

The World's Water: Ten New Commandments*

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Water is without question the most important, most precious and most versatile substance on earth. How important is water? Well, all forms of life need water to survive, so that makes it pretty important.

How precious is water? Of the approximately 326 million cubic miles of water on the Earth, only one-hundredth of one percent — or roughly 33,400 cubic miles — is freshwater, the type essential to life on land. To put it more graphically, if a half-gallon bottle held all of the world's water, the amount of usable water would fill only a half a teaspoon; of that amount, a single drop would represent the amount of water in rivers and streams. The remainder would be groundwater.

We use water in innumerable ways in our daily life — for drinking, washing and cooking. Water also forms the foundation of much of the world's economic life. It has countless uses in industry — for example as a coolant and as an integral part of the production of many goods. Many of our goods are moved to market on waterways. The force of falling water generates power in countries around the world. All of the world's food production — vegetable and animal — ultimately depends, directly or indirectly, on water. And globally, water helps regulate the Earth's climate in ways we still don't fully understand.

There are other less tangible, but also important uses for water. Water is part of our recreational life. We swim in it, boat on it and — when we have the time — relax by it. Throughout the centuries, human beings have derived aesthetic pleasure from water. Water has long been a source of inspiration for artists.

Water has played a key role in shaping human history. Think of the great civilizations that have arisen over the centuries and the names of rivers and other bodies of water instantly spring to mind. Egypt and the Nile, China and the Yangtze and Yellow rivers, Rome and the Mediterranean, India and the Ganges. Since the earliest times, water has played a vital part in the patterns of human settlements.

That's been true in Canada as well. Before the arrival of Europeans in our country, rivers and lakes provided transportation for North America's native population. Europeans followed this tradition and were able to traverse the continent using the natural waterways that cut from one end of the country to the other.

As in other countries, our earliest settlements grew up by the water's edge. And at first, these waterways were the only means of communication between the colonies scattered throughout the new wilderness. Rivers and lakes formed the backbone of our economy in those days. They were the highways of the frontier, providing the routes for the fur trade that was so important to the young colony. Later on, they were vital to Canada's trade in timber and wheat.

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In more recent times, they have continued to provide a stimulus to industrial growth in Canada by making resources and markets accessible. Canadian agriculture has benefitted from the ample supplies of fresh water Canada possesses. And in those parts of Canada where sufficient supplies are lacking, irrigation projects have played a prominent role in agricultural development.

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But what happens when adequate supplies of safe water are lacking? Nearly half of the world's population lacks access to clean water. In Africa, the majority of people are without adequate water supply and sanitation services.

The results are appalling and illustrate dramatically just how important water is. Lack of clean water and adequate sanitation is a contributing factor in the death of 12.4 million people annually. That's a daily toll of 34,000 deaths, or the equivalent of the fatal crashes of 100 jumbo jets each day — one every fifteen minutes. On top of this, unsafe water and inadequate sanitation leave countless others sick and incapacitated. It all adds up to a staggering cost in unfulfilled, wasted and unproductive human lives.

And it doesn't end with this human cost. Who can possibly tally up the economic costs and the costs to a country's future? People are the foundation of any country's well-being. No country can prosper and develop if its population is weakened by illness and disease, and its medical system overburdened by people suffering from preventable illness.

The challenge of providing decent water services is growing. The world's population is increasing rapidly. By the year 2000, there will be one billion more people on earth. Growth in Third World cities will be especially rapid. Between 1985 and the year 2000, Third World urban populations are expected to increase from one billion to one and three-quarter billions.

Providing adequate water and sanitation services to those expanding populations will severely test the resources of countries throughout the developing world. Already, many countries are struggling to provide adequate services to existing populations. Despite these efforts, many people, both in rural and urban areas are without access to safe water. Meeting the needs of growing populations will strain the capacities of even the most fortunate developing countries.

We all know that development is a long and difficult process. And years of experience have taught us that there are no shortcuts to development, no single, easy answer. But one of the best and most effective investments we can make in development is in improving water and sanitation services. Indeed, much of the progress that has been made in lowering infant mortality rates and increasing life expectancy in developing countries can be attributed directly to improvements in water supply and sanitation.

There are other important benefits to improved water use and management. One major humanitarian benefit is helping to alleviate the destructive consequences

of floods and droughts. The increasing frequency of droughts and floods in recent years has brought on ever more devastating crises. They've forced us to examine how we use our forests and agricultural lands, and how their use affects our water resources. As flooding and desertification become more common throughout the world, the need for good water resources management becomes that much more important. We now know that water policies that are planned and implemented in careful coordination with the agricultural and forestry sectors can go a long way towards preventing these disasters.

Improving food security and energy availability can be another important benefit of water projects. The water sector is important to both of these objectives because agriculture, hydroelectricity generation and fuelwood form a balanced relationship with each other and with the water resources of a region. Over-extension of agriculture into areas which are not suitable for agriculture, such as steep slopes, has a negative effect on fuelwood availability and stream flows.

And let's not forget that there are direct economic benefits to investments in water projects. For starters, a healthy population is a more productive population. Time lost because of illness is reduced, and the energy and vigour of workers increases.

Health care costs are also lowered as sickness and disease is reduced. We now know that preventative rather than curative health care policies are the most effective ways of dealing with developing countries' health care problems. Improved water and sanitation is one of the most effective means to implement preventative health care policies.

And let's keep in mind that the process itself of developing water projects brings with it economic benefits. Jobs are created during the planning and construction of the project. In the long-term, through institution building and human resource development, jobs are created in management, administration, engineering and technical services for the operation and maintenance of the facilities.

INTERNATIONAL ACTION

In the past sixteen years, four major UN conferences have touched on water problems. Three — the Stockholm Conference on the Environment in 1972, the 1976 Vancouver Conference on Human Settlements in Vancouver and the Nairobi Conference on desertification in 1977 — all dealt in some way with the water problem.

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And in 1977, the UN World Water Conference was held at Mar del Plata, Argentina. It marked a turning point in recognizing how important water is to development. More than 1,500 participants attended, representing 116 governments and many international organizations. Canada sent a large delegation, including representatives from the federal and provincial governments. The main intention of the World Water Conference was to promote a level of preparedness, regionally and internationally, which would help the world avoid a global water crisis by the end of this century. It's too early to say if the conference will ultimately succeed in meeting that objective. But I think that it has helped focus attention on this important subject and mobilize support for more work in this field.

One important outcome of the World Water Conference has been the current International Drinking Water Supply and Sanitation Decade (IDWSSD). The goal of this Decade is ambitious, but essential: to provide access for all people to safe drinking water and adequate sanitation by the year 1990. Canada strongly supports the aims of this Decade, and CIDA has participated in and contributed to major donor conferences and meetings. For example, at the World Health Assembly in 1982, Canada announced that it would contribute approximately \$300 million to reach IDWSSD goals.

Can the world reach the goal of providing safe water to everyone in the world by 1990? We've still got a long way to go and the Decade's half over, but we are making progress. Some 270 million people were provided with improved water supplies during the first half of the Decade. And 180 million have been provided with improved access to sanitation. Canadian programs in this sector have helped improve water projects for some 26 million people around the world since our program began — about the same as the total population of Canada. The Decade has also focused attention on the importance of water in development.

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The IDWSSD has also brought about a new era of international cooperation in the water sector. The UN's Inter-Agency Steering Committee for Co-operative Action established for the water Decade has become a focal point for the exchange of information on members' activities and for consensus-building among developing countries and external support agencies on major policy issues. Sub-committees are active in areas of human resource development, information exchange, project formulation, project information and

women's role in the water sector. And cooperation among bilateral donors and among NGOs have increased as well.

Over the past three decades, we have built up an important body of knowledge and experience that will help guide us through the difficult challenges of the future. What have the last three decades taught us? What do we now know that will help make our efforts in this field more effective? Here's my checklist of ten essential points:

Water is for people

First of all, water projects, like all development projects, are for people. That means that when we look at water problems and possible solutions, we must always keep in mind how they will affect people. That also means that we should evaluate the success or failure of a program by its impacts on people. We shouldn't base our evaluations on purely theoretical grounds. We need to meet the people involved, listen, talk, teach and listen again.

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People must be involved in all phases of water projects. I'm convinced that getting people and communities more closely involved in development projects is a good thing for water projects. Wider participation ensures that the full spectrum of public values is considered in water management decisions. Involving people more fully also gets them more motivated to use water more wisely. And it gives them that important sense that they can make a difference, and that they can make an important contribution to the life of their community.

Water is involved in so many different parts of our lives that decisions about water management have broad implications for a wide variety of interests — such as environmental and recreational organizations, native groups, agricultural and industrial associations, as well as professional bodies with a keen interest in water management. We need their advice and their cooperation if our policies are to be effective. And consulting interested individuals and organizations can bring to light a wealth of expert advice, local knowledge and information that would otherwise have gone unnoticed.

Emphasis on helping the poorest

In designing water projects for people, we should focus our efforts on helping the poorest people. They

suffer the most from unsanitary living conditions and have the highest morbidity and mortality rates. And the prevalence of water-related illness is a major obstacle to overcoming poverty. Nations cannot prosper if their populations are weakened by widespread illness. So it's vital that we direct our efforts at helping the poorest peoples and countries. Water projects can make a direct and enormous contribution to the alleviation of poverty throughout the world.

Roles for development partners

We've also learned that we need to be more flexible and more open about the roles of our development partners — the public, local communities, NGOs and the private sector. Development is a complicated process. It requires the full participation of all groups in society and all of the resources society can bring to this task. Governments don't have a monopoly on water expertise. Nor are governments and their centralized agencies always the most effective channel for delivering water projects. In some cases, the private sector or an NGO may be the more effective channel. Or, having the community itself help install a well or handpump, may in the *long run*, be the best way of ensuring the long-term success of a project.

There's a great deal of expertise out there in the non-governmental sector. We should draw on it more often. So I'm delighted that this forum will be tackling this issue head-on in its session Wednesday morning.

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Canada has had a lot of experience in cooperation on water projects, both at the regional and international level. Domestically, we've developed a strong legal and consultative framework to deal with water issues that transcend strictly provincial or national concerns.

At the international level, we've had to work out cooperative arrangements with our neighbour to the south. Almost 300 waterways and aquifers cross or delineate the Canada-U.S. border. Early on, we recognized the need for cooperation for the effective and mutually beneficial management of these bodies of water. We signed our first international water treaty with the United States in 1909 with the Boundary Water Treaty. This treaty established the International Joint Commission and set out the basic principles for guiding boundary water relations between Canada and the United States. Since that time, Canada has signed seven other major boundary water treaties with the United States, as well as numerous notes, memoranda of understanding and other less formal types of agreements on boundary waters.

As long as water flows across political boundaries, regional and international cooperation in the management of water resources is essential. And in the long run, it's an approach that will benefit us all. I am sure that this afternoon's session on "Peace, Water and Conflict Resolution" will come up with interesting and novel approaches to this problem.

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Promoting cooperation

And we now know that cooperation must go one step beyond this level to include regional and international cooperation. It has to because water does not obey political boundaries; it follows the laws of gravity and least resistance. Indeed, 214 river basins in the world are shared by two or more countries, including 56 in Africa. Water resources management, though, is inevitably bound by political borders and systems. We need to change that and make regional and international cooperation a key principle of water management. Cooperation is needed if water resources are to be shared equitably and environmental control measures are to be truly effective.

We've already made a few steps in that direction. Europe has 175 treaties covering 48 river basins, of which 4 are shared by four or more countries. In 1972, Africa had only 34 international water treaties although

Data bases

If we are going to develop and manage our water resources in a rational and systematic way, we must first know more about the resource. That's easier said than done. Developing the required data base is a slow and expensive process. And it's not enough to do it once. Water quantities and qualities are constantly in flux and need to be monitored over a long period of time. And we need to monitor groundwater as well as surface water, since accessible groundwater underlies more than three-quarters of the world's surface. And as if that wasn't enough, we also need to monitor water quality as well as quantity. Quantity is important but so too is quality — especially if the water is to be used for people, animals and crops.

And when we are developing these data bases, we must also take into account the effects of other variables on water availability. Water availability is di-

rectly affected by land-use practices — a simple truth, but one of critical significance in developing countries. Trees and forests reduce the rate of run-off and indirectly increase the volume of rainwater which can be exploited in a watershed. Deforestation for urban growth, agriculture and firewood collection all directly affect water resources. All of these important factors need to be taken into account as we develop and maintain our data bases.

And it's obviously not enough just to collect data, We also need to analyse and use it effectively. That means we need a strong commitment to research and to training the people required for putting these data bases to good use.

The cost of not developing them is far higher.

Building data bases on water resources is a costly process — but experience has shown us that the cost of not developing them is far higher. Reservoirs which do not fill or dams which overflow due to unexpected floods are just two costly examples of what can happen if we don't have a thorough knowledge of water resources.

Involving women

Getting women more involved is also vital. In some ways, water is a woman's issue. This is because women play such an important role in the domestic use of water. In most parts of the world, drawing and hauling water is done by women. Women are also the managers of household water resources and the principal influence on family hygiene habits and health. So women can and must be involved in the planning, implementation, operation and maintenance of the systems. Involving women will lead to better and more effective projects.

And women — who after all make up half of the world — will benefit in very direct and profound ways from cleaner and safer water. They will have more time to devote to other activities — such as income generation — their health and the health of their children will improve, and they will gain the experience, knowledge and confidence which will allow them to contribute to other community projects.

If ever there was an development issue where the involvement of women is vital, it is in the water sector. Experience has shown us the real benefits of involving women — to women themselves as well as to their families and communities.

Planning

We've also learned that thorough and careful planning must be another crucial ingredient in all water

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projects. Good planning is always important. But it's especially important in the water sector because water is used in so many different and interrelated ways.

In planning any water project, a multitude of factors need to be considered. For example, if water is needed for irrigation, project planners must ask themselves what effect the irrigation project will have on the availability of water for other uses. And what will be the effects of fertilizers and pesticides on water quality and the ability to use water for other purposes?

Above all, we must avoid planning for single-purpose use of water resources. This often results in irreparable environmental and economic losses. For example, using water to assimilate wastes results in pollution that can cause illness or death, as well as social and economic hardship, in developing countries.

And water use and land development are inextricably linked to each other. Lack of understanding of this relationship can lead to tragic errors. The recent crisis in the Sahel region of Africa is one example. Extended drought was part of the problem there that caused widespread illness and the loss of millions of lives. But inadequate water resources management and inappropriate land-use practices were at the root of the problem.

We've seen the results of this here in Canada. Over-cultivation in some areas of the prairies, combined with the use of fertilizers, pesticides, and inappropriate irrigation systems, increased salinity and resulted in massive soil erosion and land misuse. Runoffs now pollute streams and rivers, threatening their availability as domestic water sources.

Clearly, thorough planning is an essential, but difficult part of any water project. And, in some ways, it demands that water experts also be experts in a number of related areas. But as we develop a better understanding of the relationships between different water uses and health, the environment and women's lives, I am confident that the quality of our projects will improve tremendously.

Affordable Technology

An important part of ensuring that water projects are responsive to people is by ensuring that they use affordable and appropriate technology. Too often in the past, inappropriate and expensive technologies were used in developing countries — often resulting in the failure of projects. Technologies that worked in an urban setting were transposed to a rural environment — sometimes with disastrous results.

We need feasible solutions, not idealistic and unrealistic master plans that cost a fortune and often end up not living up to their ambitious aims. And we need low-cost, effective and appropriate technologies which are affordable for local communities and can be operated and maintained by them. Many developing countries cannot afford high-cost, conventional technologies if they are to serve a large and growing population with water supply and sanitation projects. We will serve more people if low-cost technologies are used and standards are set to meet basic needs.

Environment

Environmental concerns are also central to all water projects. Dr. Mustafa Tolba will discuss this at greater length later this morning, but I'd like to briefly touch on this subject because I think it's a crucial one in this sector.

The experience of the last three decades has shown us the importance of integrating environmental concerns in our development planning. This is particularly important in the water sector. Taking into account the environmental repercussions of water projects — as well as other projects that affect water resources — is essential. In particular, we must ensure that our use of water is in keeping with the principles of sustainable development.

So we get back to the need for careful planning and the thorough analysis of the wide range of factors that affect our water resources and, in turn, the multiple effects of water projects on the environment. We *must* design water projects that meet present needs without compromising the ability of future generations to meet their own needs.

Strengthening sector institutions

That's a pretty daunting list of challenges I've given you so far. But I've still got one more to add to

the list — namely the need to strengthen the institutions involved in the water sector. Strengthening sector institutions is vital. If institutions are weak, projects will ultimately fail. There are two aspects to this issue.

Strengthening sector institutions is vital.

First of all, we need to ensure the financial stability and security of the organizations that deliver water services. Subsidies are often a tempting way of trying to keep institutions viable. In the long run, though, it's not always the best route to follow. Instead, I think that we should be looking more at cost-recovery programs where the people using water services ultimately pay most of the costs of these services. In the long run, that will encourage greater efficiency in sector institutions.

Institutions can also be strengthened by providing more human resource training. Institutions are made of the people who staff them. So we need more trained and skilled people at all levels, including operators, maintenance personnel, mechanics, engineers and managers. Indeed, most of the things I've been speaking about today rely, in one way or another, on trained personnel. Planning, building and analysing data bases, evaluating environmental concerns — all of these important tasks require the skills and expertise of trained personnel.

I have a lot of faith in human ingenuity and the potential of the Earth for renewal. We are making progress, and we still have time to turn the world water situation around. Water is a renewable resource. By using it more wisely, we can leave a healthier world for our children and their children's children to enjoy.

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