What Can We Learn from the Mistakes of Others?

By Shawn Stevenson

Americans pride themselves as innovators and free thinkers. This is not to say that in the case of water allocation and usage we fall far from the tree in terms of upholding high standards. But, looking into the not so distant future, the world is going to become a smaller place. As the population grows, there is less land mass to support a greater number of people and many necessities may become commodities. Is there a need for a shift in planning practices related to water lurking over the horizon?

Land use planning and water rights in our state and across the country are a topic of constant debate. The field of Source-Water Protection has a direct connection with water quantity issues. With that being said, many of the issues that plague other parts of the world can be used as an educational tool. The intent of this article is **not** to make a political statement concerning China's growing population, industrialization, agriculture or to compare it to that of the United States. It is however the intent to illustrate some of the drawbacks and results of over allocation and a lack of Source-Water Protection and their consequential impacts on the water supply.

The United Nations Population Division projects a global population of 8.04 billion for the year 2025 and 9.37 billion for 2050. According to this *medium variant*, an increase of some 2.35 billion people can be expected worldwide between 1995 and 2025; and an additional 1.3 billion between 2025 and 2050 *(World Population Assessment and Projection, 1996).*

China has been associated with overpopulation issues for several decades. What many people aren't aware of are the water related issues that stem from the immense growth the country has undergone. Several of the problems associated with water arise from over allocation and a severe lack of updated conservation strategies. Leaving the water supply shuddering and the people in a dire situation.

A frenzy of well-digging in recent years provides evidence of the gravity of the water situation in the North China Plain. At the end of 1996, the five provinces of the North China Plain Heibei, Henan, Shandong, and the city provinces of Beijing and Tianjin had 3.6 million wells, the bulk of them for irrigation. The following year, 99,900 wells were abandoned as they ran dry. Some 221,900 new wells were drilled. The desperate quest for water in China continues today, as well-drillers chase the water table downward *(Lester R. Brown, 26 Oct 2001).*

The northern half of China is drying out. Excessive demands on the three rivers that flow eastward into the North China Plain the Hai, the Yellow, and the Huai are causing them to run out of water entirely during the dry season, sometimes for extended periods of time. The flow of the Yellow River into Shandong Province (the last of the eight provinces) passes through en route to the sea, and China's leading grain-producing province has dropped from 40 billion tons a year in the early 1980s to 25 billion tons during the 1990s. Over pumping of aquifers has even been made apparent at the surface. As water tables fall, springs dry up, streams cease to flow, rivers run dry, and lakes disappear. Hebei Province once had 1,052 lakes. Only 83 remain *(Lester R. Brown, 26 Oct 2001).*

The direct correlation of some groundwater and surface water sources is no surprise to Oregon residents who are subject to state mandates such as GWUDI, which is an acronym for "ground water under the direct influence of surface water." It is a designation assigned by ODHS to a water source where tests indicate that there is the possibility that untreated surface water could infiltrate the ground water near the source *(FAQ, St. Helens Oregon, 2, 2004).* Although the lakes in China may be separated by hydrologic barriers and are designated as separate sources with regards to consumption, the bigger picture that needs to be considered is the relationship of all water sources being connected on some level.

The other major problem that is plaguing China due to over pumping of groundwater is the actual sinking of the topography. A record setting 46 cities are sinking due to the excessive withdraw of the underlying aquifers. According to the survey conducted by the Ministry of Land and Resources, the rapid depletion of groundwater has produced more than 100 massive tunnels covering a total area of 57,900 square miles across the country *(China Daily, 11-12-2003).*

Surface subsidence picked up speed over the last two decades as a result of an increasing demand for groundwater caused by fast economic growth and urbanization, the pollution of surface water, and the construction of skyscrapers, analysts note. Collapsing of subway tunnels and a general risk to life is presently based on the instability of buildings. Despite the central and local governments efforts to limit the pumping of groundwater and replenish it with surface water since the 1990s, the total area suffering from surface subsidence is quickly expanding.

Several overseeing organizations have been formed to monitor water usage and sinking ground regions. The areas in question suffer from both severe surface water pollution and heavy economic losses caused by surface subsidence, said an official, who declined to be identified. One such organization is the North China Plain Network; it will oversee Beijing, Tianjin and parts of the provinces of Hebei, Shandong and Henan, covering 54,040 square miles. This region has witnessed the most excessive pumping of groundwater in the world and covers the largest subsidence area with the most funnels on the planet, he said *(China Daily, 11-12-2003).*

To further counteract the sinking phenomenon; several local governments are reducing the groundwater pumping in certain regions by a stern standard amount. Some other methods include injecting surface water sources back underground to help maintain water levels and closing almost 3000 deep wells. Some of these practices have been in place since 1966, but the current demand is outweighing mitigation efforts, rendering them practically moot.

Compounding the problem is the pollution of previously viable water sources. For the past several years, China has been affected with a water pollution crisis. Some of the main sources of water pollution are: **industrial** (chemical, organic, and thermal wastes), **municipal** (largely sewage consisting of human wastes, other organic wastes, detergents), and **agricultural** (animal wastes, pesticides, and fertilizers) *(Brower, 1990).* Chao Lake which is located about 300 miles west of Shanghai is a principal example of China's surface water pollution. With the ramping up of industry and developments, the lake has become polluted and has elevated levels of nutrients which contribute to algae blooms.

As a whole, the country now faces a constant struggle to balance the growing water needs for agriculture in comparison to industry and residences. Although our societies differ substantially in structure, the pollutants of concern and growing need for wastewater treatment, illustrate that water quantity concerns are a universal theme.

One question that was initially posed was if a shift in the way land use planning and water allocation in our country needs to occur to accommodate future change. The answer to the question itself is somewhat self–interpretive. Even though protection strategies have been partially engrained into modern land use planning in America, progress and growth require a constant increasing effort. China is a proof positive example of the ill effects of over allocation and the lack of source water protection. A look into China's deep rooted problems can provide the world with valuable insight. What each individual does in terms of usage, protection, or does not do (lack of protection) has a compounding affect on all water sources. Industry, agriculture, and urban sprawl are all key pieces of the puzzle. What can we learn from the mistakes of others?

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