Water Resources and Management in the 21st Century 12.13.95

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Since the beginning of time, water has been shaping the face of the Earth, not only as a geologic agent, cutting valleys and canyons and sculpting rock formations, but also as a major factor in the rise and fall of great civilizations and as a source of conflict and tension between nations. The first great civilizations arose on the banks of great rivers -- the Nile in Egypt, the Tigris-Euphrates of Mesopotamia, the Indus in Pakistan, and the Hwang Ho of China. All of these civilizations built large irrigation systems and made the land productive. By the same token, civilizations collapsed when water supplies failed or were improperly managed. The decline of the Sumerian civilization of Mesopotamia, for example, is believed to be due to poor irrigation practices resulting in salt build-up in the soil. Similarly, the abandonment of Roman aqueducts, canals and reservoirs in North Africa helped return the region to desert condition.

Water sustains human life, it sustains our environment, and it sustains our cultures. But the global demand for water is increasing and the destruction of water-dependent ecosystems has accelerated.

Rapid population growth in developing countries is contributing to critical environmental degradation and this degradation, along with inadequate water supply and sanitation services, are imposing large health problems and burdensome economic costs on the poor. Water supply sources are being stretched to their limits, and many parts of the world are facing water scarcity. Sanitation facilities are either lacking or are being overloaded, and surface- and groundwater pollution is increasing rapidly. Over 1 billion people still do not have access to safe water supplies and over 1.7 billion do not have access to adequate sanitation facilities.

Irrigated agriculture on the other hand accounts for about 73 percent of developed water used worldwide. Irrigation's direct contribution to world agricultural growth has been substantial, because both the irrigated area and the yield from it have expanded rapidly. However, irrigation is extremely water intensive. It takes about 1,000

tons of water to grow one ton of grain and 2,000 tons to grow one ton of rice. In Asia, where more than half of the agricultural land is irrigated, agriculture faces the most severe water problems of any continent. Irrigation comprises 82 percent of total water withdrawals in Asia; in the USA, 41 percent; and in Europe, 30 percent.

Despite the high priority and massive resources invested in water resource development worldwide, the performance of large public irrigation systems has fallen short of expectations. Crop yields and efficiency in water use are typically less than originally projected and less than reasonably achievable.

Salinity now seriously affects productivity on about 20 to 30 million hectares of the world's irrigated land. Salinity is a persistent problem in the plains of eastern and western China, the Indian sub-continent, central Asia, the Middle East, North and West Africa, and Australia. In other words, wherever irrigation is practiced on a large scale.

It is interesting to note that regions experiencing high rates of population growth, and the need to increase agricultural production, suffer the effects of salinization and waterlogging the most. Half of all affected irrigated cropland is in South Asia, with Pakistan and India being the most seriously affected countries.

Today, the way we think about water goes to the very heart of the increasing worldwide concern about human health, the environment, and the path towards sustainable development. Of all the natural resources needed for economic development, water is a crucial element. As we approach the 21st Century we find ourselves facing formidable challenges: rapid population growth (another 1 billion people will be added by the turn of the century); increasing demands for water to satisfy peoples needs, both in agriculture and in expanding urban centers; failing water quality, pollution, and associated health impacts; groundwater depletion; international conflict over shared water resources; a growing worldwide energy imperative; and the uncertainties of climate change.

The degradation of international waters represents a warning that the carrying capacity of transboundary freshwater basins, coastal zones, and large marine ecosystems has been approached in some places and exceeded in others by inappropriate development policies and projects as well as by unwise use. Upstream nations see little benefit for stopping pollution or maintaining river flow regimes, coastal nations see little incentive in protecting coastal wetlands that sustain ocean fisheries caught by other nations, and countries that share recharge areas for transboundary groundwater supplies see little benefit in protecting recharge zones from physical degradation and from releases of toxic and hazardous chemicals.

In particular, when we look at the issues surrounding international river basins, we face questions of competing national interests: Who owns the water? How should it be apportioned? How do downstream riparians protect themselves from upstream pollution? How should disputes be resolved? These questions are not insignificant since 40 percent of the world's population lives in international river basins. Transboundary degradation has become so widespread and the potential for conflict over resource use and allocation has been escalating that international attention is warranted.

One glance at the conflicts in the Ganges-Brahmaputra, Indus, or Mekong Basins shows the transboundary impacts that water resources management decisions can have. Consider if you will overfishing and destructive fishing techniques occurring in the South China Sea and the Yellow Sea. Pollution discharges to the Bay of Bengal know no boundaries and DDT as well as chemicals such as dioxin from industrial plants and incinerators in Asia contaminate fish in the middle of the Pacific Ocean. More and more, we realize that the world is a small place and that local actions can have global environmental implications.

Over the last two decades, however, we have witnessed an evolution in water resource management thinking -- from the Mar del Plata Conference in the 1970s to the Law of the Sea Convention in the 1980s and the Dublin Statement and UNCED in the 1990s. This evolution has resulted in a consensus that a more comprehensive approach to water resource management is needed -- one that is cross sectoral in nature, that integrates ecological and developmental needs, and that is based on a realistic analysis of the carrying capacity of the water environment. This means that, at the highest levels of government, recognition should be given that water and watersheds must be managed as valuable natural resources to meet multiple uses rather than as mere inputs to specific sectoral activities. It also means that flexible and effective institutional mechanisms should be created to provide the services people need and are willing to pay for.

To help implement the consensus reached at Dublin and Rio, institutions at both the national and international levels need to be strengthened and partnerships at the country level need to be created. To these ends, the Global Environment Facility (GEF) has a key role to play in promoting collective action -- both as a facilitator and a funding

mechanism.

Two years before the Rio Conference, the GEF was established as an experimental program to test new approaches and innovative ways to respond to global environmental challenges in the four focal areas of climate change, biodiversity, ozone depletion, and pollution of international waters. In March 1994, after 18 months of negotiations, agreement was reached in Geneva to transform the GEF from its pilot phase into a permanent financial mechanism. The restructured facility, with its $2 billion trust fund, represents the first major financial accomplishment since Rio. The new GEF is open to universal participation (currently 149 countries) and builds upon the partnership between UNDP, UNEP, and the World Bank -- which are its implementing agencies. In addition to the four original focal areas, land degradation will also be eligible for funding insofar as it relates to one or more of the four focal areas. Making the GEF permanent sends a modest but important signal about the international community's resolve to follow a path to a more secure and sustainable way of life on Earth.

During its pilot phase, the GEF supported thirteen international waters projects, worth over $120 million, that: (1) focused on the building of regional institutions to more comprehensively manage the environment of a shared regional sea or river basin; (2) leveraged associated financing for priority interventions; or (3) resulted in preparation of draft action programmes to sustain regional networks of institutions and develop human resource capacity to jointly plan and manage shared water resources.

For the permanent GEF, two broad strategic objectives have been adopted as the path to fulfill the GEF mission. First, the GEF will seek to minimize the risks of global environmental damage. Second, the GEF will seek to maximize global environmental benefits. By pursuing these two objectives, the GEF will strive to have the broadest possible impact within the boundaries set by its finite resources. There are seven means which can be pursued to meet these objectives:

(1) integrating GEF activities with national activities and priorities;

(2) ensuring the sustainability of global environmental benefits;

(3) developing a strategic and diverse portfolio of activities as a means of reducing risks against future uncertainty;

(4) increasing and enhancing environmental information to improve decision-making;

(5) complementing, not substituting for, traditional sources of development funding;

(6) facilitating effective responses beyond GEF-financed activities to address global environmental issues; and

(7) ensuring the cost-effectiveness of its activities.

For international waters, the GEF will place priority on addressing the following four areas of imminent threat:

First, Control of land-based sources of pollution that degrade the quality of international waters. Of special emphasis is the prevention of releases of persistent toxic substances and heavy metals as well as nutrients and sediments in basins of international waters where rare and endangered species or unique ecosystems are threatened;

Second, Prevention of physical and ecological degradation of critical habitats (such as wetlands, shallow waters, reefs, etc.) that sustain biodiversity and provide shelter and nursing areas for threatened and endangered species;

Third, Control of excessive exploitation of living and non-living resources due to inadequate management and control measures such as overfishing and excessive withdrawal of freshwater; and

Fourth, Control of ship-based sources of chemical washings and non-indigenous species which are transferred in ballast water and can disrupt ecosystems or cause human health effects.

GEF's catalytic role will help integrate international waters issues into national development plans, will encourage the transfer of environmentally sound technology and knowledge, and will help strengthen the capacity of developing countries to play their full part in implementing needed interventions in different sectors relating to international waters. In essence, the GEF will help nations put together the essential pieces of a more comprehensive, ecosystems-based approach for managing international waters as a means to operationalize sustainable development and

achieve global environmental benefits. GEF will fund the transaction costs of these processes, it will leverage the participation of other programs and forms of development assistance needed to comprehensively address the sustainable use of international waters, and it will provide links to other GEF focal areas so that countries can effectively set priorities to achieve multiple benefits of GEF interventions.

Apart from the GEF, and at the national level, UNCED's Agenda 21 -- the ambitious plan for sustainable development in the next century -- provides a comprehensive blueprint to guide the implementation of national policies and programs. It covers over 100 program areas ranging from social and economic aspects of development to health, population, soils, and science and technology. Such comprehensive and all encompassing agendas, together with their huge financial costs, tend to overwhelm government institutions and contribute to inaction. Decision-makers look for tradeoffs among competing priorities and for specific goals and targets. In the area of water resource management, and as we approach the Twenty First Century, I would single out three priority goals: (1) guaranteeing every individual, almost two billion, access to clean water and sanitation. This requires targeted investments and better educational services to insure that water of acceptable quality is available at affordable cost. Special attention must be focused, however, on community involvement; (2) feeding the hundreds of millions of hungry people in a sustainable manner. This means improving the efficiency and productivity of irrigation water supplies and adopting integrated strategies for reducing land and water degradation; and (3) stabilizing world population at sustainable levels because the strain of rapid population growth on social services, on rural and urban environments, and on political systems is already immense. Investments in education, health care, and family planning seem modest when compared with the possible costs of not curtailing present population growth rates.

Finally, when it comes to water resources, the lessons from the past are clear. Without appropriate policies and institutional capacities for making the transition to more comprehensive, ecosystem-based water resources management, no technical or engineering fix will succeed. Both the North and the South face enormous challenges in making fundamental changes in how water resources are managed. The GEF has emerged as a catalyst, a facilitator, and a source of funding for incorporating global environmental considerations into the processes for making these fundamental changes. Water is life, and sound management of water resources is an integral if not the key component of the new paradigm for sustainable development -- one that allows the steady improvement in living standards without destroying the fragile natural capital of river, marine, and groundwater systems.
