AN OVERVIEW: WORLD POPULATION AND WATER

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By the gift of water You nourish and sustain us and all living things." These are the words used in the baptismal rite in Lutheran services. But in our world increasing numbers of people cannot assume they will be nourished and sustained, and within a few years, a water crisis of catastrophic proportions will explode on us—unless aroused citizens in this and other nations demand of their leadership actions reflecting vision, understanding, and courage. Political leadership on water issues—as in every other field—tends to be shortsighted. But on water, shortsightedness could be cataclysmic. It is no exaggeration to say that the conflict between humanity's growing thirst and the projected supply of usable, potable water will result in the most devastating natural disaster since history has been accurately recorded, unless something happens to stop it.

The world's population of 5.9 billion will double in the next forty to ninety years, depending on whose estimates you accept. Our water supply, however, is constant. Compounding those grim realities is the fact that per capita world water consumption is rising twice as fast as the world's population. You do not have to be an Einstein to understand that we are headed toward a potential calamity.

Nations fight over oil, but valuable as it is, there are substitutes for oil. There is no substitute for water. We die quickly without water, and no nation's leaders would hesitate to battle for adequate water supplies. A decade ago U.S. intelligence services identified ten potential flashpoints where war could break out over water. I no longer have access to that type of information since leaving the Senate, but I know the number is higher today and will be much higher a decade from now. At least 300 million people live in regions of severe water shortages. By the year 2025, it will be three billion. A child born in 1960 in the Middle East or North Africa entered a region where the fresh water available annually was 3,430 cubic meters per capita. By the time that person reaches the age of 65, in the year 2025, it will be 667 cubic meters a year per capita, a drop of approximately 80 percent. Anywhere on our globe there are statistics nearly as dramatic. With three-quarters of the earth's surface covered by water, it may be hard to believe we can be headed toward a crisis based on water deficiencies, but 97 percent of that resource is saltwater, and perhaps two-thirds of the remainder consists of icebergs and snow.

Although we are nearing a crisis, concern by the public and political leaders is just beginning to emerge.

A few magazines publish hints about the severe difficulties ahead. You may find a small circle of knowledgeable people discussing it, but it would be conservative to estimate that 10,000 times more media attention was devoted to the recent O.J. Simpson trials than to the approaching water crisis. But here and there are small signals. The international organization of the Rotary Clubs held a conference in the Netherlands in 1991 on the topic "Water: Tomorrow's Crucial Resource." In 1993 National Geographic, for only the second time in its 105-year-old history, had a special edition, titled simply "Water." In his introductory explanation for this extraordinary special edition, editor William Graves noted: "The problem is simply people—our increasing numbers and our flagrant abuse of one of our most precious, and limited, resources." In his 1995 annual State of the World, Worldwatch Institute's Lester Brown reported: "Concern over water scarcity

is rising." The Financial Mail of South Africa commented in September 1995: "The most frightening of the many statistics for the future [of] South Africa are those related to water." A bulletin of the rnational Food Policy Research Institute begins with these words: "Reform of water policy is urgently needed." The heading of the bulletin: "Dealing With Water Scarcity in the Next Century." Time magazine reports: "At the moment, countries are poised to go to war over oil, but in the near future, water could be the catalyst for armed conflict." Dr. Wally N'Dow, whom the Los Angeles Times describes as "the world's foremost specialist on cities," says bluntly: "In the past fifty years nations have gone to war over oil. In the next fifty we are going to go to war over water. The crisis point is going to be fifteen to twenty years from now." But voices like these are isolated and largely ignored.

Buried in all the daily news trivia, the careful reader can find strong warnings about our future. The Financial Times of London begins a story: "Water, like energy in the late 1970s, will probably become the most critical natural resource issue facing most parts of the world by the start of the next century." The British publication, People and the Planet, predicts that by the year 2025 at least sixty-five nations will experience serious water shortages. Another British journal, Wolrldlink, the magazine of the World Economic Forum, has a cover article titled "Water: The Next Source of Trouble." A scholarly journal on international law calls the shortage of fresh water "the national security issue of the twenty-first century." "Water Crisis Looms, World Bank Says" is the heading of a story on an inside page of the Washington Post of August 3, 1995. The Associated Press story accompanying that heading quotes World Bank Vice President for Environmentally Sustainable Development Ismail Serageldin: "We are warning the world that there is a huge problem looming out there.... The experts all agree on the need to do something fast. The main problem is the lack of political will to carry out these recommendations."

That is the crux of the matter: political will. That is not going to be generated by World Bank reports. It must come from aroused citizens who understand the severity of the problem and demand action. Almost four centuries ago, a British writer noted: "Water is a very good servant, but it is a cruel master." "If you want to save your children from poverty, pay attention to water," Shimon Peres, then Israel's foreign minister, told a 1994 National Press Club forum in Washington. Middle Eastern leaders who are usually reluctant to agree on anything are unanimous in saying that severe water shortages lie ahead in that region, and unless this difficulty is solved, armed confrontation is almost inevitable. Lack of water can have profound economic and military consequences.

There is a touch of prophecy in the old saying that harkens back to the era of the Wild West: "Whiskey is for drinking, and water is for fighting over." A national leader may take his nation to war over the threat of the loss of oil, but no leader can tolerate the loss of water without a belligerent response. If it takes years of negotiations for California and Nevada to agree on the allocation of the Truckee River waters, it should not come as a surprise that it took nine years to get hostile neighbors India and Pakistan to agree on the Indus River basin, and that India, Pakistan, and Bangladesh have been negotiating since 1960 on the Ganges River basin. The complicated Danube River basin agreement in Europe is supervised by a task force of twelve nations, seven international organizations, and four nongovernmental groups.

Everyone can agree with U.S. Supreme Court Justice Oliver Wendell Holmes that "a river is more than an amenity, it is a treasure." There are more than 200 river basins in the world that are shared by at least two countries and over 2,000 treaties on these shared resources. The first water treaty, signed by two nations using the Weser River in Europe, goes back to the year 1221. Even when nations are on the best of terms, like Canada and the United States, there are serious

disagreements on water-sharing issues. Our two countries manage our problems without resorting to arms, but who can say what will happen in the Middle East where there are no water surpluses and where the relationships between countries have a stormy history. By the year 2020, the most conservative estimate is that thirty-five nations will have severe water scarcity problems. Their leaders will not simply issue press statements. More than a dozen nations receive most of their water from rivers that cross borders of neighboring countries viewed as hostile. The word rival comes from Latin, meaning "someone who shares the same stream." Those who want a world of peace not only must look at stopping nuclear tests and reducing the arms race, but also at the troublesome issue of water.

In the 1962 book Silent Spring, which stirred the nation, Rachel Carson wrote: "In an age when man has forgotten his origins and is blind even to his most essential needs for survival, water along with other resources has become the victim of his indifference." When she wrote that, water quantity problems were only a tiny dark cloud on the horizon. One source notes: "Water is being withdrawn from [the world's] underground stores (aquifers) many times faster than it is being replaced by nature.... The rate of net withdrawal today is roughly equal to the flow of the Colorado River." Similar illustrations are emerging around the globe almost unnoticed, like the silent start of a plague. It is only the beginning. No knowledgeable person disputes the conclusion of Pacific Institute founder and president Peter Gleick: "Fresh water is an increasingly precious resource."

United Nations authorities underscore that with this simple statistic: 9,500 children a day die either because of lack of water or, more frequently, because of diseases caused by polluted water. If one 747 plane filled with 350 children were to crash, killing all those on board, we would be mesmerized by the television and radio reports, and the story would fill the front pages of our newspapers. Yet at least sixteen times that many children die each day for water-related reasons, but they do it quietly, and their stories rarely reach our living room TV sets and seldom even appear in the back pages of our newspapers. In Africa, the world's fastest growing continent with a population of 750 million that is projected to double in twenty years, 40 percent of the population is expected to suffer serious illnesses over the next decade—frequently fatal—because of water-related problems.

A century ago, the leading killer of children in the United States was malaria. Today, it is almost nonexistent here. A variety of methods has been used to dramatically reduce the population of the mosquitoes that carry the disease. But around the world each year, 1 to 2 million people die of this highly preventable disease that is water-related, and approximately 280 million are infected. Water-related diarrheal diseases are even worse, killing about 4 million people a year, 3.2 million of them children. A simple treatment with oral rehydration salts (ORT). costing about twenty cents per treatment, could save almost all of these lives. In 1991 "almost 40 percent of the cases of diarrhea in children were treated with ORT, averting about one million unnecessary deaths." Schistosomiasis, a disease carried by a water snail found in standing water where people work and play and use it for toilet purposes, kills 200,000 people a year and debilitates another 200 million. Millions more have been hit by "river blindness" and guinea worm disease, less life-threatening than they are debilitating. Recently, thanks to the leadership of former president Jimmy Carter and the Carter Center, the number of those stricken by these diseases has been reduced. Even though these and other water-related afflictions can be prevented and/or treated relatively inexpensively by U.S. methods, these problems are likely to worsen with the growing water shortage, as desperate people use more contaminated water. "Bad water is better than no water," they reason.

That choice is dictated by the human body, which is composed of more than 70 percent water. It takes less than a 1 percent deficiency in our body's water to make us thirsty. A 5 percent deficit causes a slight fever. An 8 percent shortage causes the glands to stop producing saliva and the skin to turn blue. A person cannot walk with a 10 percent deficiency, and a 12 percent deficiency brings on death. There are more excruciating ways to die than from lack of water—but there are not many. A minimum annual water intake to sustain human life (including food production) is 7,500 gallons a year. These figures take on greater significance when combined with the fact that two-thirds of the world's population have to go out of their homes to fetch drinking water, and in most of the third world nations as much as one-third of the daily calorie intake is used by women and children—the main water carriers—for obtaining water.

Ironically, the areas of the world with the fastest growing populations are also the areas with already severe water problems, and the shortages will get much worse. North Africa, sub-Saharan Africa, Central Asia, Mexico, and the Middle East all have rapidly growing populations and rapidly depleting water supplies. Congressional Quarterly Researcher reports: "In the Middle East and throughout the world, water is increasingly becoming the central political issue—and a matter of survival for literally billions of people." More and more, in all parts of the world, there is a squeeze between urban populations and farmers for limited quantities of water, and the larger number of people in cities are starting to prevail. Water specialist Sandra Postel writes: "No one has tallied the effect on future food production of the progressive shift of water from agriculture to cities, combined with the many forms of unsustainable water use."

While water sufficiency problems are not nearly as severe in the United States as in most nations, three of the fastest-growing large states—California, Texas, and Florida—also feel the squeeze on water supplies and soon will face major difficulties. As of 1996, five of the ten fastest growing cities in the United States are in those three states. It is significant that all three states, like many parts of the globe with serious shortages, have at their doorsteps huge amounts of water that still are too expensive to modify for major consumption purposes: ocean water.

A World Resources Institute study comments: "If all the world's water fit into a bathtub, the portion of it that could be used sustainably in any given year would barely fill a teaspoon." That is an exaggeration, but it illustrates a truth.

Without a surge in desalination research, many in the world will be able to repeat the well-known lines from Samuel Taylor Coleridge's poem, "The Rime of the Ancient Mariner," with new meaning:

Water, water everywhere
And all the boards did shrink;
Water, water everywhere
Nor any drop to drink.

Maintaining water quality in a world of shortages is also a problem. Travelers to many nations are routinely warned to avoid drinking the water, even in luxury hotels. Many of us have experienced the results of not following that advice. Seeing people bathe, wash their clothes, and drink, all from the same obviously polluted body of water, is a common sight in much of the world. At least 1.5 billion people—probably more—do not have access to a minimally adequate supply of safe water, and approximately 3 billion lack sanitation facilities, a problem that is tied to water quality. Even in the United States we have such problems. A study reports that one-fourth of the water people in West Virginia drink is unsafe. An August 1995 story in the New York Times begins:

Tap water in the Corn Belt is dangerously contaminated with agricultural weed-killers, posing serious health risks, according to a study released today by the Environmental Working Group

Herbicides were found in the drinking water of almost all 29 cities and towns tested. At 18, the levels exceeded Federal safety standards.

The worst violations were found in Danville, Illinois, where the level of the weed-killer cyanizine in one sample was 34 times the Federal standard. In Fort Wayne, Indiana, a single glass of water showed nine kinds of herbicides.

The article suggests that the dangers are particularly severe for young children.

The United States is ahead of almost all nations in water quality, yet in one brief period bacteria in the water supply of Milwaukee caused more than 100 deaths and 4,400 to be hospitalized. But because we have worked over the decades to improve the quality of the water we use, our water is generally safer to drink than it once was, and our streams and lakes are cleaner. I can remember when there were no fish in the Illinois River, and now as I travel through my state, I see people fishing on the banks of the river or in boats, and I wonder how many of them know that government policy made this possible. The United States has doubled the numbers of lakes and rivers and streams in which people can fish and swim without danger. But the United States is not typical. However, the greater problem for the future of the world is not quality but quantity.

The World Bank estimates that eighty nations have water shortages severe enough to retard agricultural production. In almost all nations, including the United States, below-ground water tables, called aquifers, which are the source of much of the supply, are dropping, in some cases rapidly, and in a few areas this resource is depleted. With reduced per capita water availability almost inevitably comes reduced food availability. In less developed nations, as a whole, 90 percent of water use is for irrigation, and as the irrigation canals dry up, food production declines. It is hard for many to understand the dimensions of the problem, including farmers who all of their lives have been accustomed to ample water supplies for irrigation.

I wish those who are skeptical about water warnings could have joined Senator Harry Reid of Nevada and me on a trip to Uzbekistan. We visited what had been a port city on the Aral Sea, once the third largest inland sea in the world. Some years prior to that, Soviet engineers convinced Nikita Khrushchev and other leaders that they could, for irrigation purposes, divert water that flowed into the Aral Sea, particularly to increase cotton production (an old dream of Lenin). They gave assurances that while there might be a temporary decline in water to the Aral Sea, soon the runoff would replenish the sea, and no harm would result.

Senator Reid and I stood at the edge of what had been a harbor and looked down perhaps seventy-five feet to dry land. It was dry much farther than we could see, dry for approximately the next fifty miles. The formerly huge runoff from the Amu Darya and Syr Darya Rivers had dropped to nothing. The fishing industry in the Aral Sea in the 1950s supported 60,000 jobs; now, none. Two-thirds of the Aral Sea's water has disappeared, and agricultural lands around the sea have reduced production because of greater salinity, the salt blown by the winds from the now dry land. A World Bank report has this cryptic epitaph for the Aral Sea: "Costs for full restoration of this hypersaline dead water body are prohibitive." Thirty million people have been adversely affected.

Senator Reid and I visited a clinic run by U.S. volunteers dealing with unexpected health problems, particularly lung difficulties that arose because of dry salt and toxic dust in the air. According to a 1989 study, two-thirds of the people in the area surrounding the Aral Sea are suffering "from hepatitis, typhoid, gastrointestinal diseases, or throat cancer. Especially affected are the children, who suffer from ... anemia, rickets and liver complaints." In 1997 a local physician told the New York Times much the same story: "We are seeing a very high incidence of anemia, especially among children. Cancers have increased. Stomach and intestinal diseases are very common. People's kidneys and livers cannot stay healthy in an environment like this." Infant mortality rates are four times that of the rest of the former Soviet Union. Soviet leaders told the Aral Sea ship captains that the water would return, and in the old Soviet Union, when the government told you not to move a ship, you did not move your ship. There, in this "harbor," were hulks of large boats marooned fifty miles from water.

In less dramatic ways, the Aral Sea disaster is happening on every continent. Water specialist Sandra Postel writes about this in a magazine article titled "Where Have All the Rivers Gone?" She describes the gradual shrinkage of three American rivers, as well as those in other nations. One is the Colorado River, which drains 244,000 square miles—an area larger than France, though in volume of flow it is only sixth among U.S. rivers. It provides water to seven states. The Colorado watershed includes 2 million acres of farmland and 21 million people and is the most rapidly growing population area in the United States.

In China I met with university officials about that nation's water difficulties. China's already serious problems are going to become infinitely more serious. In a nation with huge food demands and half of its cropland under irrigation, China may have to significantly reduce irrigation. China's Minister of Water Resources observes: "In rural areas, over 81 million people find it difficult to procure water. In urban areas, the shortages are even worse. More than 300 Chinese cities are short of water and 100 of them are very short." China has 22 percent of the world's population but only 7 percent of the world's cropland and 7 percent of the world's freshwater. Qu Geping, head of China's Environmental Protection Agency, says that the ideal population for China's water supply is 650 million, but today the nation has almost twice that number, and the population is still climbing.

In the past twenty-one years, the international demand for water has doubled, and unless there are herculean efforts at conservation and research, less dramatic and more tragic scenes than the Aral Sea will unfold: dry dirt, dust, and desert where productive fields now exist, and with that will come food shortages that cause reduction in average life span and misery for much of the world. Many lakes and wetland areas will disappear, and of those that survive, sizable numbers will have increased salt content, diminishing their ability to provide assistance in growing food.

There are ways to avoid the looming waterless storm. The later chapters of this book spell out the answers. However, we are inching toward solutions when the grim realities require us to take giant strides. Unless the environmental movement, leaders of our religious communities, and others with a sense of responsibility for the future mobilize and mount a substantial effort to alter the present course, the years ahead will not provide either a brighter civilization or one that we would recognize today. Expect average life spans to drop dramatically, and wars to multiply.

The most disturbing scenes of human suffering I have ever viewed were in Somalia, before U.S. troops went in to relieve the situation. Hundreds of thousands starved to death. Starvation from lack of food is a slow process. Human beings can live several weeks without food, and while shortage of water is often the cause of the lack of food (complicated in Somalia by the almost

total lack of government), people can live only a few days without water. The massive numbers dying for lack of both food and water will be seen by all of us over and over and over again if the world does not act, and action requires U.S. leadership. No other nation has our capability and resources to lead.

The question is whether we will.