

## **The World Water Crisis: Toward Sustainable Solutions**

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Welcome, and many thanks to President Machen, Wendy Graham and all of the conference organizers.

The title of the Symposium is “Florida Challenges, Global Solutions,” but it could just as well have been Global Challenges, Florida Solutions – Florida is not alone in the nature of the water challenges facing us, and can offer experience, practice, and successes. There is ample opportunity at this symposium to share these.

I’ve been asked to step back a bit and offer a global perspective. The world of water is changing. And depending on whether you are an optimist or a pessimist, the opportunity and the challenges are enormous. Old problems continue to vex us and new ones are arising.

- Local water scarcity
- Water contamination
- Water-related diseases, from diarrhea to malaria to schistosomiasis.
- The effects of climate change on water availability and quality

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- The production of food, goods, and services
- Ecosystem degradation and destruction
- All the social and political challenges associated with the political ramifications of finding and using a scarce natural resource from depletion to pollution to inequitable use to fundamental threats to national and international security.

We've made enormous progress in tackling water problems – anyone who says all the news is bad is wrong.

But I'd like to argue that the old ways of thinking about water are inadequate. Water is not just a "resource" or a "factor of production" or an "input." Water is special. It has more than simply physical or environmental characteristics; it often presents deep security, economic, cultural, and societal challenges. And people care deeply about water.

In order to address these challenges we need new tools: technological, economic, institutional, and educational. And we are going to have to challenge conventional thinking and the status quo.

**First**, I'd like to explain why I believe there to be a water "crisis."

**Second**, I'd like to explain why I believe it is getting worse, not better,

**Third**, I'd like to describe some **trends, policies, and technologies** that suggest a different path, to a different future, is possible.

But to begin to move along this path, we must tackle some taboos; we must rethink old assumptions. And this may be the hardest of all.

**First: Why do I believe there to be a “Water Crisis”**

There are many pieces to the water crisis: **human, environmental, and political.**

**To me, the human dimensions are the worst, and most inexcusable.**

You’ve heard some of the numbers:

- Globally: more than one billion people lack access to safe and reliable drinking water; more than 2.4 billion people lack adequate sanitation.
- Between 2 and 5 million people, mostly children, die every year from preventable water-related diseases such as cholera, diarrhoea, typhoid, dysentery... This is what I mean by inexcusable.
- 100 million people in India, Bangladesh, and Nepal are drinking water with too much arsenic. Just as bad, they’ve been doing so for decades and didn’t know it until 10 years ago. And even worse, we’ve known for 10 years and they still have no satisfactory alternative available to them. This is also what I mean by inexcusable.

I’m not going to talk much today about the international aspects of these problems, but even here in the **southeastern** U.S., no real effort has been made to integrate human needs, growth patterns, planning activities, and water, with the kinds of results we see around Atlanta, the cities in southern Florida, and of course Tucson, Las Vegas, Los Angeles, and every other major western city. This leads to the second dimension to the problem: the environmental dimension.

**There is an environmental dimension to this crisis:**

For too long, we have taken the water we need away from the ecosystems that also need that water, and that also provide the environmental goods and services on which we all depend.

The most threatened species and ecosystems on the planet are those that need the water that we humans appropriate for our use and either consume or contaminate. Fisheries, river deltas, inland wetlands, migratory routes are all threatened by the way we use water. 30 to 40 percent of all freshwater fish and amphibians in North America are considered imperiled. The Colorado River, the Yellow River in China, and others no longer reach the sea. Others are so heavily contaminated, their natural ecosystems have been destroyed. It is hard to think of a major river or freshwater ecosystem that doesn't face some kind of serious ecological challenge because of human use of water. As you know, one of the earliest examples of the failure to understand and integrate land, water, and environmental planning was the terrible damage done to the Everglades, and the enormous effort that has now gone, and continues to go, into trying to fix it. Again, here in the southeastern US, we've recently seen challenges to the health of rivers that we used to consider abundant and well-managed, like the Apalachicola-Chattahoochee-Flint system, where ecological values in Florida are threatened by uses of water upstream in other states.

Water quality is deteriorating in many places from biological and industrial contaminants, in mixes we often don't expect, with consequences we don't understand. More than 30 years ago the Cuyahoga River contaminated with industrial wastes, caught fire and burned – a scene the world watched on

television. (Led to the Clean Water Act a few years later.) 15 years ago Milwaukee was hit by one of the largest waterborne disease outbreak of modern times when 400,000 people became ill and 100 died from *cryptosporidium*. (Led to new filtration rules for municipal water.) 10 years ago we discovered the insidiousness of *MTBE* in our groundwater. (Led to changes in the mix of our gasoline.) Five years ago found traces of human medicines, antibiotics, and endocrine disruptors in aquatic ecosystems and wildlife. Three years ago we realized the scale of our *perchlorate* problem. What will it be next year? Yet water-quality monitoring, enforcement, and regulation always seem to be one step behind.

In the most disturbing example of our ability to massively disrupt our environment, we are altering our very climate. The evidence is clear and compelling that climate change not only *will* occur, but it is already occurring. And the hydrologic cycle IS the climate cycle. There is growing evidence that these changes will be felt, not *just* globally, but locally, in ways we're just starting to understand.

Even slight changes in water availability or demand are going to change the balance between “**enough**” and “**not enough**.” Furthermore, we built an incredibly complex set of water systems designed and tuned for the past climate as we understood it, not the future one. It is time the *real* climate debate began – not about the science, but about the technical, policy, economic, and social responses that will be needed.

And this leads to the third dimension: the political one.

**And there is a political dimension to the water crisis:**

Water has been for millennia a source of tensions and conflict, a target during war and a tool of violence, a political issue. Fights over or with water are found throughout myths, legends, and history: from the war between Umma and Lagash in ancient Mesopotamia 5000 years ago to the perennial battles among the Colorado River states, the US and Mexico, and between the cities and the farms. And of course, the long-standing, and still unresolved dispute among Georgia, Alabama, and Florida.

Water and politics make a volatile mix.

Another political dimension: there is a disconnect between our water laws and water rights systems, and the hydrologic reality of our water resources. We live in a 21<sup>st</sup> century world controlled by 19<sup>th</sup> and 20<sup>th</sup> century policies, laws, and institutions.

### **Why do I believe the crisis is getting worse, not better?**

1. **Population is growing**, and it is growing fastest in places where water problems are most severe. There is no problem on earth that isn't made worse by rapidly growing populations; and this is particularly true of water. And even where we used to think water was abundant, like here, we are learning that there really are limits.
2. It's getting worse because of **disagreement and paralysis** over how to deal with the problem.
3. It is getting worse because **efforts and programs to address water problems are inadequate** to the scale of the problem.

4. It is getting worse because we've delayed dealing with climate change so long that we are now, unavoidably committed to serious changes to our water resources.
5. And it is getting worse because we are **mired in old thinking, entrenched interests, and lack of political inspiration and leadership.**

## **Moving Forward**

**But all the news isn't bad. Let me offer some observations that suggest there is a path to a sustainable water future – what I call the soft path for water -- and raise some issues that are typically taboo in water discussions in the hopes that we can move beyond 19<sup>th</sup> and 20<sup>th</sup> century thinking.**

First, the water crisis is not the result of a lack of resources, or money, or brains.

- Absolute scarcity is not our problem. Yes, there are regional problems with scarcity, though I would argue that there is almost no place on the planet where basic human needs for water for drinking, sanitation, cooking, cleaning cannot be met with locally available resources. And in most places, there is even more water.
- We are a rich world: rich in money, and education, and ingenuity, and good will. Those things, like water, are not evenly distributed. But the uneven distribution of this wealth gives some of **us** a special responsibility to act.

- We are intelligent beings: We've decoded the human genome; manipulated substances at the subatomic level, eliminated some diseases permanently, and are using smart machines and technologies to explore the universe around us.

Second, lack of supply infrastructure is not our problem. I would like to challenge the commonly held assumption that a few more dams or aqueducts or groundwater wells will finally solve our problems. There may be a need for new supply infrastructure, particularly in the developing world, but even if we had massive new water projects, I would predict that our water problems would remain largely unchanged.

At the same time, there **are** other water infrastructure investments that are vital and must continue: We must continue to invest in our **water-quality** infrastructure for our drinking water; **purification and reuse** for our wastewater, and **reliable distribution systems** to deliver one and remove the other. One of the consequences of the knee-jerk opposition to new taxes we see from many of politicians is the decay of the public infrastructure around us, including the water systems we rely on to keep our water flowing and clean.

Third, we must stop taking the “demand” for water for granted -- or as fixed and immutable. The dynamics of the demand for water are changing; indeed, have already changed.

The demand for water has always been assumed to be connected to population and economic growth. This is no longer true. The United States uses less water today for all purposes than it did 25 years ago; on a per-



capita basis, we use much less than we did 25 years ago. Per-capita water use in the US has dropped 20 percent since 1980. How? We've started to tap into the waste and inefficient uses throughout our society, though improved water use technologies, education, and structural changes in our economy.

**Our goal is not to use water:** it is to attain the quality of life, health, goods, and services we may desire. Some of these things require water, but many of them require less water than we currently use. Thus, a fundamental part of the soft path means **rethinking water use, reducing waste and losses, and improving water efficiency and productivity**. And in what may be the best sign of all that this is possible, more and more countries, corporations, and individuals are doing so.

This is a remarkable, little known, and under-appreciated fact. We've broken the link between growing population, exponentially expanding economies, and water use. Indeed, a set of studies from the Pacific Institute shows that more can be done: even a place like California, or Atlanta, or Las Vegas, or I dare say Florida, can do far more to use far less water.

Fourth, we must expand the definition of water supply.

Rather than taking more water from overtapped aquifers and rivers, we must look to smart **conjunctive use of surface and groundwater**. We must relearn traditional methods of **rainwater harvesting**. We must realize that **treated wastewater** is an asset, not a liability. We must look, in some cases, to new technologies such as **desalination and advanced treatment**. We must develop real-time, accurate **water-quality monitoring** technology.

Fifth, water must be properly priced. The failure to price water properly leads to overuse, underinvestment, and poor economic decisions. Most of us don't pay enough for water. But water must also be *fairly* priced to reflect costs, encourage efficient use, and protect the poor. This also means eliminating some subsidies for water.

Sixth, we must expand our concepts of management and regulation and develop new institutions:

- Centralized facilities must be complemented with small-scale decentralized facilities.
- We should move from local water management to regional integrated management.
- We should acknowledge the role and responsibility of governments for protecting the public interest. That means:
  - Developing and enforcing water quality standards and laws;
  - Guaranteeing water for ecosystems.
  - Involving the public in decision making.
  - Acknowledging, and dealing with, climate change.
  - Regulating the private sector's involvement in water.
  - Ending inappropriate water subsidy and pork projects.
  - Addressing growth in a comprehensive and responsible manner.

This is a remarkable time in water policy. I believe we face serious risks and a water crisis. But I also believe that there are real, effective, affordable, and attractive solutions that can help us make the transition from where we are to where we want to be. We'll hear about many of them here at this symposium. I believe this transition is inevitable, but the challenge will be to

**[Page 11 of 11]**

make sure it happens fast enough to prevent the painful and disruptive impacts we all hope to avoid.

**Thank you.**