

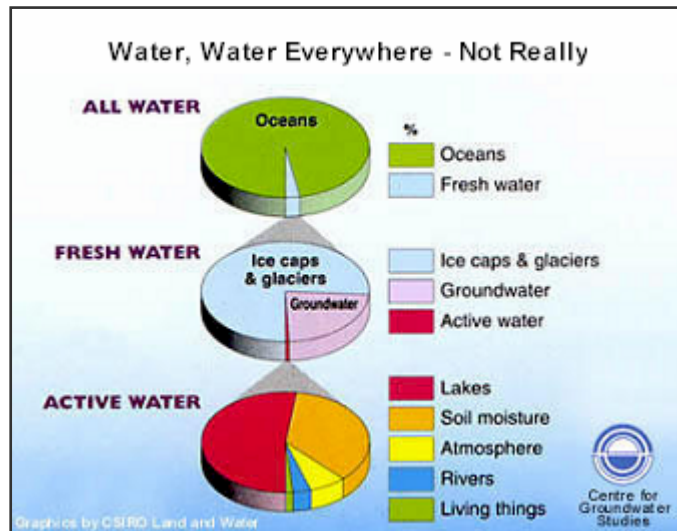
POLICY: Water

Earth, the watery planet; has dangerously low levels of fresh water. Unlike *climate change*, where many aspects of the issue are still under debate, *water scarcity* is a certainty and its consequences are a certainty. Many of the consequences, even the most dire, are not decades hence but will appear two or three years hence. Futurists have admitted they were wrong in 2000 ... some events they forecast for 2025 have already happened in 2006.

Water – The Reality

The *green revolution* of the 1970s was a success, but there were victims and consequences. The 1972 *Limits to Growth* of the **Club of Rome** formalized forecasting at a global level; its multi-factorial computer projections demonstrated world population growth rates were very close to crunch time. Resources – the focus then was mainly *oil* -- would simply not sustain the growth rates. Many of the factors such as “death due to overcrowding” extrapolated with Malthusian objectivity from *rat* populations, were self-explanatory, and sufficiently colorful to grab the attention of the world. Such forecasts probably stiffened **China**’s resolve to implement a “one child” policy which had marked effects on its population growth. During the 20th century the world’s population tripled but with widespread introduction of “modern” agricultural techniques including *intensive irrigation* the world’s grain harvest also tripled during the later half of the century. That revolution has come at immense cost and with an entirely false sense of security. All of the world’s great rivers and fresh water bodies have now been severely comprised or polluted and withdrawals made from underground water reserves during decades will take thousands of years to replenish. The “crunch” was merely postponed for a generation.

Most of Earth’s water is *sea water*, and most of the fraction that is fresh water is locked up in *ice*. Less than **0.1%** of Earth’s water is available for human use. The history of human settlement reflects the nexus with water – *Indus Valley* civilization, *Nile* civilization, *Fertile Crescent*. Civilizations not only rose but also fell by water; ruins of cities throughout the world now in the middle of dusty nowhere once stood near water-courses that moved or dried up. History is replete with attempts to control water, to dam, store, and move it. The *Marib* high civilization in 6th century BC *Yemen* lasted as long as the Marib Dam; Rome lasted as long as its lead-lined *aqueducts*.



Around 7,450 billion cubic metre per year (Gm³/yr) of water is used for all purposes around the world; a simple average of 1,240 cubic metre per head per year (m³/cap/yr). **India** is the greatest user of water in absolute terms, but has a below average use per capita. The highest use per head is in the **US** with 2,480 m³/cap/yr, twice the global average. The **Chinese** use 700 m³/yr per capita, less than one-third the US usage. At least 70% to 85% of all water around the world is used in *agriculture*, 5% to 10% is used in *industrial processes* and only around 5% is used by *households*, and only a small part of that is *drinking water*; most is used in cooking, cleaning, sanitation, and bathing. Thus, water scarcity is a vague term. It may mean insufficient water for agriculture or some industries or insufficient supply of water to people in villages or cities. Whether the water is drinkable or not is a different dimension to scarcity. Of the 20% of people who lack access to safe drinking water, many of these are the 50% of the world’s population who lack satisfactory *sanitation*. *Water scarcity* can not be overcome by any amount of hygiene or filtration.

Virtual Reality

Most water now, as ever, is used by *agriculture* not by people in cities; and in exporting and importing commodities, water – *virtual water* -- is moved around the world locked up in the goods that consume it in their production. *Virtual water* is now a mature concept and no serious discussion of water is possible without it. One *potato* requires 25 litre of water to produce; one glass of *milk* requires 200 litre. One sheet of office *paper* requires 10 litre; exporting 1,000 sheets of paper is to export of 10,000 litre of water. Common food *grain* requires 1,000 times their own weight in water to produce; one tonne of grain is 1,000 tonne of *virtual water*. But even more water-greedy is *cotton*; one cotton T-shirt has a virtual water component of 4,100 litre. Clearly, water is not just an incidental detail of agricultural production – it is integral to the strategic equation of world food supply, and the supply of essential goods. Exporters of grain and other goods are exporting water. Similarly, a country imports those goods it does not have sufficient water to produce; it in effect is importing water. Nature handles the miracle of growing the grain; supplying sufficient water to where it is needed is the man-made miracle. World trade is water trade; grain futures is water futures. For these reasons, systemic water shortages in a large world player such as **China**, **India**, or the **US** will be transmitted around the world.

Water Management

The *where* and *when* of water is critical. In many areas, drought will be broken by monsoon rains or hurricanes causing catastrophic floods – then the yearly cycle of drought and flood will repeat. Even cities and regions with severe water scarcity will drain storm rains away as a nuisance rather than collect it even for agricultural purposes. Most cities are built for drought, or for flood, rather than a sensible synthesis of the two. *Waste* and *loss* are also major elements of the water equation. Losses through *evaporation* from shallow standing reserves, from *canals*, *leaks* from pipes in cities, and *waste* from agricultural irrigation is a significant component of water use. In *New Delhi* and *Mexico City* up to 40% of reticulated urban water is lost due to leaking pipes. *Pollution*, another negative impact on water resources, often costs nothing – it requires only a moonless night and/or the price of an official's blind eye. But the *cost* of pollution is borne by the whole community and, if cleanup is possible, the cost is invariably far greater than the cost of orderly *sequestration* or *recycling* of dangerous wastes in a safe manner. Education, policing and crippling penalties are the only solution for willful or careless destruction or degradation of public water. Systematic pollution such as *pesticide* and nitrogen-rich *fertilizer* runoff, and untreated *sewage* outfalls into *estuaries* and *oceans* is causing loss of *ocean* habitat and a decline in fish near large population centers. The oceans are large but they are a sensitive interconnected earth sub-system needing a similarly-interconnected overview as land water systems.

A callous disregard for the future is also found in the use of *groundwater* reserves (aquifers). *Aquifers* that take centuries or millennia to recharge have been drained in decades in the **US**, **China** and elsewhere. Use of aquifers is often a political expedient or commercial windfall. Rather than solve water problems with capital-intensive storage and diversion of rainwater, government sees groundwater as a quick fix. But it is a temporary and disastrous fix. Fossil aquifers are, like *oil*, not renewable; porous rock aquifers do replenish but in exponentially-longer timeframes than they are being depleted. Aquifers are being drilled deeper and deeper with lessened flows each year. A day will come – tomorrow, or the day after – when the aquifer will give out and government will be left with industries, towns, whole regions economically dead. Equally catastrophic is the slow death of the region interconnected with the aquifer, often ecologically-rich *wetlands* or *marshes*. In coastal areas, salt *seawater* can flow into the aquifer and spoil the entire reserve. As aquifers are sucked dry there will also often be land *subsidence*, as seen in **Bangkok**, **Mexico City** and **Venice**. Similarly, badly-planned *dams* or overuse of rivers has led to *silted* unhealthy waterways. Vast bodies of standing fresh water such as the *Aral Sea* or the *Great Lakes* have been starved of flesh inflows and/or have been severely polluted.

Water-borne disease

In some parts of the world, comprehensive water policy must integrate with the management of water-

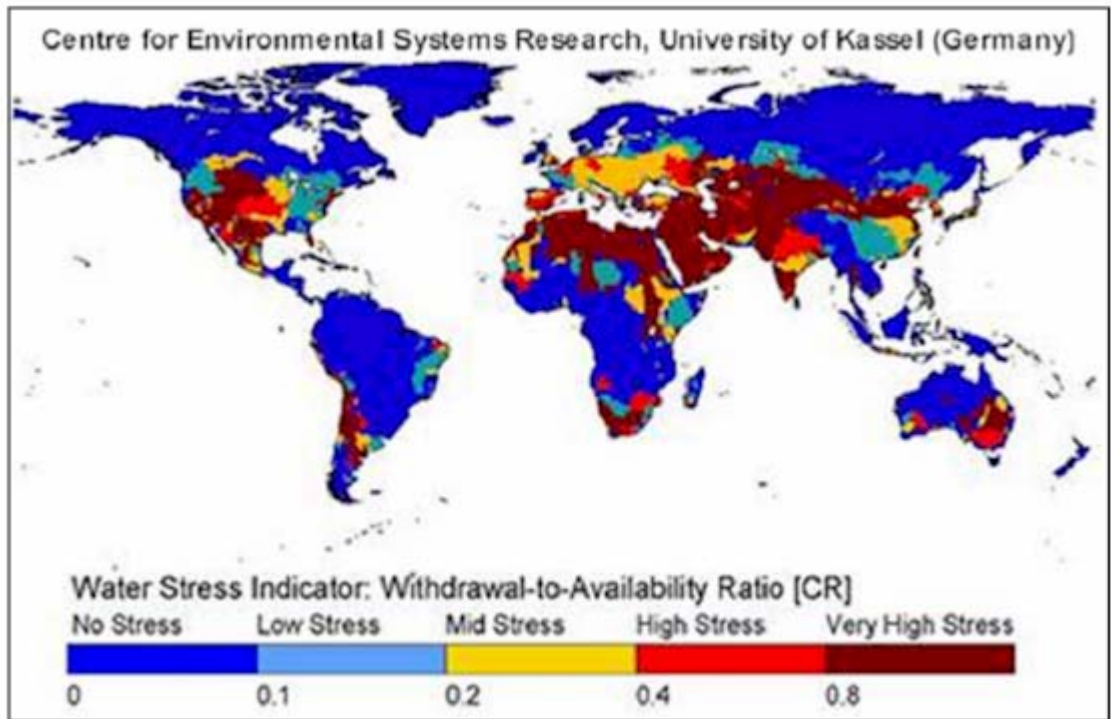
borne and water-related diseases. *Diarrheal diseases* afflict one billion people each year and lead to the deaths of just over three million; *malaria* affects 400 million and kills 1.5 million. Over 90 million each year are infected by *Onchocerciasis* (“river blindness”), *Bancroftian Filariasis* (“elephantiasis”), or *Dengue Fever*, all related to mosquitoes or river-dwelling insects.

The sanitation-water nexus

The UNICEF report *Progress for Children: A Report Card on Water and Sanitation* (September 2006) is almost all good news. Since 1990, 1,200 million more people have gained access to clean drinking water; 83% of the world’s population now has access and the Millennium Development Goal of 89% by 2015 is now achievable. **Latin America**, the **Caribbean** and **South Asia** are likely to reach targets 10 years early. In most cases, the greatest danger to potable water supply is human settlement itself. In the industrialized world, water pollutants are most likely to be a toxic cocktail of persistent industrial chemicals, but in the developing world pollutants are most commonly sanitary waste. Hence, water supply, *sanitation*, and basic *hygiene* are aspects of the same issue. Often, providing safe water simply means improving sanitation arrangements not delivery of a new water source. Half of the world’s population do not have access to satisfactory sanitation facilities.

Desalination

Desalination using thermal or membrane technologies can recover clean water from sea-water or brackish groundwater. Energy consumption per-unit and the cost of membrane modules in membrane separation plants is decreasing but indicative costs remain high at around \$1.50 to \$3.00 per 1,000 gallons (\approx \$500 /Mlitre), allowing for the original capital cost of \$100M or more. Desalination is the mainstay of water supply in **Saudi Arabia** and **Kuwait**, where the real cost of energy is nominal, and in **Israel** where there is no choice but it is also used to augment water supply in the **US** in locations such as **California**.



World Water Policy

The first intergovernmental gathering to consider to water issues was *Mar del Plata United Nations Conference on Water* in 1977. After several more specialist meetings, the World Water Council was

founded in 1996 with headquarters in Marseilles. There have now been four meetings of the World Water Forum, the most recent in Mexico City in March 2006 had 24,000 participants. These meetings have the benefit of a global perspective comprising numerous case studies. A common factor that can be examined across the world is **water stress** – a state where use approaches or exceeds sustainable supply. All populated areas of the world, and their grain-growing areas, are experiencing water stress.

China and **India** are crucially important to more detailed examination of water issues because they are case studies writ large and trends there affect world markets.

China

Two-thirds of China's grain production and one-third of its population is in the northern plain but the region has only 20% of China's water. One of the great rivers bringing water, the *Yellow River*, is greatly depleted by use further upstream – in 1997 it was **dry** for 75% of the year. Decreasing supply of river water such as this and over-pumping of shallow **aquifers** has caused the **water table** to drop at around 1.5 metre per year. Some farmers are now pumping from the deep (non-replenishable) **fossil** aquifer at depths of 300 metres (1,000 feet). The region is simply drying out – year by year, desertification is spreading further south. China's grain production peaked at 392 million tonne in 1998. The 2005 harvest was 358 million tonne. For years, shortfalls were met from a vast command economy reserve but this is now depleted and in 2004 China started to **import** grain. China's increasing purchase of grain will – as with **oil** – affect prices and supply throughout the world.

China's answer to its water difficulties is a Pharaonic hydrology project that will divert 50 Bm³ of water each year from the *Yangtze* and *Yellow* rivers thousands of kilometers northwards in three great canals. But China's own water planners say three to five times that will be needed in the north by 2030, and much of the increased supply will be absorbed by industry rather than the grain-growing that needs it now. Also, as with all such great schemes there will be downsides such as silting, leaks and other losses, and depletion of once great rivers. Without radical rethinking of water use, China will continue to fight against basic statistics: it has 22% world population but only 8% of world renewable water. This extreme stress is exacerbated by China's environmental and pollution control policies which to date have been shoddy or non-existent or ignored. In 2004 almost 60% of hundreds of monitoring sites on China's seven major rivers found the water **unfit for human consumption**; 400 major cities across China already have serious **water shortages**.

This serious situation has occurred with China still on the edge of rapid development. It has managed to limit population growth but China is not only growing, it is growing **affluent** and that invariably means an improvement in **diet** towards Western levels. Average consumption is still quite modest but as the Chinese diet grows towards Western levels, 40% of today's world grain harvest would be needed just for China. As grain consumption reaches a record 500 million tonne in 2006, demand for foods such as **meat** (high virtual water) grows, and domestic grain production falls, China faces a catastrophe brought by its own success. The Chinese people have increasing demand which its water supply will not meet. This will lead to social discontent or to massive and increasing grain **imports**. China's leaders admit there will be critical water shortage by 2030 when the population is forecast at 1,600 million but there is every indication it is already critical.

India

India is already in a more precarious situation than **China**. The average minimum diet is very close to the level necessary to sustain life. Grain harvests are still increasing but water supply for irrigation is at high stress levels. As elsewhere, farmers have augmented surface water irrigation by pumping **groundwater** from under their own land. There are no restrictions in India on this use of groundwater but the farmers are depleting everyone's water not just their own. Village wells must be deeper and deeper each year to supply drinking water. But for India's 1,100 million there may be lifesaving hidden capacity. India's water handling infrastructure is so severely inefficient that capital upgrades anywhere in the vast archaic irrigation and reticulation system will find water presently being wasted. Large cities such as *New Delhi*

have water shortages but at least 40% of water brought into New Delhi is lost through leaking pipes. Immense capital intensive projects on water supply are easier said than done in India where World Banks full of capital could be spent in every direction but the situation does afford India some hope of staying just behind the disaster curve.

Drinking water, not just irrigation water, is a severe problem in India. Only about 10% of *sewage* is treated and both urban and industrial pollutants (and corpses) are commonly dumped directly into waterways." Which in turn severely contaminates ground water. This is a classic demonstration that *sanitation* is an inseparable aspect of water supply.

Water Disasters

Many water disasters have already occurred and are indicative of the nature and extent of disasters yet to come. Soviet command economy turned the *Aral Sea* from the world's fourth largest body of fresh water into a toxic desert. River diversion to feed insane *cotton* projects caused the water level to drop 16 metre in 30 years. What water did reach the Aral was heavily polluted with now-outlawed *insecticides* used to grow cotton. **Mexico City** drained the *Aztec* lakes it was built on and deforested the surrounding area. The city is now subsiding due to the rapid loss of groundwater. There is growing water scarcity but when there are deluges flood-water mixed with sewage runs through the city. An estimated 40% of reticulated water is lost through 100 year old leaking pipes. The major *Murray-Darling* river system in **Australia**, the driest continent, has been critically damaged by intensive irrigation for agriculture. The water table has risen and forced ground *salts* to the surface and turned increasing areas of once fertile land into deserts. If all remediation were commenced today, much of the river system would take several decades to recover.

Water wars?

The conditions for future *water-wars* are developing in several places. **Syria** and **Iraq** accuse **Turkey** of taking too much water from the headwaters of the *Tigris* and the *Euphrates*, the same territory the *Kurds* claim as homeland. One reason for **Israel's** reluctance to withdraw from **Syrian** territory on the *Sea of Galilee* is that this is now the source of 30% of Israel's water. Israelis have "Western" patterns of water use, with a per capita consumption four times that of neighboring Palestinians. **Egypt** has warned **Ethiopia** and **Sudan** that it is prepared to resort to war if they continue to extract from the *Nile* the increasing quantities water they need for their own growing nations. The *Ganges*, running from **India** to the sea in **Bangladesh** is so depleted and polluted that coastal mangroves are dying. Global warming is disrupting the annual freeze and thaw cycle that feeds the river threatening an ever-diminishing flow. **Pakistan** accuses **India** of depleting the flow of the *Chenab* and threatening to deplete it further by building a US\$1B dam at *Baglihar* in disputed Indian-controlled *Kashmir*. The flow of the *Indus* has been so reduced that sea water has intruded into coastal estuaries and has harmed 90% of the agricultural land in *Sindh*. Indian generals say that they do not need a *nuclear* bomb against Pakistan; a "water bomb" is sufficient.



Water Policy – US

In the early 1990s there were 90,000 federal employees working on water problems within 10 cabinet departments, 2 major agencies, and 34 smaller agencies.

In 1965, Congress established the **Water Resources Council** under the *Water Resources Planning Act*, but the Council had liaison powers only and could not formulate or even recommend policy in its own right. In the early 1980s, the GAO reported that the WRC had some "unifying presence" but it was mystified by what it actually did and it was axed by the *Reagan* administration as a cost-saving. By the 1990s, there were armies of federal employees working across the array of water issues, but they did not

talk to each other, or always fight on the same side, and rarely coordinated with even larger numbers of state and local and private sector employees involved with water issues. The **Western Governors' Association** in 1989 called for policy coordination at a *White House* level, but this and other calls has not led to a unified US policy framework for water.

It is only in light of the crises emerging throughout the world (and in the US) now that the wide scope of water-related policy areas is fully understood. All of the policy areas *land use planning, river basin management, catchment management, metropolitan utilities maintenance, pollution and environmental management, water quality management* have developed within their own silos with as little coordination with other policy areas as possible. If policy oversight exists it is spread so thinly across a range of agencies as to be invisible. Countless projects – federal, state, and local – have been *mission specific*; build that dam, approve that housing development, upgrade that drainage system, without reference to a coherent whole.

Interest groups are providing the only focus at present around which an integrated policy may coalesce. *American Rivers* warns “There are some towns that are literally running out of water because they haven't paid attention to supply and demand”. *Smart Growth America* says, of *Atlanta's* water crisis, “There are no natural boundaries to the city's growth, so it sprawled in all directions”. Some cities and counties are aware aquifers can only recharge if cities leave as much *unpaved surface* as possible; most are not.

Numerous issues throughout the US need the attention of an integrated policy. One urgent issue concerns a major part of the US grain-producing region and its use of the *Ogallala aquifer* which is being depleted at around 12 billion cubic metre each year (Bm³/yr). Already the equivalent (says the BBC) of 18 years total flow of the *Colorado River* has been extracted from the aquifer. Although porous-rock aquifers gradually recharge from rainwater, much of the *Ogallala* is a *fossil* aquifer – a deposit sealed up millions of years ago – and it will not replenish. This type of irrigation – bores extracting water to exactly where it is used – is highly productive. Conversely, as bores are exhausted or must be pushed to greater and greater depths the loss of productivity, and rise in cost of production, will be keenly felt.

There have been some moves towards integrated water policy. The **U.S. Army Corps of Engineers** established the **Institute for Water Resources** to provide “forward-looking insights and analyses on emerging national water resources issues”. Also there is federal coordination on some broad-brush issues. In October 2000, Washington announced “a framework for land and resource management focused on *watersheds*” involving the departments of *Agriculture, Defense, Energy, Interior, NOAA, EPA, Army Corps of Engineers, the Tennessee Valley Authority (TVA)*.



The multi-function, multi-state TVA of the *New Deal* is a rarity on the US scene and may be a way forward for the type of multi-mode approach that water policy demands. The TVA – its successes, its lessons-learned, the skills it has evolved in brokering competing interests – are just those capabilities needed in a “Federal Water Authority”. Australia, the driest continent with a dire array of water crises established a high-level post of Water Commissioner in the Prime Minister's Department in late

September 2006; better late than never said many. An equivalent US position would be in Department of State (or very senior post in DOI) or the White House.

Water Futures

All of *North Africa*, the *Middle East* and *Iran* have become major grain importers. Increasing urbanization and increasing affluence inevitably lead to demand for reticulated water and a diet more costly in *virtual water*. Governments have little choice but to let urban populations win in competition with agriculture for water but in consequence agricultural products must be imported. **Egypt**, with 79 million people, now imports 40% of its grain supply and is competing for top spot with **Japan** as the largest world importer of *wheat*. For the first time in 5,000 years the *Nile* has failed to meet all of Egypt's

needs. Even more precarious is **Algeria**, with 33 million, that must import over 50% of its grain supply. The imports of *North Africa* represent another great river like the *Nile* flowing into the region in the form of the water locked up in imported grain. These examples are unremarkable except in the context of new players such as **China** or **India** entering world grain markets. If huge nations like these need an extra 2% or 3% -- or annually increasing amounts -- from the world grain market, much of the world will be affected. With a year or two of *bad harvests*, or *grain disease* or *drought* in grain producing countries, widespread famine and doubled or tripled grain prices are probabilities not possibilities.

In the 1970s, this was foreseen as a *food shortages* but what is really at play is *water shortage*.

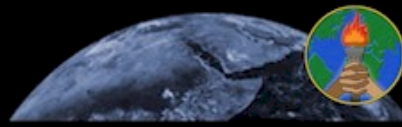
A truly critical situation has been averted by some years by draining *aquifers*, in **China**, the **US** and many other places. Like living off a credit card, this tactic is unwise and of limited life. Water levels in aquifers will continue to fall to greater depths, the cost of exploitation will increase and finally, the quality and quantity of water will be unsuitable for the agro-industries that have burgeoned above them. The “water bubble” will burst and along with it the “grain bubble”. This is likely to coincide with huge middle classes in **India** and **China** who, like the **West**, have grown accustomed to a lifestyle built on cheap grain, and “free” water. Two or three Horsemen of Apocalypse seem to be waiting in the wings.

Is there **Hope**?. In theory, yes; but only if governments convince their populations that water has value related to its cost and scarcity, only if aquifers are treated as non-renewable resources, only if immensely wasteful “green revolution” irrigation systems are replaced throughout the world with more efficient systems. The only way to make this series of miracles happen is to pass on the actual cost of water to its users. Farmers will pay for what they use and much food will cost more. Many years ago, the bean-counters insisted that public libraries, museums and public transport be run on a “*user pays*” basis; perhaps with the same zeal they can now calculate what billion-dollar agribusinesses should be paying the public purse for the water they use. The only point of a cost basis, and its only virtue, is that it will force or encourage the use of more efficient irrigation such as *drip irrigation* and reduce waste and losses. In some areas, it will also encourage use of rainwater for household use or (where suitable) for drinking. Effort can impact the water problem -- **Singapore**'s upgraded water system has losses of less than 5%.

Who Owns Water?

In 2000 there was an unseemly spat between the **World Bank** and **Bolivia**. Using monetary threats, the World Bank made Bolivia privatize the water supply for *Cochabamba*. A subsidiary of **Bechtel** bought the rights to manage the water supply, and almost immediately tripled the water charge to households, and (reportedly) cut off water to the poor who could not pay. This led to protests, a general strike, riot police, and at least one death. Four months later, “Bechtel fled to the United States” and sued the Bolivian government for compensation. The activists said Bechtel was making the poor “lease the rain”; Bechtel said this was the only way *Cochabamba* would have a reliable, well-maintained, corruption-free water supply. As ever, the real issues are to be found somewhere in the middle.

Reticulated water for urban populations is just one element of the water issue but it involves the majority of the electorate. **Mexico City** (and **Delhi**, and many other cities) urgently need a major upgrade of water reticulation to halt wastages up to 40% and make the water safe for drinking but these massive works are capital intensive and some model recovering the cost over, say, 50 years is necessary. With the proviso that the truly poor can always be exempted from any charges, a Bechtel like arrangement seems to be the only way to move forward. The poor certainly do own the rain but do not necessarily own billions of dollars of pipes.



Near-Term	Mid-Term	Long-Term
<p>Water is a <i>national security</i> issue. A growing consensus says there is <i>not</i> a water problem, but a water <i>management</i> problem. A <i>manageable</i> national security issue is rare. Action on preventable losses and uneconomic use of water is doable. <i>Valuing</i> water is contentious but necessary – to value water reflecting its replacement and handling costs. This is not a means of raising revenue from the poor but of determining the true cost of production of common crops and manufactured goods. When true water costs are factored in, some crops or other goods may be clearly uneconomic to produce in some areas. China and Australia have started to take a national overview of water; the US as yet has not.</p>	<p>In much the same way <i>carbon credits</i> have been suggested as a means of calibrating hydrocarbon usage, so the concept of <i>virtual water</i> could be used more widely by planners, and policy-makers in determining resource priorities. With the relative acceptance of environment conservation notions in the last decade, a wider public acceptance that water has a cost is politically possible. <i>Fossil aquifers</i> should be classified as national treasures, and not used to grow crops. Notions of what constitutes “ownership” of water and what that entails will be increasingly up for discussion whatever the traditional view has been.</p>	<p>Unlike the <i>Climate Change</i> debate, there is very little debatable about water issues; very little room for political stances. Raw statistics show that water stress of today is <i>famine</i> or <i>war</i> of tomorrow. But before going to war for a bag of grain or a glass of water, each nation should acquire a comprehensive understanding of its own water position, including all the presently isolated issues of <i>international trade, pollution, land use</i>. In the US, the only multi-mode body of the type necessary to get this overview is the <i>Tennessee Valley Authority</i>. A similar type of “Federal Water Authority” will be necessary, better sooner than later.</p>

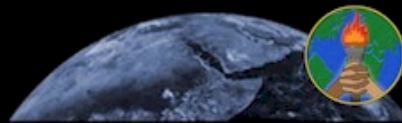
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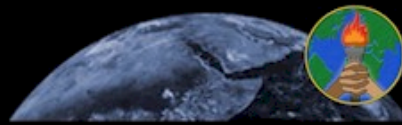
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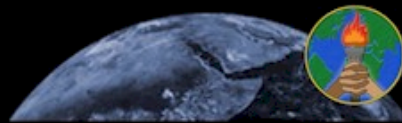
Hazard Level

Change Codes
↓ Deteriorated
• Steady
↑ Improved
↗ Alert

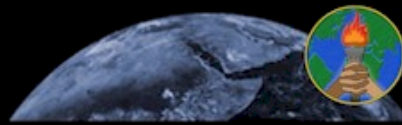
week-ended	See daily list of news items
2007 Jul 01	<ul style="list-style-type: none"> • No country influences whether <i>Asia</i> will soon be at war or peace more than China, which controls the <i>Tibetan plateau</i> — the source of <u>most major rivers</u> of <i>Asia</i>. <i>Californians</i> have been told to start conserving water after the <u>driest year in over a century</u> -- "A mere 3.2 inches of rain -- less than a quarter as much as usual -- fell on downtown Los Angeles in the year beginning on July 1, 2006, the lowest since records began 130 years ago." Brazil's pharaonic <i>São Francisco</i> river transposition project seems to have nothing in its favor -- São Francisco Diversion: Brazil Vows Water for All But Elite Will Get It. <i>Desalination</i> is not a ready option ... yet; "Current methods require about <u>14 kilowatt-hours of energy to produce 1,000 gallons of desalinated seawater</u>".
2007 Jun 24	<ul style="list-style-type: none"> • [nothing significant to summarize but see links to stories in this topical area]
2007 Jun 17	<ul style="list-style-type: none"> ↓ China: <u>20% of the world's population, 7% of its water resources</u> -- <i>neglect and pollution</i> by profiteers have turned a challenge into a crisis calling for expensive solutions -- Polluted, drought-stricken China eyes sea water. "India remains concerned about reports of <i>diversion of waters</i> from rivers which flow into India from China's Qinghai plateau ..." -- Water-sharing clouds Indo-China ties.
2007 Jun 10	<ul style="list-style-type: none"> • [nothing significant to summarize but see links to stories in this topical area]
2007 Jun 03	<ul style="list-style-type: none"> • <i>Climate change</i> will not make millions of <i>refugees</i>, but <i>water scarcity</i> will -- U.N. Braces for New Breed of Environmental Refugees.
2007 May 27	<ul style="list-style-type: none"> • The Ghana Minister for Water Resources warns <i>conflict</i> is the alternative to protection and better use of <i>water resources</i> throughout <i>Africa</i>. Soon it will necessary to carry water by rail to <i>Zimbabwe city</i> -- "the train would bring water from the Zambezi River in the north of <i>Zimbabwe</i>, around <u>400 kilometres</u> away."
2007 May 20	<ul style="list-style-type: none"> • That mythical "invisible hand in the marketplace" delivers <i>profits</i> to a few but does not deliver <i>equity</i>; "the evidence shows that the <i>private sector</i> has shown a great reluctance to commit finance to connecting the poorest people to <i>clean, affordable water</i>..." -- 134 Groups Urge Rich Countries to Pull the Plug on World Bank's Push for Water Privatization.
2007 May 13	<ul style="list-style-type: none"> ↓ Chinese authorities warn there will be <u>no reticulated drinking water</u> outside the <i>Games Village</i> at the Beijing Olympics -- "The billions spent on cleaning and modernizing the Chinese capital have been many but not enough to make water potable." "A [Chinese] dam on the Brahmaputra river in Tibet will lead to a <i>major ecological disaster</i> for Bangladesh within the next few years"
2007 May 06	<ul style="list-style-type: none"> • [nothing significant to summarize but see links to stories in this topical area]



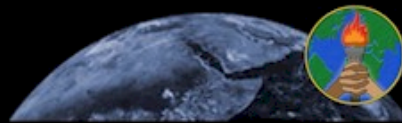
2007 Apr 29	<ul style="list-style-type: none"> • The Interstate Commission for Water Coordination comprising delegates from Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan met for the 47th time but there is still no credible strategy for <i>water security</i> for the region's more than 55 million inhabitants. In Mumbai [India] taps are running dry – there is now a <u>continuous shortfall</u> of around <u>1G litre/day</u>, about the same quantity estimated to be lost by <i>leakage</i> through the pipe network that dates in part to the 1860s. WHO says 16% or 230 million of Africa's population will face <i>water scarcity</i> by 2025, and as many again will live in <i>water-stressed</i> countries.
2007 Apr 22	<ul style="list-style-type: none"> • As Australia continues through its worst <i>drought</i> in <u>1,000 years</u>, the government is preparing to turn off <i>irrigation</i> water to farmers. India has developed its <i>first floating desalination plant</i> with a capacity of one <u>million litres per day</u> off the Chennai coastline.
2007 Apr 15	<ul style="list-style-type: none"> • Limits to Growth -- without exponentially-better <i>water management</i>, it will be <u>impossible</u> to achieve Africa's Millennium Development Goals. Three upstate projects threaten New York's water quality with "dying a thousand deaths".
2007 Apr 08	<ul style="list-style-type: none"> • With the EU's support, the Kyrgyz foreign minister has proposed a <i>Water and Energy Academy</i> in the Kyrgyz capital (Bishkek) in the hope of resolving Central Asian water disputes. <i>Waters Run Short In South Florida</i> -- "There are solutions, but they are not cheap, and they are going to take a while". A compendium of <i>projects</i>, outdated <i>water laws</i>, and desperation in the US dry West -- <i>No Longer Waiting for Rain, an Arid West Takes Action</i>.
2007 Apr 01	<p>↓ The great Mekong River is "drastically dry" -- "[two] Chinese hydro-electric dams contribute to severely low water levels impeding river navigation.... The worst is yet to come. China is now building a <u>third dam</u> ... "</p> <p>India is predicted to face <i>severe water crisis</i> by 2045 -- "this is not just a technological problem, not just an economic problem, not even a social problem - it is a <i>political problem</i>." ["Severe" in this context means widespread death from lack of water.]</p> <p>The 10 Nile Basin countries have agreed to a <i>Nile Basin Cooperative Framework</i> replacing a 1929 colonial arrangement created by the British.</p>
2007 Mar 26	<p>↓ The FAO says the world must learn about <i>sharing water</i> now to avoid future <i>water wars</i>; a subtext is that much water is presently <i>wasted</i> or <i>under-priced</i> -- a person needs to drink <u>2 to 5 litre per day</u>, but a kg of beef needs <u>15,000 litre</u> to produce.</p> <p>In China, a <i>drought</i> downstream on the Yangtze triggers a debate over China's Three Gorges dam -- the Yangtze last year fell to its lowest level since records began.</p> <p>Most of the world's freshwater ecosystems are under siege; WWF list the 10 most threatened rivers -- <i>WWF's Top 10 Rivers at Risk, Rio Grande Makes List</i>. World Water Day March 22 is to focus on <u>one person in six</u> without access to <i>safe drinking water</i> and over <u>2.6 billion</u> without <i>sanitation</i>.</p>
2007 Mar 19	<ul style="list-style-type: none"> • Five Central Asian nations met to discuss <i>sharing water</i> and <i>energy</i> of Amudarya and Syrdarya rivers and other shared water resources.
2007 Mar 12	<ul style="list-style-type: none"> • Kazakhstan and China have not yet been able to resolve differences over access to



	<p>the resources of <i>Lake Balkhash</i>, the <u>third-largest freshwater lake</u> on earth.</p>
2007 Mar 05	<ul style="list-style-type: none"> • Azerbaijan, Kazakhstan, Iran, Russia, and Turkmenistan met in Tehran to discuss shared issues concerning the <i>Caspian Sea</i>. <p>The World Bank is providing around \$105M for <i>water management projects</i> in 13 Indian states.</p>
2007 Feb 26	<ul style="list-style-type: none"> • China is requiring the population to reduce its <u>already low</u> per-capita <i>consumption</i> by another <u>20%</u> by 2010. <p>Famine and rumors of famine -- Australia's key agricultural research agency predicts the <i>grain crop</i> will be <u>60%</u> less this year due to <i>drought</i> and reduced <i>irrigation</i> water.</p> <p>A philosophical look at <i>water disputes</i>; "<i>Realists, Liberals and Marxists each have their own explanations for water conflicts</i>" -- <i>States should plan for water tiff resolution in good years</i></p>
2007 Feb 19	<ul style="list-style-type: none"> • Guyana's 5-year contract with the UK company that has managed the <i>privatized water supply</i> will <u>not</u> be renewed because of failure to meet development targets. <p>There is a <i>water crisis</i> in western Peru -- the world's largest <i>tropical ice cap</i> is retreating at about 60m (200ft) a year, up from 6m (20ft) a year in the 1960s.</p> <p>The binding World Bank decision on a disagreement between India and Pakistan over the <i>Baglihar</i> dam on river <i>Chenab</i> is in India's favor.</p>
2007 Feb 12	<ul style="list-style-type: none"> • The UN gives examples of water <u>cooperation</u> -- <i>From water wars to bridges of cooperation: Exploring the peace-building potential of a shared resource</i>. <p>In the US, <i>Montana, Wyoming, Nebraska, Kansas, South Dakota</i> (and others) are involved in <i>water wars</i>, just a taste of those to come.</p> <p>In India, the decision of the <i>Cauvery Water Disputes Tribunal</i> has fallen short of what both <i>Karnataka</i> and <i>Tamil Nadu</i> had demanded.</p>
2007 Feb 05	<ul style="list-style-type: none"> • A scenario that sees <i>tankers</i> shipping emergency water to needy cities has added credibility given that <i>single hulled oil tankers</i> are being phased by 2015 out and will become available at scrap prices. <p>32% lower flows in the <i>Indus</i> this year, and a 20% less <i>snowfall</i> around the headwaters, are a taste of <i>water crises</i> to come in the sub-continent.</p> <p>Water development projects in Ethiopia's part of the <i>Nile</i> basin, the home of 20 million people, is said to be crucial to <i>poverty</i> alleviation. [But, as ever with river projects, someone somewhere else will be adversely affected.]</p> <p>The US National Academy of Engineering has awarded a \$1M prize to Bangladeshi scientists for an ingenious low-technology system that filters <i>arsenic</i> from Bangladesh's arsenic-laden groundwater.</p>
2007 Jan 29	<ul style="list-style-type: none"> • <i>Bulawayo</i> in Zimbabwe's Matabeleland, a bastion of opposition to President Mugabe, has been denied a <i>pipeline</i> from the Zambezi and now has about two weeks water supply remaining. <p>The Australian federal government has pledged billions to water resources "<i>Australia's water use is unsustainable and its water management system needs radical and permanent change.</i>"</p>
2007 Jan 22	<ul style="list-style-type: none"> • <i>Salt</i> inflow into over-used <i>rivers</i> is forcing cities in south China to go upstream for water -- salt in Macau's drinking water is three times the level at which people generally start to notice a salty taste.
2007 Jan 15	<ul style="list-style-type: none"> • [nothing significant to summarize but see links to stories in this topical area]



2007 Jan 08	<ul style="list-style-type: none"> [nothing significant to summarize but see links to stories in this topical area]
2007 Jan 01	<ul style="list-style-type: none"> Israeli analysts observe that the price of Syria's cooperation in the <i>Middle East</i> are likely the water resources that Israel also needs -- "the <i>Golan water-shed</i> is the source for more than <u>55%</u> of Israel's <i>fresh water</i> " [The item includes excellent <i>graphic</i> of regional water politics.]
2006 Dec 25	<ul style="list-style-type: none"> [nothing significant to summarize but see links to stories in this topical area]
2006 Dec 18	<p>↓ Five years data collected by the twin <i>satellites</i> of the <i>Gravity Recovery and Climate Experiment</i> (GRACE) show a bleak picture for the world's <i>fresh water</i> not revealed in commonly-available information -- "<i>Stream flow measurements</i> are often <u>not shared</u> among nations for economic, political or national defense reasons." Particularly in <i>Africa</i>, fresh water is dwindling -- "...a drying trend in major African basins such as the <i>Nile</i>, <i>Congo</i> and <i>Zambezi</i>" is certain to lead to cross-border tensions.</p>
2006 Dec 11	<p>↓ In <i>Africa</i>, <i>Lake Victoria</i>, second only to <i>Lake Superior</i>, has dropped at least six feet in three years; <i>Lake Chad</i> has shrunk to 2% of its 1960s size. US plans to <i>seal</i> border watercourses may cause dire problems in Mexico -- Mexican wells would become polluted without the seepage and migratory birds would be threatened if wetlands disappeared. President Arroyo of the Philippines urges better <i>water management</i> in face of a crisis -- Manila residents pay 5 to 10 times as much as New York residents and there are waterless hours each day; it is a national security issue.</p>
2006 Dec 04	<p>↓ Although China denies some details, a plan to build a <i>hydro-plant</i> on the <i>Yarlung Zangbo</i>, the headwaters of India's <i>Brahmaputra</i>, may have international implications.</p> <p>A Turkish dam on the upper reaches of the Tigris will cut water flowing to Iraq by 50% -- a profound disaster.</p>
2006 Nov 27	<ul style="list-style-type: none"> Water is now a matter of national security for Peru -- "Working <i>toilets</i> and clean <i>drinking water</i> are unattainable luxuries for a third of Peru's city dwellers and two-thirds of its rural population."
2006 Nov 20	<ul style="list-style-type: none"> A <i>desalination</i> plant officially opened in <i>Perth</i> [Western Australia]; it will provide 17% of Perth's water from the <i>Indian Ocean</i>. <i>Peoples Daily</i> gave a detailed review of the new <i>National Development and Reform Commission</i> policy on the <i>price basis</i> of China's water. UNEP says that in <i>Africa</i> [all of it?] "<i>rainfall harvesting</i> is more than adequate to meet the needs of the current population several times over" - management is the key.
2006 Nov 13	<p>↓ UNDP wants another \$4B a year to fight '<i>water apartheid</i>', <i>water-borne diseases</i> that kill far more people than <i>HIV/AIDS</i> and <i>malaria</i> combined -- "We sometimes lose sight of the sheer depth of inequality."</p> <p>The UNDP warns <i>Central Asia</i> faces the dual problems of weak regional cooperation on water issues and a collapsing <i>irrigation</i> system.</p>
2006 Nov 06	<ul style="list-style-type: none"> [nothing significant to report]
2006 Oct 30	<ul style="list-style-type: none"> "Wetlands are nature's amazing cleaning machines" - Phoenix [US] shows the way in water treatment using integrated natural systems. China's <i>damming</i> of the 2,906-km long <i>Brahmaputra</i> river in Tibet could trigger catastrophe warns downstream neighbors.
2006 Oct 23	<ul style="list-style-type: none"> A classic "<i>virtual water</i>" example -- in Kenya 12 large corporate farms exporting <i>flowers</i> to Europe are in reality exporting <i>water</i> needed downstream by thousands of small farmers.



2006 Oct 16	<ul style="list-style-type: none"> ↓ A deadly outbreak of E. coli (<i>Escherichia coli</i>) carried by <i>spinach</i> and <i>lettuce</i> was traced to <i>irrigation water</i>, showing a system that quickly delivers fresh food across the country can just as quickly spread deadly bacteria.
2006 Oct 09	<ul style="list-style-type: none"> • [nothing significant to report]
2006 Oct 02	<ul style="list-style-type: none"> ↓ A commentator observed "since it takes 1,000 tonnes of <i>water</i> to produce one tonne of <i>grain</i>, importing grain is the most efficient way to <i>import</i> water....trading in grain futures is in a sense trading in water futures." In Australia, the driest continent, now the Fourth Estate agrees that the "<i>water crisis</i>" is all about <i>water management</i>.
2006 Sep 25	<ul style="list-style-type: none"> • [nothing significant to report]
2006 Sep 18	<ul style="list-style-type: none"> • China announced a big-picture plan to fix its dire water problems.
2006 Sep 11	<ul style="list-style-type: none"> ↓ 1.1 billion people world-wide still have no access to <i>safe drinking water</i> and 2.6 billion lack the associated utility of reasonable <i>sanitation</i>.
2006 Sep 04	<ul style="list-style-type: none"> • Australia is particularly vulnerable to any decrease in rainfall due to climate change -- water is the main issue in an up-coming State election. Kazakhstan, Kyrgyzstan, Tajikistan, and Uzbekistan met to discuss reviving the Aral Foundation and other water resource issues.
2006 Aug 28	<ul style="list-style-type: none"> ↓ <i>Water wars</i> seem closer: 145 countries share at least one river basin — severe water scarcity has arrived in some areas decades earlier than predicted — one third of the world population already face some form of water scarcity — <i>biofuel crops</i> are a vapid alternative because fuel crisis, food shortages and water crisis will converge. But a rising voice of opinion stressed there is <u>no</u> water shortage, just a crisis in water MANAGEMENT; even fixing leaks and waste can avert some of the crisis.
2006 Aug 21	<ul style="list-style-type: none"> • A water conference said a third of the world is facing water shortages because of poor management of water resources and soaring water usage, driven mainly by <i>agriculture</i>.
2006 Aug 14	<ul style="list-style-type: none"> • [nothing significant to report]
2006 Aug 07	<ul style="list-style-type: none"> • [nothing significant to report]
2006 Jul 31	<ul style="list-style-type: none"> • A growing problem in rich and poor world alike -- even the war of ethnic and tribal rivalry in Darfur are only symptoms of a deeper cause – competition for WATER.
2006 Jul 24	<ul style="list-style-type: none"> ↓ New York's water is getting worse because of changing weather patterns and increasing runoff from land clearance and development upstate.
2006 Jul 17	<ul style="list-style-type: none"> • [nothing significant to report]
2006 Jul 10	<ul style="list-style-type: none"> • [nothing significant to report]
2006 Jul 03	<ul style="list-style-type: none"> ↓ The three-state "water war" over the Apalachicola River is a taste of the sort of water crisis that will face the US in future.

Commencement of Service

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