewed efforts to adjudicate long-simmering discords over rights on rivers and lakes which also serve as national boundaries. Co-operation must be promoted among nations bisected by the same rivers. There is enormous potential for technical, financial and managerial interchange. This may require administrative changes. Some of the same parochialism which affects the management of water at the national level is also apparent



Nuclear power reactors require large amounts of water for cooling. Shown here is the Mihama Power Plant of Kansai Electric Co. Photo: Japan Atomic Industrial Forum, Inc.

Discharge of untreated industrial waste is a major cause of water pollution. Photo: UNESCO/F. Bibal.



within the United Nations System, where various committees and specialized agencies pursue their interest in water problems independently of each other. One of the by-products of the United Nations Water Conference might well be a stream-lining of the international machinery dealing with water matters.

But ultimately the success of our efforts will depend on those who direct a nation's, or a city's, or a corporation's, or a village's decision-making processes, and those who put the conceptions thus arrived at into action on the ground. Among the people who in years to come will determine whether this globe has an adequate supply of water of the quality required if the hope and expectations of our people are to be met, none have a more important part to play than those who deal with our energy supply, and among them in the front rank, those pioneers who are working to put nuclear energy to peaceful and constructive use.

If I had three wishes which I could address to the nuclear energy community they would be the following: One: Please improve the efficiency of heat cycles so that generating units can cut down on the amount of water they need for cooling purposes. Two: Please encourage the utilization of take-off heat of nuclear power stations and its use in industry, agriculture and/or municipal heating systems in the vicinity of the generating plant. This, too, will reduce the need of water as a coolant; moreover it will serve as an example of efficient use of our scarce resources. And finally, three, a variant on the second point: I hope it will be possible in the future to plan and construct nuclear facilities increasingly in such a way that they form a part of comprehensive area or river valley development schemes in which the total investment is addressed to the area's total needs – for community, agricultural and industrial, recreational and other development – and incidentally, to the need for the economical use of water and its intelligent allocation to meet the real needs of the people. If the United Nations Water Conference at Mar del Plata can be instrumental in the adoption of programmes such as these, it will have amply repaid the efforts that have gone into its planning.