

Plenty of water and no supply: Lessons for the world from Sao Paulo

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Abstract

This paper provides evidence and analyses to address the current water crisis in Sao Paulo, Brazil. The data collection is derived from the policies defined by the various levels of government brought to bear on the provision of water to the people of Sao Paulo. The article discusses specific policies and investments which are expressed in budgetary documentation via accounting records, in an attempt to quantify the impact.

Introduction

It would seem a foregone conclusion that virtually every living thing on earth must have water to live. Water is such an important component to sustaining human life that the United Nations has declared it a human right to have access to safe drinking water and sanitation (UN, 2010). Gleick (1996) reports that this same conclusion had been arrived at as early as 1977, when the Mar del Plata conference stated that "...all peoples, whatever stage of development and their social and economic conditions, have the right to have access to water in quantities and of a quality equal to their basic needs". Gleick (1996) further states that the 1992 Earth Summit in Rio De Janeiro strongly reaffirmed this position expanding it to include ecological water needs. Gleick (1996) recommended that a standard of 50 liters per person per day be adopted by all levels of government. This amount would vary depending the factors such as climate or culture.

Though there is an abundance of water on the planet, there are many who do not have a sufficient supply, or their source is at best questionable and at worst toxic (Gleick 1999). The reasons for this are many, but if we are to survive, we must overcome them to the extent that there is at least the bare minimum to sustain life.

Since 1934 the authorities in Sao Paulo, Brazil have been aware of the prospect of an issue with providing adequate water for their growing metropolis. There have been efforts to engage policies and processes which were intended to meet the needs of flourishing agriculture and industry. However, the results have been less than satisfactory as two drought events have each left the city with a temporary shortage of water (Johnsson and Kemper, 2005, p.13).

The current drought condition in Sao Paulo, Brazil should serve as a wakeup call to the rest of humanity. This is not an out of the way location of minimal means and affluence; it is a city of almost 8 million people as well as the capital of the wealthiest state in the country of Brazil.

The planet earth may well be on an irreversible course to worldwide fresh water scarcity. The forces of nature (solar and cosmic radiation, volcanic action, climate change, et al) combined with human eco-exploitation has driven the ecological context to a state as yet unseen in the historical and geological record (Craig, 2010, p. 13).

Detailed analysis of the circumstances of the Sao Paulo drought offers lessons that may be applied to other locations.

Literature Review

Need

Gleick

In 1996, Peter Gleick published *Basic Water Requirements for Human Activities: Meeting Basic Needs*, the findings of exhaustive research into the various human uses of water. His results gave exacting details of the several purposes of water, including drinking, food preparation, bathing and waste disposal (Gleick, 1996, p.83-85) At the time of his writing, Gleick stated that there had been no satisfactory analysis of the additional use of water related to the processes of growing food necessary to meet the minimum caloric requirements for human survival (Gleick, 1996, p.86). Hence, the actual value required for this critical function could then only be estimated.

Gleick concluded by stating that there are efforts afoot to address the issue of meeting basic human needs for water (Gleick, 1996, p.88). These included efforts to integrate environmental issues as well as sustainable economic and social development. This produced the concept of "Basic Water Requirement" (BWR) whereby access to at least 50 liters of clean water per person per day (l/p/d) should be considered a fundamental human right (Gleick, 1996, p.90).

In 1999 Gleick published a continuation of the 1996 paper with fresh data and a new title: *The Human Right to Water*. The 1996 data indicated that nearly a billion people lacked access to the standard specified as the BWR (Gleick, 1996, p.88). During the interceding three years that number had exceeded one billion. Gleick further states that almost three billion people do not have access to adequate sanitation facilities. These conditions were believed to lead to substantial, unnecessary human suffering which was preventable. At the time it was estimated that 14 to 30 thousand people were dying daily as a result of water-related disease; most of these being the young or elderly (Gleick, 1999, p.2).

Gleick posits that "in some ways this right to water is even more basic and vital than some of the more explicit human rights already acknowledged by the international community, as can be seen by its recognition in some local customary laws or religious canon" (Gleick, 1999, p.2). Gleick enumerates various acknowledgements from this body dating as far back as 1948. None specifically speaks to a fundamental human right to access adequate clean water however. Gleick poses the question, "is water so fundamental a resource, like air, that it was thought unnecessary to explicitly include reference to it at the time these agreements were forged?" (Gleick, 1999, p.4).

Gleick concludes with a formulation which would be suitable as a component of the declarations of human rights extant:

“All human beings have an inherent right to have access to water in quantities and of a quality necessary to meet their basic needs. This right shall be protected by law.” (Gleick, 1999, p.11).

World Health Organization

The World Health Organization (WHO) report on the Ecosystem and Human Well-Being (Corvalan, C. Hales, S., & McMichael, A. 2005) indicates that the WHO assessment team came to essentially the same conclusion as Gleick, stating, "for the human species and all other forms of life. Human biology has a fundamental need for food, water, clean air, shelter and relative climatic constancy" (p.1). Further, the team specified similar values for the minimum amount of clean water for each person.

United Nations

The efforts of Gleick, et al, contributed to the United Nations' eventual passage of resolution A/RES/64/292, The human right to water and sanitation on August 3, 2010 (UN, 2010, p.1). The resolution acknowledged the import of equal access to clean water and sanitation as a fundamental element of basic human rights. It further affirmed the duty of governments to promote and protect this right. To that end a commitment was made by the signatory states to achieve the requirements of the Millennium Development Goals; to reduce the number of people who do not have access to safe water to half the value by 2015 (UN, 2010, p.2). In October of the following year the UN Human Rights Council passed A/HRC/RES/18/1, The human right to safe drinking water and sanitation.

Perhaps with these standards in mind, the state and local government of Sao Paulo and federal government of Brazil have made efforts to provide governance over the watershed which supplies the Sao Paulo metropolitan area.

Policy

Drummond and Barros-Platiau

Drummond and Barros-Platiau (2006) each collected and analyzed data from selected environmental laws and policies enacted by the federal government of Brazil from 1934 to 2002. The results of their work were originally published as a master thesis (1998) and doctoral dissertation (2000), respectively. The paper published by the Baldy Center for Law and Social Policy combined and refined the findings of Drummond and Barros-Platiau highlighting the significant efforts regarding water management.

The "Water and Mines Code" (a popular name for Presidential Decree 24.643) was enacted in July of 1934. In conjunction with this the forest management code was also decreed. These decrees were a milestone in Brazilian environmental law, the main effect of which was to place all public lands under the control of federal agencies. Up to this time these resources had been under the control of private interests. This system was not unlike the "law of the jungle" in that the most powerful entity exercised control over as much land and its resources as possible. Through a concession system, established as a result of the Water and Mines Code, companies were licensed to use the land resources. Private, state-owned and hybrid entities developed hydroelectric systems and expanded agricultural use (Drummond & Barros-Platiau 2006, p.87).

The "Forest Code", enacted in January of the same year, mainly dealt with control of logging. However, there was some provision for protecting some classes of

forest land. Unfortunately, the sections that provided protection of the watershed were not included among those granted "permanent protection". The enforcement of this "protection" was only lightly implemented, and then only where there was easy access to the area and the inspection effort was less difficult. Though the initiative was groundbreaking, in practice the 1934 decrees lacked specific attention to the problem of providing a domestic water supply (Drummond & Barros-Platiau 2006, p.89).

The next significant effort came as a result of the "Land Statute", enacted in November of 1964. The intervening years saw little additional movement toward management of natural resources due to a global depression and World War II.

But a 1964 military coup that ousted the civilian government enacted a progressive land reform law, which made it legal for the government to seize private land deemed to have "full social function". This revolutionary concept made wasteful land use illegal, while making protection of the environment public policy (Drummond & Barros-Platiau 2006, p.89).

And yet, a specific provision of adequate clean water for the general population was still not considered a point of necessity. In fact, these decrees were primarily motivated to benefit wealthy individuals and corporate interests.

Johnsson and Kemper

In June of 2005 Rosa Maria Formiga Johnsson and Karin Erika Kemper completed research, funded by the World Bank. The working title of their paper was "*Integrated River Basin Management and the Principle of Managing Water Resources at the Lowest Appropriate Level – When and Why Does It (Not) Work in Practice?*". The research findings were published as a *World Bank Policy Research Working Paper*

entitled *Institutional and policy analysis of river basin management: the Alto-Tiete river basin, Sao Paulo, Brazil*.

Johnsson and Kemper (2005) state that Brazil had begun to define and implement water resource management systems earlier than other countries. The resource management system put into practice was based on the principles espoused by various prominent global charters. A major element of these principles embraced the concept of localized policies and decentralization of authority regarding the management of water resources.

In 1991 Sao Paulo was the first state to codify these principles (Johnsson and Kemper, 2005, p.4). Johnsson and Kemper (2005, p.4) opine that São Paulo state would be expected to achieve advances in decentralized water resources management. Being the richest and best-equipped as well as having the most-experienced water management institutions, the state of Sao Paulo was able to take the first steps towards implementation with no federal assistance. However the process of increasing the scale of implementation was more difficult. Due to the excessive amount of industrial development and the increase in the urban population (in the focus area of the 2005 study) the execution of localized control was hampered (Johnsson and Kemper, 2005, p.5). It was determined that the tactics employed must consider the hydrology, socio-economic, cultural and historical aspects of the indigenusness population of the local area (Johnsson, et al, 2005, p.5).

Johnsson and Kemper (2005, p.5) introduce the term basin-level to describe the context of the local area. This is a reference to the specific region that was the focus of their research, The Alto-Tietê River Basin, in São Paulo, Brazil. However, the term is

appropriate for virtually any other locality since the supply of water to most regions will generally equate to a river basin.

Johnsson and Kemper (2005, p.5-6) further define the specific attributes to consider when engaging the process of decentralization:

- Economic development of the nation;
- Economic development of the basin area;
- Initial distribution of resources among basin stakeholders; and
- Class, religious, or other social/cultural distinctions among basin stakeholders.

(Johnsson and Kemper, 2005, p.5-6).

The case of the Alto-Tietê River Basin, and therefore that of the São Paulo metropolitan area, historically had positive marks for the first two elements. However, the third had only included industrial and large agricultural entities without consideration for small farms or the general population. In addition, there is no indication that the fourth marks were factors considered in the early efforts to implement water management processes. The exceptions would be that the upper class might have benefited from the industrial and major agricultural uses. By the time of the research of Johnsson and Kemper, the provision to the urban population had finally become a concern and was therefore an additional consideration in the process of water management (Johnsson and Kemper, 2005, p.9).

An issue which arose was as a result of urban sprawl being unregulated (Johnsson and Kemper 2005, p.8, 11-12). This led to a condition where the use of ground water resources was out of control (Johnsson and Kemper, 2005, p.11). This

was exacerbated by the continued hegemony of the influential hydropower sector conflicting with the need of drinking water for the Sao Paulo metropolitan area.

An additional complicating factor was the lack of adequate sewage collection and treatment facilities and improper disposal of solid waste. This lack lead to contamination of the little water that was available (Johnsson and Kemper, 2005, p.12).

Each of the aforementioned issues had some form of legislative direction which was intended to deal with the issue. However, they each lacked complimentary regulation to make the laws operational (Johnsson and Kemper, 2005, p.12).

The structure of the organization developed for the purpose of water management in the Alto-Tietê River Basin, consisted of as many as 14 separate federal, state and municipal agencies. The relationships between these entities is a complex arrangement and the processes engaged to affect water management entailed a series of dynamic bargaining protocols. The net result was (as of 2006) the establishment of what is essentially a symbolic organization which consisted of a small office with a three-person technical team (Johnsson and Kemper, 2005, p.21).

Drought

A major drought was experienced in Brazil late in 2000 which carried into 2001. The drought eventually lead to a declaration of a national level energy crisis due to insufficient water supply for hydropower systems (Johnsson and Kemper, 2005, p.13). This impact was also felt by the urban population. However, Johnsson and Kemper do not mention the issue of human suffering. The meteorological mechanisms at work during this event were not unheard of in the region, though rarely experienced to this degree (Cavalcanti & Kousky, 2001, p. 2).

Since December 2013/January 2014 (the normal rainy season for the Southern Hemisphere) the region, which includes Sao Paulo has been experiencing the meteorological anomaly which has previously brought about the drought conditions (Escobar, 2015). This dearth, now in its second year, has led to a severe shortage of water throughout the Sao Paulo metropolitan area. The local governments are attempting to curtail excessive use and waste by financially rewarding those who conserve and punishing those who do not by levying a fine. In addition the pressure of the water main has been reduced to minimize leakage rates and discourage waste. It is being contemplated by the several local governments to take drastic measures in the form of a complete shutdown of the water distribution system for hours or days at a time.

The Alto-Tiete river basin water system, as of Escobar's article, has only 15% of its volume remaining. Reservoirs in adjacent regions are also at low volumes. A new system that will bring in water from a distant watershed is not expected to be completed until 2016. The impending dry season of 2015 is already upon the region, leaving the expectation of a human tragedy of epic proportions.

Conclusion

Escobar (2015) cites unnamed Brazilian scientists (with expertise in water issues) as blaming a combination of the effects of the current climate anomaly and the ineffective government programs for the growing crisis. They further stated that there is a need to be prepared for increasingly extreme climate events.

The early effort of water management was oriented to industrial and major agricultural uses. The tendency to cater to the desires of the affluent had the potential of

resulting in mismanagement (Johnsson and Kemper, 2005, p.8, 11-12). Due to low-income residents being continually expelled from the urban centers the city's periphery became shanty-towns for the poor (Johnsson and Kemper, 2005, p.8). Mismanagement of water resources combined with uncontrolled urban sprawl set the context for a potential disaster (Johnsson and Kemper 2005, p.8, 11-12).

The ingredient which has completed this recipe for disaster is unfortunately mostly beyond the control of any human being. Climate variability, whether of anthropogenic origin or a completely natural cycle, is the element which is the catalyst for an unexpected event. Yet these events are not unknown.

Based upon historical documentation and the geological record, humanity is very much aware of many potential climatic events. With these we may plan for each as much as it is possible relative to the risk of the event and the potential lost.

Sao Paulo, Brazil actually has significant water resources available on a national level. The Amazon is responsible for about 20% of the Earth's fresh water entering the ocean. The river pushes a vast plume of fresh water into the ocean. The plume is about 250 miles long and between 62 and 124 miles wide (Penn, 2001, p.8). The river basins, lakes and reservoirs which make up the Sao Paulo metropolitan area water supply system do not compare to the Amazon. But the water supply is adequate to the needs of the population.

The referenced data lead one to conclude that the issue which lead to the current crisis is mainly a lack of adequate management. This applies to the domestic housing, sewage collection and disposal/processing, solid waste collection and disposal, as well as the equitable division of water resources. Each of these had some form of legislative

effort to administer and control at various levels. However, the lack of operational regulations each law had little or no effect.

There are lessons to be learned from this situation:

1. Most climatic events, though impossible to accurately predict, are not unknown. Therefore, contingency plans and preparations should be made to mitigate each according to the level of discreet risk.
2. Legislation must have attendant regulations
3. Management must be objective in discharge of legal obligations

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