

LOW WATER STRESS - LOW COPING CAPABILITY

BRAZIL'S EXAMPLE

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Key challenges in water rich developing countries are rapid urbanization and associated flood events. Since public companies have large problems in expanding water supply and sanitation quickly enough, private companies may be an alternative. Addressing the causes of floods by involving stakeholders may be more economical than consequence-focused engineering works.



INTRODUCTION

Low water stress regions may contain water stressed products

According to a report recently approved by the UN Commission on Sustainable Development (1), “water stress can begin once the use of freshwater rises above 10 percent of renewable freshwater resources...” (paragraph 70). Scandinavia, Canada, most of the extinct Soviet Union, Australia, most of Africa, and all of South America are below this threshold level and, as such, could be classified as low water stress regions/countries. However, depending on the size of the region/country and on the internal hydrological diversity, this classification may be misleading. Brazil, for example, which covers roughly half of South America, has a per capita availability of 102 m³/day, which is more than 5 times the water availability in Europe. Nevertheless, scarcity of water is the major problem in the dry Brazilian Northeast, an area inhabited by more than 30 million people.

Even in those parts of the world which are indeed blessed with low water stress, often there are water related problems, as for example pollution. This is almost always the case in countries with low capability to cope with water management problems.

Capability depends on both income and institutions

Because income level is perhaps the most important reason for this low capability, the UN report has used it “as a rough measure of the ability of different groups of countries to deal with water issues. In general countries with higher per capita incomes are in a better position... as the financial resources and skilled people for management and development are more readily available” (1, paragraph 72). Still according to the UN report, a low income country has a per capita income of less than \$795, and a high

income country has a per capita income of more than \$8,956 (there are two intermediate classes between these two extremes).

There are numerous countries that, despite being blessed with low water stress and with per capita income well above \$795, still are unable to achieve rational use of the abundant water resources, due to lack of institutional capability. For the sake of this article, these countries will also be ranked as “low coping capability”.

COPING WITH URBAN WATER PROBLEMS

Water resources problems of “low water stress - low coping capability” countries are usually related to the consequences of uncontrolled urbanization processes and to the lack of integration among sectors (irrigation, hydroelectricity, water supply, ...) in planning and management water resources at the river basin scale.

The most important of these problems are water supply and sanitation to large cities, and flood control.

Public Water Supply and Sanitation not always efficient

The explosive growth of urban centers over the last 25 years, which continues unabated, is rapidly depleting previously bountiful freshwater resources. By the turn of the century, 21 megacities (ten-million-plus), 18 of them in developing countries and innumerable smaller cities and towns will have to satiate their thirst by drawing from ever more distant and degraded freshwater sources (2).

In general, public water and sanitation services or companies in developing countries are not efficient, due to a number of reasons:

- a) Bad operational practices. In general, there is lack of proper planning and maintenance. Sometimes the physical losses reach 50% of the treated water. **Figure 1** shows, as example, a pipeline crossing a polluted creek in Niteroi, Rio de Janeiro. It is wasting water through several holes. Besides, it has the wrong elevation, which will certainly cause upstream inundation during storms and may result on infiltration of the contaminated water of the creek into the pipe.
- b) Bad commercial practices. The general picture is that metering is applied to a small percentage of consumers, subsidies are implicit rather than explicit, and there is no cutting-of-water policy for lack of payment. In these circumstances, no wonder there is a high waste of water. Furthermore, because the poorest segments of society are not commercially attractive, due to the high percentage of unpaid bills, sometimes they are simply not connected to the water distribution system, even in cases where the connection would be technically feasible.

Desperate people seek individual solutions

Figure 2 shows a typical result of this blind policy. It shows a photo of the “distribution system” adopted in the “favela” (slum) known as “Rio das Pedras”, Rio de Janeiro, consisting of PVC pipes hanging from a bridge, in the most precarious way. The explanation for such awkward scene is quite simple. Since the water company does not

deliver water to the poor households, desperate people seek individual solutions that result in the most inefficient, wasteful and dangerous “system” one conceive. Each household, or small group of households, stretches its own PVC pipe to the manhole and simply steal water from it. One can notice that contamination in this case is almost a sure event, as several pipes are actually immersed in the polluted river. In addition, the hanging pipes form a “nest” that retains trash during storms, which blocks the river course and causes inundation.

Public companies - poor functioning

Public companies often lack of financial and administrative autonomy. The board of directors of public companies in developing countries are usually severely constrained in their autonomy to run the business by complicated legal systems. They can not hire or fire personnel, sign contracts or equipment, as a private company would do. There are too many controls over their action and in the general these controls are focused on “processes” rather than on “results”.

Political interference - Directors of public companies are often selected based on their political connections to the ruling party, rather than on their technical or managerial abilities. Furthermore, and most importantly, tariff setting is often affected by macro-economical considerations, as for example inflation control. As a consequence, tariffs are disconnected from costs, resulting on no incentives for cost minimization.

Public companies finally tend to lack of financial resources necessary. In Latin America alone, it is estimated that the region’s countries need to invest an annual \$5 thousand million in water supply and \$7 thousand million in sewerage and sewage treatment over the next decade. These requirements are well beyond the public sector’s financial capacity.

Private companies to act within regulatory framework

As a reaction to the above problems facing public water and sanitation companies, the notion is spreading that the public sector should establish the legal and regulatory framework, and then allow public and private companies to compete for the mandate to provide service (3). In real life application of these principles has been hampered by the conflict between the need to establish the legal and regulatory framework, which means the creation of new responsibilities for the public sector, and the prevailing trend for decreasing the size of governments.

In some cases, concessions of public services previously held by public companies, that were loosely controlled by governments, are now being transferred to private companies, even before putting in place the regulatory framework. This state of affairs creates a risk for both, the population and the private companies that are getting the concessions, as the absence of rules may result in future lack of continuity of services or on decay of its quality.

This position is supported by some people that oppose government intervention in the economy, even for controlling public services. They like to cite the obvious

improvement of performance that could be observed in the telephone sector, after de-regulation. However, competition could be established in the telephone sector, and others alike, because they are no longer natural monopolies, due to several technological breakthroughs (cellular phones, for example). In other words, competition inside a concession area could be established. Certainly this is not the case of water supply and sanitation, that persists as a natural monopoly.

If competition for the service on a day to day basis is not feasible in natural monopolies, one can at least establish competition for the concession even if the universe of private companies competing for water and sanitation concessions is rather small. The formation of coalitions among these companies can not be ruled out.

An alternative for public companies of developing countries - rarely used unfortunately, is the adoption of management contracts between government and the board of directors. These contracts would consist of well established economical and social targets, in exchange for financial and managerial autonomy.

Flood Control: addressing consequences rather than causes

The chaotic expansion of big cities in developing countries, subjected to hot humid tropical climate, is usually associated with a time increase of the flood frequency. For example, there are several neighborhoods in the poor outskirts of Rio de Janeiro that are now inundated almost every year. That is, storms that in the past would cause minor problems, now cause major problems, with huge human suffering, due to:

- Occupation of the flood prone areas by the poor, that do not have any other option (**Figure 3**);
- Clogging of rivers and channels with garbage, which is not properly collected neither disposed (**Figure 4**);
- Sedimentation of channels and rivers, as a result of erosion on the hillsides;
- Increase of surface flow, due to the impervious surface laid on top soil.

Usually governments of developing countries tend to deal with the consequences of these processes, rather than with the causes. They are prone to expend large quantities of money on costly engineering works, such as construction of channels, dikes and pumping stations, much because construction companies lobbies, and very little on land use planning and management, as well as on maintenance of the existing infrastructure. Under these circumstances, an optimal engineering solution may not be the most recommended one. For example, this author refused to adopt a flood control solution based on the creation of a polder, that would be the optimal alternative in Holland, but that would not long last in the outskirts of Rio de Janeiro, due either to lack of maintenance of the pumps, or to uncontrolled settlement in the flood storage area.

Active stakeholder involvement

Experience has demonstrated that all these problems are greatly reduced whenever there is an active involvement of the stakeholders in the decision process. It has been proved in a real case (4) that the local population reacts quite positively when the decisions are taken with their involvement. In this specific case, people that previously lived in risky areas along the banks of rivers were moved to new homes, built on more valuable land. Once the flood threat had been removed, they started to expand their houses, while businesses invested in construction and renewal. Tax revenue collected by the Municipalities raised, and opened up a new phase of economic and social development.

PLANNING AND MANAGEMENT OF WATER RESOURCES

A new paradigm of water resources management has emerged from some important international meetings and policy papers on water (2, 5, 6):

- planning and management of water resources should be done at the scale of the river basin, with the participation of stakeholders;
- controlled issuance of water permits for intakes or for dilution of effluents is an essential tool for planning and for investment by the water users;
- bulk water is an economic good and as such should be charged in order to: (i) achieve rational allocation; (ii) create the financial resources necessary for the improvement of the river basin;
- human supply is top priority among competitive uses.

River basin scale not always the best

It has not been easy to apply these concepts in developing countries. One of the difficulties is that the river basin scale is proper in most cases, but not in all. Hydroelectric power plants in different river basins can be electrically interconnected. When a drought strikes a particular river basin, sometimes for several years on a row, the system may be sustained by the power plants located in different river basins, apart from each other by thousands of kilometers. In these circumstances, the electric power sector will tend to plan and operate the reservoirs from the interconnected system perspective, rather than from the river basin perspective.

The river basin committee - the right mix

The proper mix of representatives in the river basin committee can make a big difference. Limited experience has shown that if the NGO's outweigh the users representatives (water-supply/sanitation companies, industries, irrigation districts, power companies...), decisions of river basin committees tend to become unfeasible because those that decide do not have to pay for their decisions. On the other hand, if decisions are left only to users, there is a risk that the environment would not be properly preserved for present and future generations. River basin committees do not need to be established across the board. Committees should be formed only in basins, or sub-basins, which have some water conflict, actual or potential. Local problems may

induce the formation of committees for some of the upstream sub-basins. In this case it is necessary to create a hierarchical relationship between basin and sub-basin committees. When it comes to flood control, community participation in the selection of solutions is highly useful. However, because flood protection is a community benefit, rather than an individual benefit, government financing is unavoidable.

Consistency in water permits

Water use permits should apply either to quantitative uses of water, such as irrigation/urban supply, or to qualitative uses, such as dilution of industrial/urban waste. However, in most cases quantitative and qualitative permits are issued by different government agencies, which are often rivals. Ideally, both kinds of permits should be issued by the same agency. For this, the same yardstick should be adopted in order to reduce quantitative and qualitative uses to common ground.

Revenues should finance improvements

Pricing bulk water should not be a source of revenue for governments, as there is a widespread disbelief in developing countries about government capability to carry on new policies, such as the rational use of water resources. Instead, the corresponding river basin committee should preferably use the revenue in the same river basin where it originated. Ideally, revenue should decrease with time because the money raised with the water tariff should finance improvements for the river basin as a whole.

Pricing bulk water face resistance from sectors that believe that accepting lower environmental standards, which result in lower production costs, is the only hope for developing countries to compete within the global market.

CONCLUSIONS

Low water stress is a necessary but not sufficient condition for a country or region to be free of water related problems. When the coping capability is low, there will be all sorts of problems related to excess of water, excess of pollution, or both. Coping capability may be low due to the weakness of institutions, even in countries with reasonable per capita income.



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