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REMEMBERING THE FUTURE

VOL. 3, Issue 2-3, July-August 2011

A Watershed Moment for the Trajectory of Blue Gold: Soil Reserves & the Thirst for Tangible Returns

Introduction

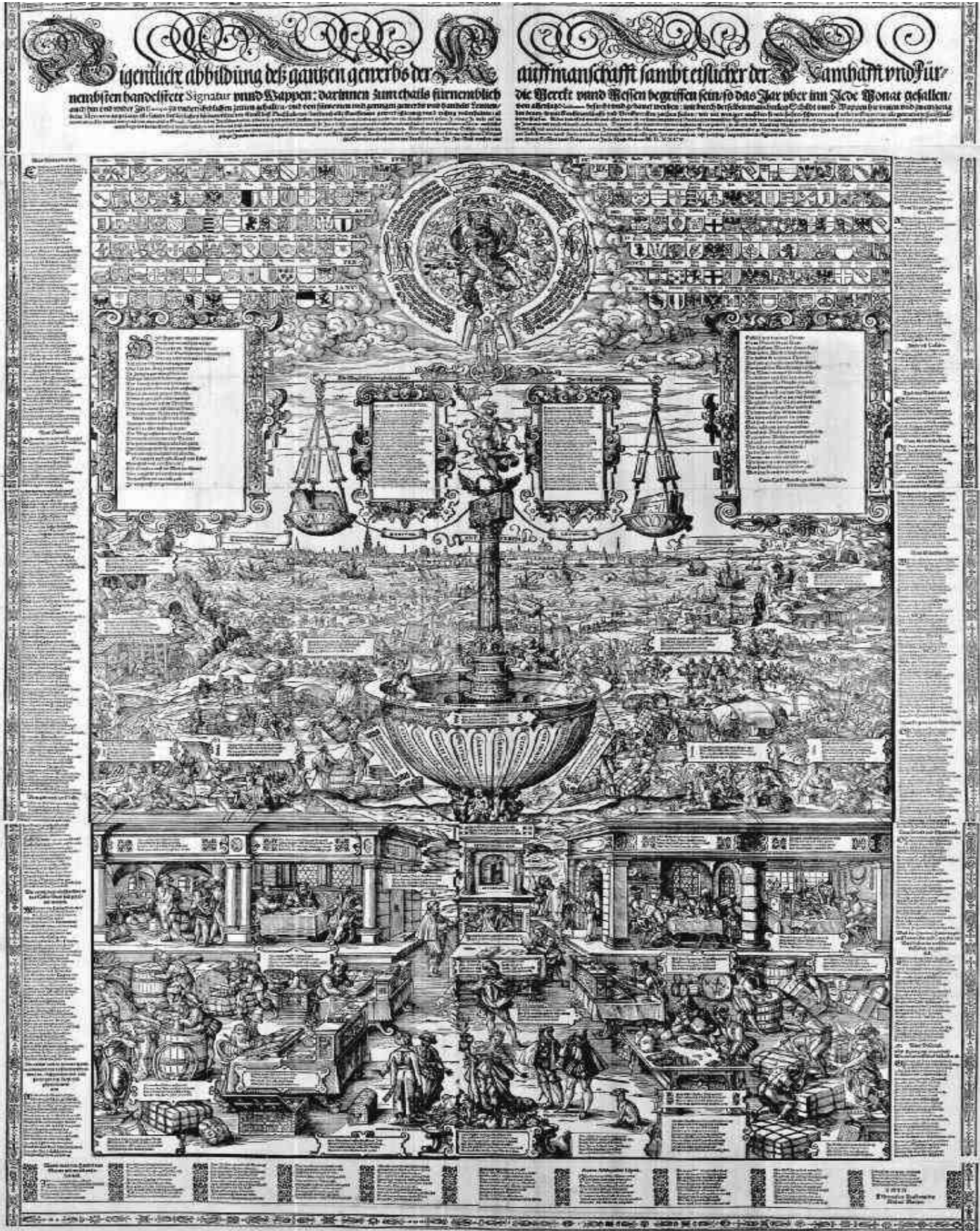
When we search for life in other planets, first and foremost we search for water. This issue on blue gold, is drafted in the midst of the renewed Euro-zone debt crisis, and while on this part of the Atlantic we are equally concerned about our own national debt, the fragile recovery, and the market turmoil. Part of our message in this newsletter, is that a dysfunctional equilibrium may be developing in the global economy. On one hand, countries such as China and India are growing fast, comprise almost one third of the global population, while on the other hand together they control less than 10% of the global supply of fresh water. From that perspective – and this is not the right forum to debate the moral issues surrounding the water – water may be seen as a liquid asset that has been undervalued given the trajectory of the global economy.

The aquifers of major cities such as Mexico City, Buenos Aires, Jakarta and Bangkok are being drained. As more than two billion people are making efforts to enter in their respective middle classes, demanding better nutrition, the water pressures will increase, since close to 70% of water worldwide is used in agriculture. Climate change adds to these pressures as glaciers melt, reservoirs dry up, and rivers stop flowing into the seas. Global population projections along with the green revolution (better seeds, fertilizers, etc.) have become a mechanism that feed each other. However, the water supplies remain finite, and with the population rising by one billion every 10 years. Irrigated areas have to increase exponentially and with them the need for more and more water. In the last two decades the amount of land that needs irrigation has doubled and the water drawn for farming has tripled. A significant percentage of people who go to bed hungry every day is due to lack of water to grow food. It is estimated that in the next 15 years, more than 30% of the global population will live in countries with chronic water shortages. The soil reserves for water and food become the ingredients of this new asset class that is developing.

Moreover, the demand for water is growing from the other two major places, that is industrial and domestic activities. These two sources have quadrupled in the last few decades and their demands keep rising. However, as figure 2 below shows, only 3% of the water could be classified as usable. The rest 97% is salty and the desalination procedures are costly and require significant amounts of energy. Now, of the 3% fresh usable water, about 70% is frozen (glaciers, poles, etc.), and thus only about 0.75% of fresh water is readily available for all human and animal activities, as figure 2 shows.

However, before we proceed with further analysis, allow us to integrate a few thoughts from art, related to figure 1 below. Jost Amman produced in 1585 the woodcut that can be seen below. It is known as the *Allegory of Commerce*. Merchants are seen trading, discussing prices and exchange rates, while others are casting their accounts. Goods are being loaded and carried into warehouses for shipping.

Figure 1



However, all these activities can materialize because of Antwerp's river that gives life to all trading activities. If it were not for the waters of the river, nothing could move, and hence the fountain with the two scales (named debit and credit) would be moot. From the basin of the fountain (another water symbol) a pillar is rising. The pillar is known as Fortune and is partly bald and partly long-haired. Fortune stands on an unstable globe of chance and is inviting the merchants to seize market opportunities.

The plethora of labels symbolizes the numerous nuances of trading, calculating, and accounting for profits. The dilemmas of market activities are summed up at the foot of the woodcut. Males surround a female figure. The former personify prudence, skills, integrity, while the latter stands in the midst of emblems of power: crown, orb, a sack of coin and the civilized things that coins can buy i.e. books, art, and musical instruments. However, she too stands on an unstable sphere! Life seems to move like a river, the flow of which generates life and death, and hence the skull alongside the sack of coins.

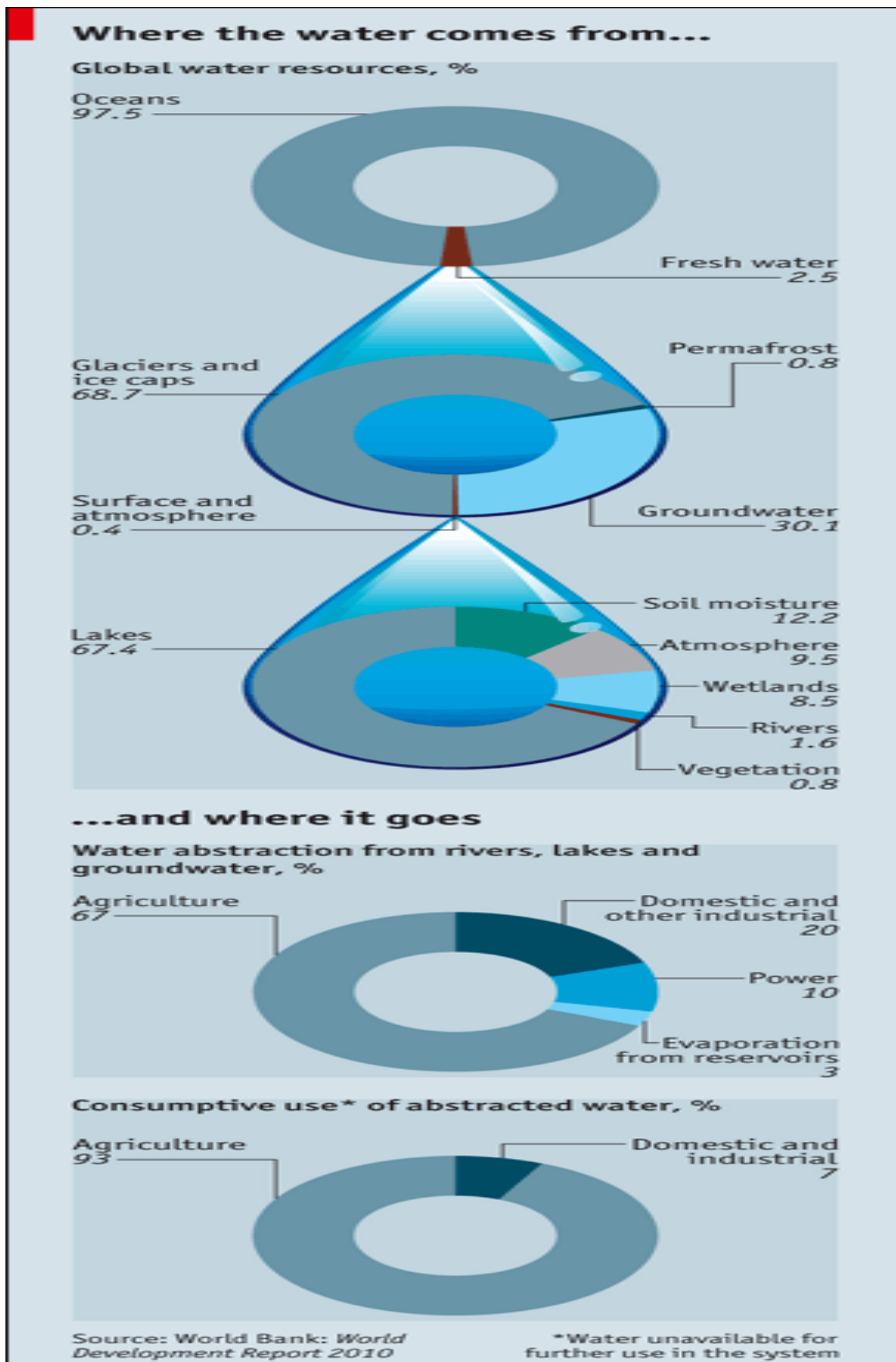
The unfortunate thing nowadays is that Homer is dead in the classroom, where students are trained in formulas and test-taking techniques, rather than being educated in the process of thinking that integrates disciplines and advances the human spirit. Hence, it is no wonder that wealth these days is considered a process of debt accumulation!

Determining the Value of Water as an Asset Class

The value of water depends on different factors. Among them we could identify as the top ones, its availability, its purpose, its usages, the surrounding circumstances, and the prospects of its use. Six countries control 50% of the fresh water in our planet (Russia, Canada, Brazil, Colombia, Indonesia and Congo). The groundwater aquifers are very valuable for irrigation, while the flowing of the rivers sustain life. Water is used extensively in several industries from oil production, to power generation, and from hydro-electricity to chip making. Without water life and all human activity dies.

The absence of water for basic necessity as washing our hands, becomes a lethal medium for the transmission of diseases. The loss of life and the hospitalization costs related to the absence of clean water has direct and indirect effects in the lost production and productivity measures. Thousands of kids die every day due to the consequences of diarrhea and the lack of proper nutrition. Studies show that a more nutritious diet in the first four years has lifelong positive effects in terms of health, schooling, cognitive skills, and higher wages. It has been estimated that close to 4-5% of poor countries' GDP is lost every year due to poor nutritional diets. When we add the other costs such as malaria, air pollution, etc., then we should not be surprised when the WHO (World Health Organization) estimates that half of the effects we observe due to malnutrition are due to lack of safe water and sanitation. The contamination of rivers results in water rationing in big developing cities such as Delhi. In the US, roughly 40% of the country's waters are considered significantly and dangerously polluted. Moreover, 25,000 sewer systems are estimated that discharge raw sewage into rivers and lakes. Water purification systems (osmosis and reverse osmosis) are estimated to do extremely well in the era that is unfolding and labeled as the New Silk Road.

Figure 2



Despite the fact that the business of desalination and reverse osmosis consume significant amounts of energy, investments in them are expected to rise for both developed countries such as Spain as well as developing countries that emerge as new economic powers. Information obtained from satellites regarding water withdrawals will soon inform farmers as to where to grow their crops. Technological improvements in renewable energy as well as those that advance irrigation procedures and measure evapotranspiration feed into the process that awakens water supplies and transforms them into a form of a liquid asset class.

The lack of maintenance in water systems exacerbates problems, while local politics or mismanagement could create disincentives for the proper funding of water supplies. In the midst of all these investors and investment banks are looking for the new commodity that will become the star in the next few years. As our presentation this month claims, we are of the opinion that this new big idea could be water. However, we do not claim that such an idea is as timely as the one we had exactly a year ago regarding silver. We believe that it will take a few years before it becomes clear that water can be used as an asset class. The time, however, may be now to start investing in that asset class (like it was gold more than 10 years ago, when we were calling for it). The historic era before us will call for the re-evaluation of ideologies, paradigms, priorities, venues for achieving growth, assets and their valuations. In the new paradigm that is unfolding we believe that water will play a primarily role.

In this new era, emerging countries will rise out of poverty and hundreds of millions of people will enter the middle class in their respective countries. Farming will continue playing a very important role in providing better and more food, jobs, and will be an engine for growth. Farming without water is inconceivable. Related to that thought the following table should be seen with the prospect that the hundreds of millions of people who will be entering the middle class will increase the pressures on the demand side, and thus contribute to the formation of new asset classes.

Figure 3

Amount of water used to produce certain items

Source: USGS

Item	Water used (gallons)
1 slice of bread	10
1 pound chicken meat	500
1 cup of coffee	35
1 pound of corn	110
1 pound of eggs	400
$\frac{1}{3}$ -pound hamburger	4000 to 18000
1 orange	13
1 sheet of paper	3
1 pound of potatoes	100
1 cotton shirt	700
1 pound of steel	30
1 pound of wheat	110 to 250

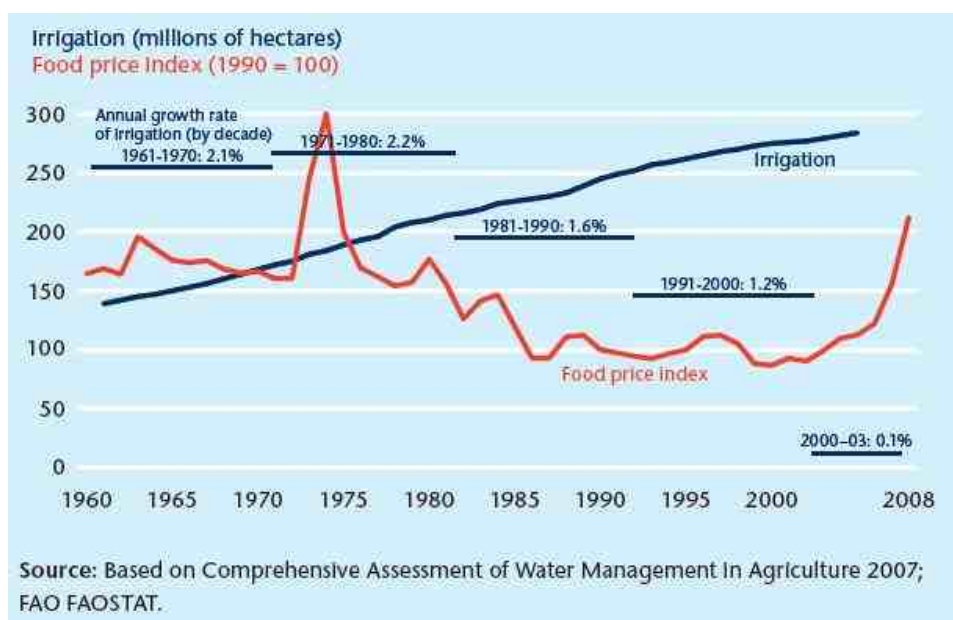
As growth takes places, groundwater will become more and more valuable, as it happens throughout Europe and the US. India and China combined pump close to 40% of the world's ground water and their middle classes are just now under formation. Given the state of water pollution, their growth rate, and the fact that water is drawn faster than it is replenished while levels are falling (the latter according to official numbers which may be underestimated), then it may not be an exaggeration to consider that in a few years time water supplies may be in critical condition, especially when we take into account the fact the serious quantities used nowadays in agriculture are contaminated with arsenic, uranium, fluorides and other dangerous chemicals. Moreover, the evaporation of standing water leaves the soil salty and thus production levels drop off.

The alarming pace by which wells are built and pumped in China (especially in the north where half the population lives and where most of the vegetables are grown, while the population there gets only one quarter of the water that the average person

gets in the south) makes the argument above pale given China's relentless pursuit for power, and growth. The water available to the average Chinese citizen is about one quarter of the one available to the average person worldwide. Building dams and canals (pointing to last month's infrastructure topic) has been the answer for the Chinese thus far. However, the cost of these solutions in terms of construction, maintenance, and every day running is pretty high. Water management systems that improve efficiencies and deliver results along with the needed quantities will have significant profits to reap in the years to come.

The depletion of aquifers for irrigation purposes is something we have witnessed in our own country in the agricultural projects run in the Southwest. Water conservation and the reduction of evapotranspiration will become major concepts in the next few years and areas where businesses that offer solutions can thrive. Wasteful water management can cost countries billions of dollars and choke off their growth rate, as it is already happening in Kenya, China, India, and almost all the African continent. The fact that food prices have started rising along with irrigation (see figure below) due to demographic and economic pressures, point out to what comes next for the prices of products and projects related to our finite water supplies.

Figure 4



The combination of water infrastructure systems - such as small dams, drains, sewers, reservoirs, barrages and irrigation canals - along with proper water management has the potential of raising output and productivity, while feeding millions and providing jobs and incomes to many more. Africa, the Middle East and Southeast Asia stand to gain significantly from hydro projects at a time when climate change brings flooding and drought with unpredictable results. Water storage will prove to be as vital as Joseph's warehousing the seeds during the years of plenty.

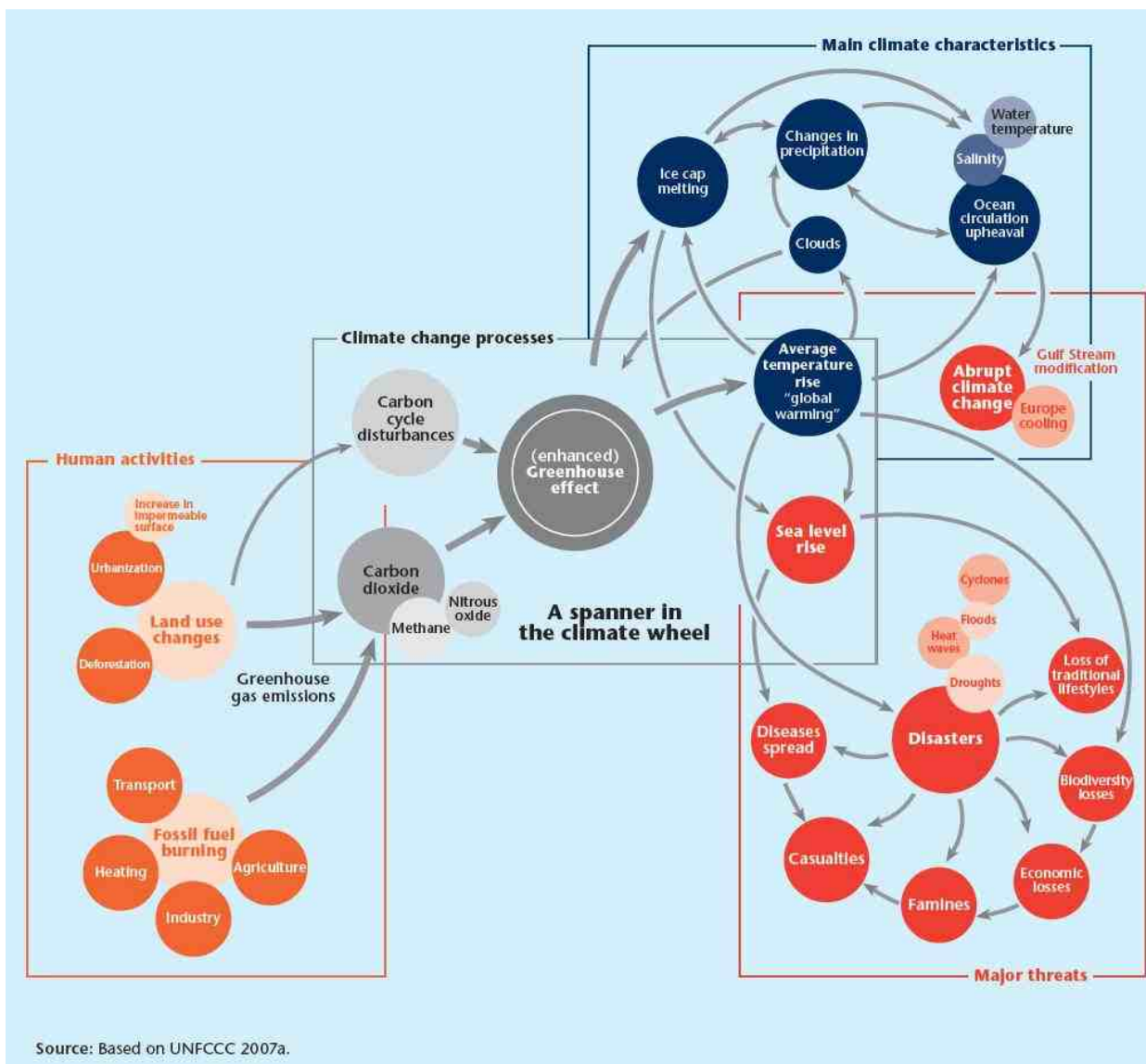
The Fundamental Factors and Facts Affecting Water Issues: Opportunities & Threats

World leaders understand that the water dilemma affects them all. Irrigation, flood control, water supply, sanitation, and hydropower are vital and closely linked with growth and development issues. A water crisis will lead to political and social instability. The challenges are significant but the problems are not insurmountable. There is a host of interacting factors that determine demand and supply issues. The list below does not claim to be exhaustive, but should provide the reader with enough factors that if analyzed would point to the importance of water - of course, we should view this asset class in the broader sense i.e. projects and businesses related to water issues - as an asset class in the unfolding new era, given the comingling of so many factors that affect water and other asset values.

- Economic growth for emerging countries.
- New middle classes that demand better nutrition.
- Demographic pressures.

- Exploitation of aquatic systems, and depletion of water supplies.
- Weaken flood protection and urbanization.
- Climate change. The following figure shows that water measures the anthropogenic causes of climate change.

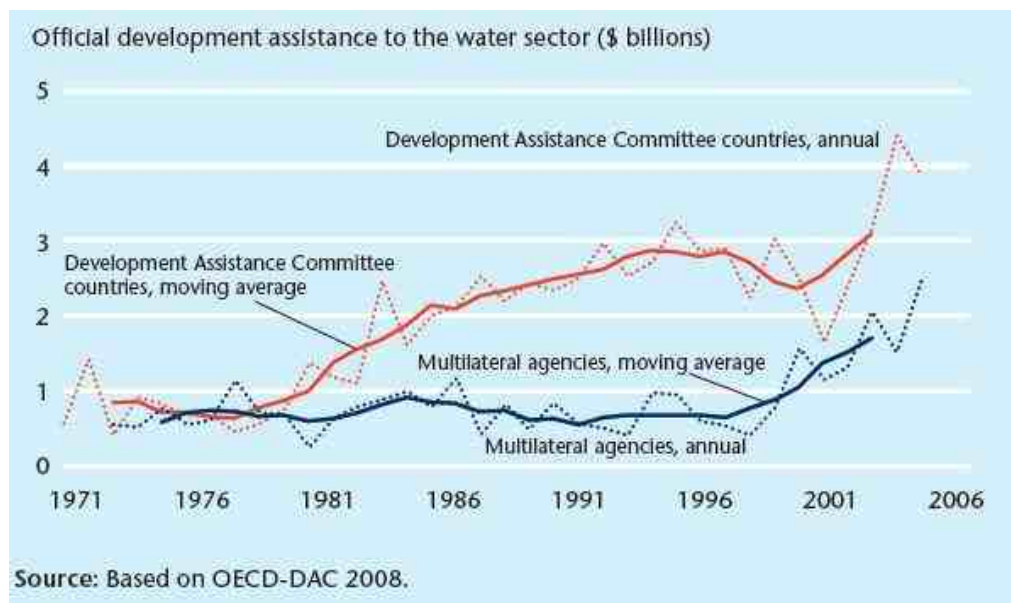
Figure 5



- International trade and “virtual water” that is embedded in traded products.
- Lifestyle changes and other social factors and attitudes such as consuming bottled water.
- Technological changes that affect supply and demand conditions.
- Institutional and government policies.
- Funding water infrastructure systems.
- Pollution, over-pumping, and corruption.
- Policy-made trade-offs given the financing constraints and the uneven power of political groups.
- Health issues and costs associated with water and the water ecosystem. Better sanitation conditions and better water supplies to emerging countries will reduce their health-related costs, and allow a health dividend that will advance incomes and growth even more.
- Energy prices (water management systems that use less energy could thrive) and ageing water infrastructure.
- Where water usage is more intensive, the institutional factors that put restraints are absent.

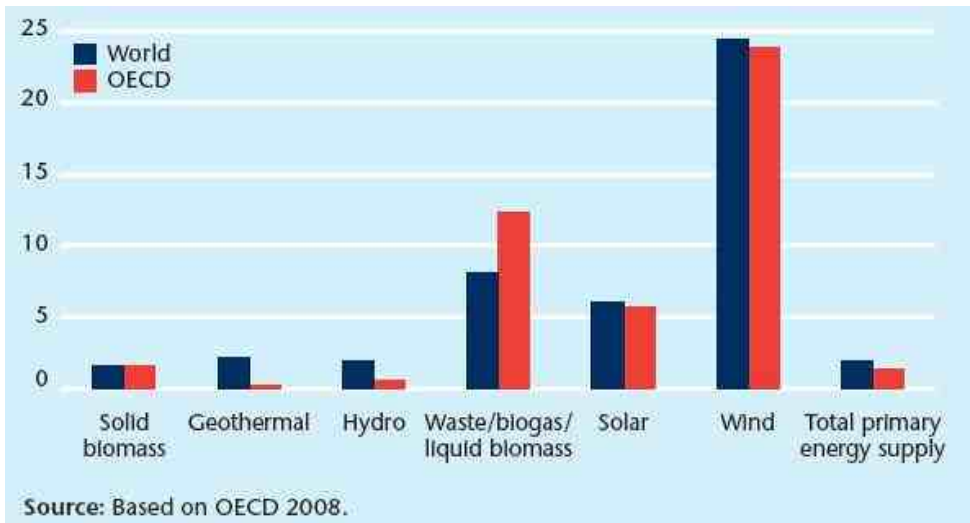
- The changes in the hydrologic cycle when associated with the terrestrial carbon cycle, demand better systems of management.
- Hazards related to water (droughts, floods, loss of wetlands and ecosystems, as well as other such as landslides and ground erosion) will give rise to new opportunities.
- Ecological sensitivities related to biodiversity and the pollution of rivers (see last graph in this newsletter) due to chemicals and biological waste, will also provide ample opportunities for proper treatments and management systems.
- Currently more than 1,700 billion cubic meters of water are needed for the production of tradable commodities. The expected increase in the levels of globalization may triple that demand in the next 10 years.
- Data and information regarding water resources and conditions from the ground and from satellites could turn out to be a major industry by itself.
- The financing constraints demand creative solutions where the private and public sectors cooperate in a win-win situation where concepts such as BOT (build-operate-transfer) can be used for the betterment of societies.
- The fact that development assistance has been rising as the following figure shows, points out to the formation of the new forces that will shape the new asset class.

Figure 6



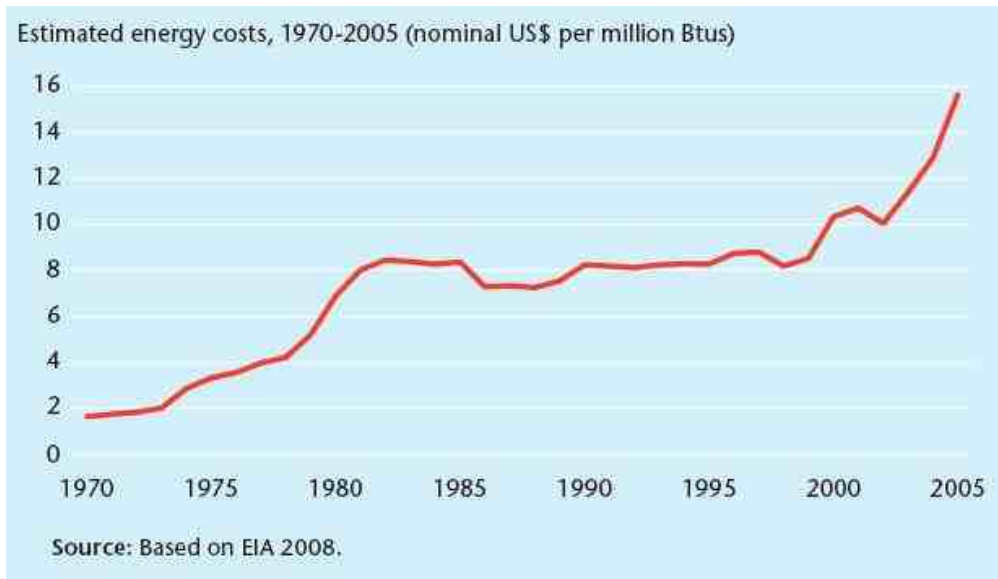
- The increased use of bioenergy (see figure 7 below) has raised particular food stocks and thus the projected higher production levels of biofuels will have effects on water prices.

Figure 7: Average Annual Change in Renewable Energy production 1990-2005



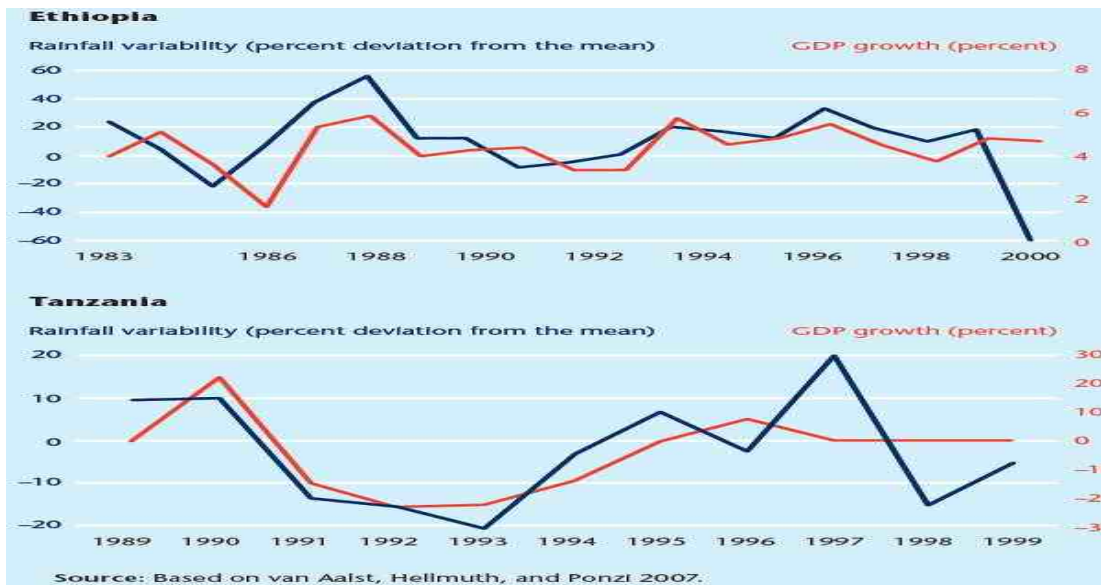
- According to the IEA (International Energy Agency), by 2026 we will need about 45% more energy than the level we would need by 2018. Water supplies will be affected since water is needed for the production of all types of energy, and energy prices have been rising (see figure 8) and will continue doing so, given demand and supply conditions.

Figure 8



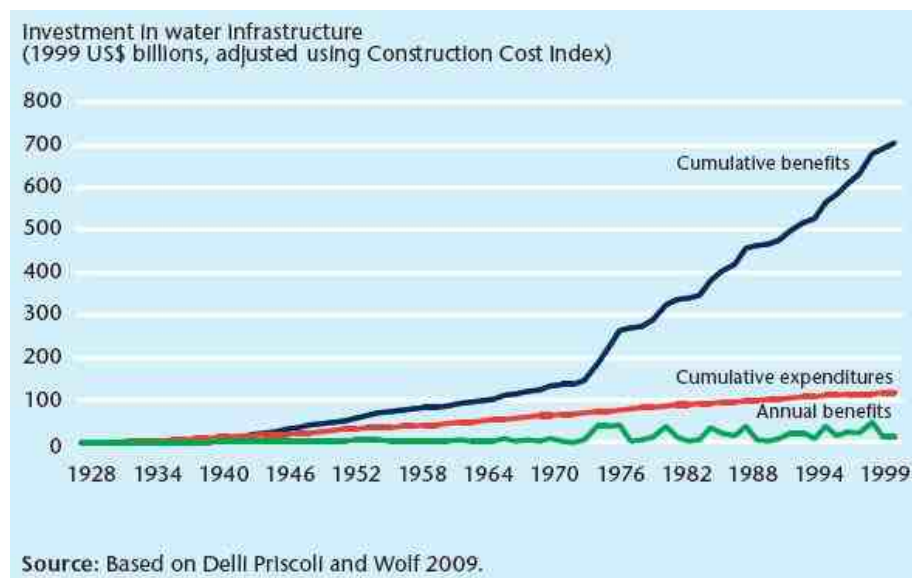
- The costs associated with replacing ageing water infrastructure in industrialized countries is estimated to be \$200 billion a year for the next several years. Investing in companies that will be awarded those contracts could prove to be very profitable.
- The commitment to see emerging countries grow implies a significant increase in water demand. Moreover, when we take into account that close to 5% of their GDP is lost due to lack of water, then we can estimate that water-related projects will advance global growth, reduce poverty, while advancing living standards and incomes. The following figures are indicative of the role that water plays in the growth prospects of developing countries.

Figure 9



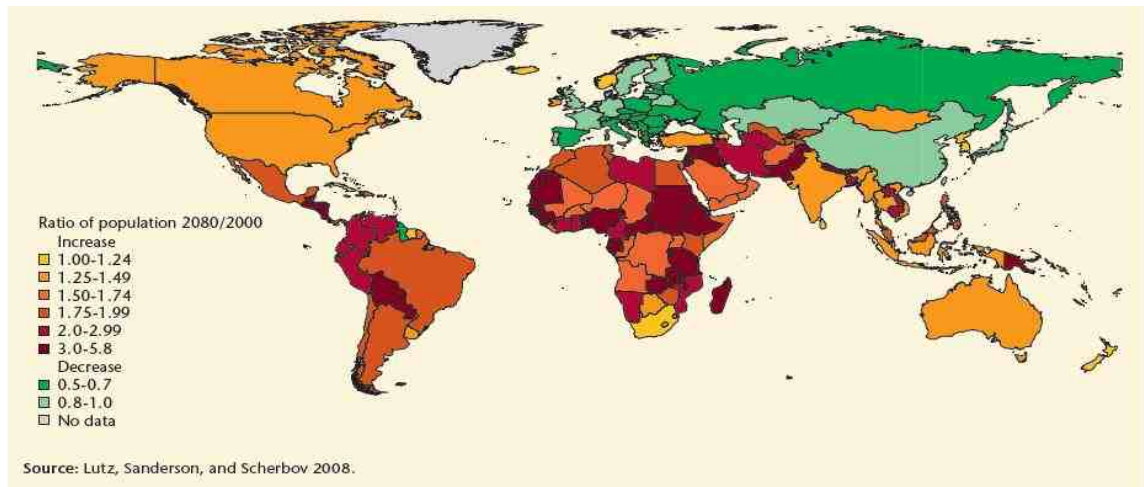
- Water-related projects yield 3-4 times the amount invested. Between 1930-1999 in the US they yielded 6 times for each dollar invested, as the figure 10 below shows.
- The world will have significantly more people in urban and vulnerable areas in the next 10-15 years, increasing the pressures on the demand side.
- Inability to address water-stress problems in the countries that surround the New Silk Road could reduce global growth prospects which would translate into lower asset prices, lower demand for the products of developed countries, and thus lower incomes worldwide.

Figure 10



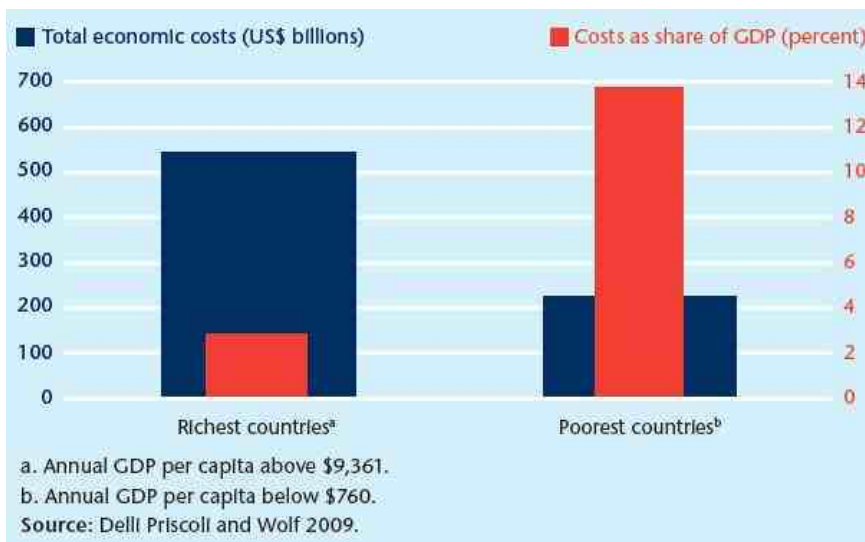
- Food scarcity and the corresponding price increases are exacerbated by water shortages, and cost increases related to fertilizers and energy costs. As we understand all these factors are water-related.
- Most population increases will take place in developing countries that are already experiencing water stress, as the following graph shows.

Figure 11



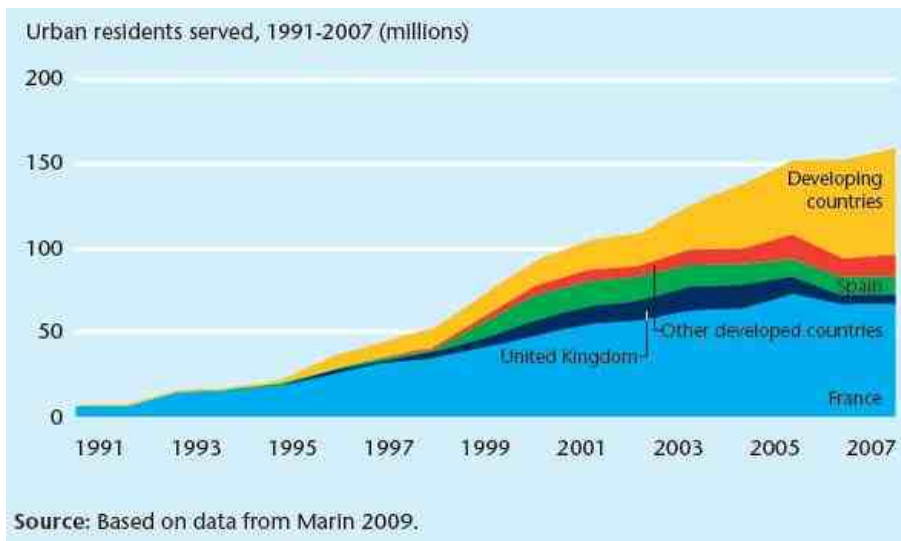
- The ecosystems in the Mediterranean are susceptible of losing 60-80% of their species even with a temperature increase of 2 degrees (Celsius).
- The pollution costs and risks of water degradation can be demonstrated by facts such as follows: In the Baltic Sea more than 75% of the coastal biotopes were threatened by loss from eutrophication, and contamination. In France, close to 6% of the population is exposed to water quality that does not conform with WHO standards. Close to 70 developing countries are exposed to water quality that contains arsenic.
- Water issues as discussed above are linked to food and energy supplies, climate change and turmoil in the financial markets. Water issues need to be resolved for global growth to be set on a sound trajectory. The emerging New Silk Road and the surfacing desire to see the developing world emerge as a vital component in global economics, point to a political desire to resolve those issues by investments in the sector, making it an asset class by itself.
- The costs of disasters in terms of lost GDP is much higher in the developing countries as the following figure shows. Resolving water issues advances their GDP and enhances the prospects for the developed world too. Water investments can become a new Marshall Plan for the developing countries.

Figure 12



- The fact that private water operators have been playing a significant role in water-related projects (see figure below), is indicative of the fact that a public-private initiative advances common interests and growth prospects via creating and sustaining assets.

Figure 13



- As we wrote earlier, diseases affiliated with water issues carry a significant toll in terms of direct costs, but also in terms of lost production, incomes, growth potential, and productivity. The following table tells this story, which if reversed will become a seed for a win-win scenario of growth. Again, all indications are that it is in the process of being reversed, which creates the water-investment opportunities.

Figure 14

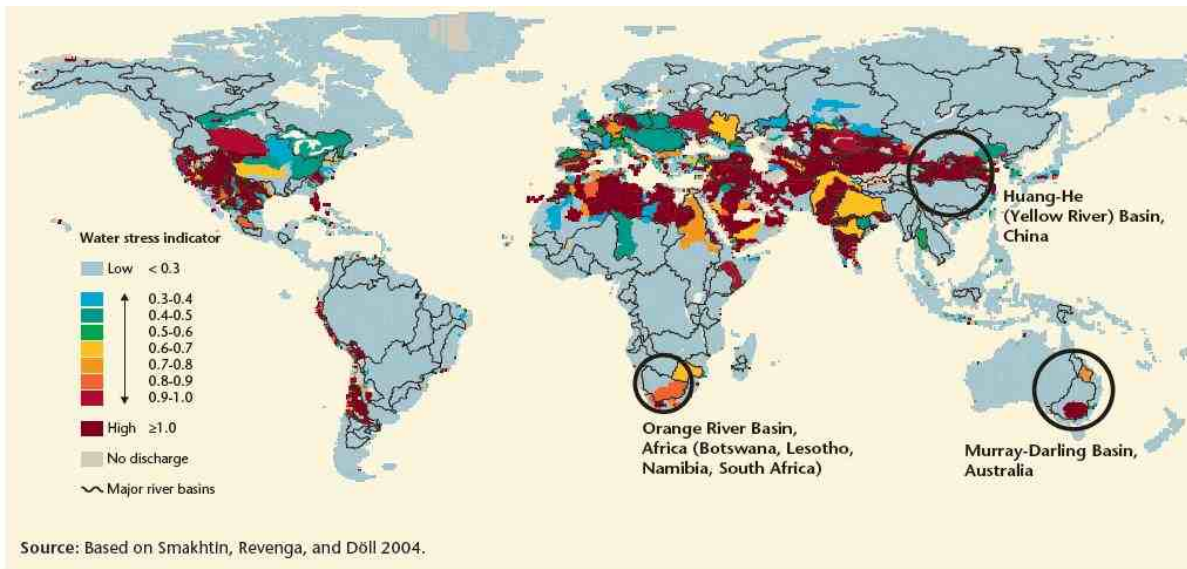
Disease	Annual global burden attributable to water, sanitation and hygiene		Percent of total burden attributable to environmental factors	Environmental pathways
	Deaths (thousands)	DALY ^a (thousands)		
Diarrhoea	1,523	52,460	94	Water supply, sanitation, hygiene
Malnutrition	863	35,579	50	Water supply, sanitation, hygiene, water resources management
Malaria	526	19,241	42	Water resources management
Lymphatic filariasis	0	3,784	66	Water supply, sanitation
Intestinal nematodes	12	2,948	100	Sanitation
Trachoma	0	2,320	100	Water supply, hygiene, flies
Schistosomiasis	15	1,698	100	Water supply, sanitation, water resources management
Japanese encephalitis	13	671	95	Water resources management
Dengue	18	586	95	Water supply, sanitation

a. Disability adjusted life year, a summary measure of population health. One DALY represents one lost year of healthy life.

Source: Adapted from Prüss-Üstün and Corvalán 2006; Prüss-Üstün et al. 2008.

- Given the pollution and water-stress levels of river basins around the world (the situation has deteriorated since the time that the next figure was published), opportunities will arise in water-treatment projects and the companies associated with those projects.

Figure 15



Epilogue: Beyond Epicurean Claims

The Greek philosopher Epicurus taught his philosophical beliefs in his school known as “The Garden”. We have been entrusted with a big garden that we need to tender. A garden cannot be sustained unless it is watered. The trajectory of the new era centers on resolving water issues. Such resolutions seem to be under way. Projects that center on relieving water-stress issues will be the ones that could cultivate growth, advance gains for all, fertilize the New Silk Road, resolve food pressures, alleviate poverty, produce tangible returns, and assist the well-being of societies. Epicurus’ teachings (not that we agree with all of them) were revitalized by Pierre Gassendi, who influenced John Locke, from whom Isaac Newton and Thomas Jefferson drew inspiration from, drafting in that way the story of what we call nowadays the era of Enlightenment. The Garden may have been shut down – along with the Stoic Porch, the Lyceum, and the Academy – by emperor Justinian in 529 A.D., but its influence is still among us. Bread alone is not enough to feed humankind, but water is vital to sustain it.

Ode to the New Silk Road sustained by water!