Hydropolitics in Southern Africa: What is the Prognosis for Peaceful Development of Shared Watercourses?

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Abstract

If the wars of this century were fought over oil, the wars of the next (21st) century will be fought over water (World Bank vice president Ismael Serageldin, 1995).

Water has the capacity to serve as an instrument of peace, regional cooperation and development (Koffi Annan, 2003).

The above represent two opposing views on hydropolitics. Are they reconcilable? This paper provides a brief overview of the hydropolitics of Southern Africa. The southern African region has an arid and variable climate, both temporally as well as spatially. Floods frequently follow droughts and an average year is rare. As with most parts of the world, the impacts of climate change are debated, but it seems likely that the region will become drier over the next 50 years. It is also a region, which is emerging from past conflicts and is starting to develop its economies by promoting industrialization, primary industries and intensive agriculture. The above climatic factors in combination with the past conflicts and economic development have led many commentators to label the southern African region as being hydropolitically vulnerable. They postulate that the likelihood for conflict is high – second only to the Middle East. This paper shifts the emphasis away from the physical water resources and incorporates concepts from the realm of social resources to paint a more positive picture. It is argued that direct conflict over water is not the only possible outcome as economic factors such as trade and benefit-sharing serve to ameliorate the possible disputes over water in the region. Cooperation is likely to develop at community level – between groups who share a water resource.

Introduction

A large number of international river basins, inherent climatic variability, and a natural uneven distribution of perennial rivers characterize southern Africa. The region also has a history of political instability, driven by liberation struggles against the former colonial powers, apartheid, and the Cold War. Southern Africa's transboundary rivers and their associated ecosystems could become either drivers of peace and economic integration or sources of endemic conflict. Water scarcity has also placed limits on the future economic growth potential of the region's four most economically developed countries. This situation, combined with the regional development of international and increasingly complex interbasin water transfers, highlights the need to develop appropriate scientific methodologies that can shed light on future patterns of conflict and cooperation.

In situations where the political will is not in place, the possibility exists for technical-level cooperation between representatives of the basin countries, such as forming institutions and using the existing legal framework to jointly manage shared water resources. According to the Functionalist school of thought, such technical cooperation between countries can be built on and enhanced once cooperation at the political level begins (Kalpakian, 2004). It is the existence of legal agreements as well as the legal and institutional capacity to effectively implement them, which has a direct bearing on the ability of a region to adapt to changing climatic, economic, social and demographic conditions. A basin runs the risk of water scarcity leading to some type of dispute if the joint institutional capacity and legal framework are not in place. This presentation will provide an overview of the hydropolitical situation in the Southern African region using concepts from security studies as an analytical tool.

Hydropolitical Realities

Hydropolitics is a function of two variables: the rate of change in the hydrologic system, and the institutional capacity to absorb that change (Turton, 2003). It is hypothesized that if the capacity to absorb change is sufficient to respond to the occurring change, the vulnerability for conflict is minimized (Wolf, 2003). When analyzing the state of hydropolitical vulnerability in Southern Africa it is therefore essential

to look at both sides of the equation, i.e. the underlying factors that create vulnerability to conflict as a response to hydrologic change as well as the legal and institutional response to such change. These determine whether the management of water takes place in an open politicized context or in a closed securitized context. Politicisation means to make an issue appear to be open, a matter of choice, something that is decided upon and that therefore entails responsibility, in contrast to issues that either could not be different (laws of nature) or should not be put under political control (Jagerskog, 2003). By contrast, securitization is a speech act legitimising extreme measures by calling on existential threats, as 'so important that it should not be exposed to the normal haggling of politics' (Warner, 2004).

In Southern Africa the key issues causing hydropolitical vulnerability include:

1. Natural Climatic Variability – naturally variable rainfall patterns with frequent periods of floods and drought.
2. The construction of large dams and associated interbasin transfers (IBT) – largely as a response to the above point, in order to mitigate the impact of the natural climatic variability.
3. Population dynamics in the region – growth or decline in population size affecting the water needs of the region.
4. Economic Priorities – African economies tend to emphasize resource extractive industries such as mining and forestry. These extractive industries, if not well managed, tend to affect surrounding ecosystems negatively. At the same time, environmental legislation covering emissions into the atmosphere, soil, and water is generally either not in place or, if it is in place, frequently not implemented.
5. Social resources – These encompass factors such as institutional development, economic wealth, and systems of government, laws, and legislation and the education level of the population. The key to adapting to the first four factors' impact on water resources lies in this realm. A politically powerful and diversified economy will have a range of policy options available. Weaker economies with low levels of

institutional and social development have a more difficult time trying to adapt to water insecurity.

These components exercise an influence on each other – with the climatic variability being a driver of the societal responses which follow (see Figure 1). Each of the above components is likely to be affected to some extent by cross-cutting issues such as global climate change (GCC) and HIV/AIDS. The effects of GCC are not possible to predict with accuracy. An increase in temperature could lead to longer or harsher droughts in the Southern African region, but there is the chance that it could lead to greater periods of rainfall (Scholes & Biggs, 2004). Whether this rainfall would be spatially and/or temporally evenly distributed is unknown. The only effective response lies in the realm of social resources in the region – managing the threats and opportunities presented in a sustainable fashion. The challenge for Southern Africa is to find ways to strengthen and build the social resources of the region. Likewise, the impact of HIV/AIDS on the region's water resources is difficult to gauge. A drop in the population may equate to less stress on water resources, but the fact remains that many countries in the region are on course towards industrialisation – with possible negative impacts on water resources.

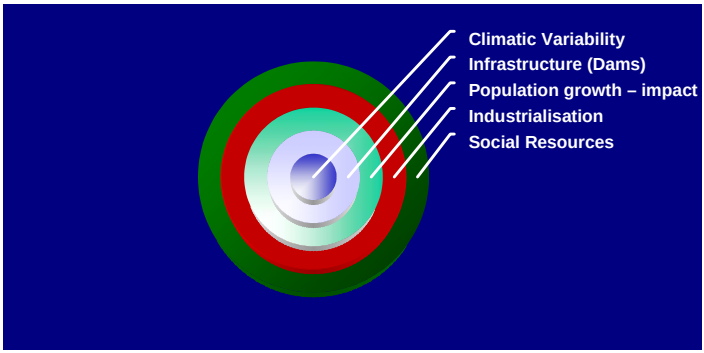

Figure 1: Variables Impacting Water Resources Management

As far back as the mid 19th century, colonial administrators of the Cape Colony recognised that the prime issue with rainfall in the region was not quantity but quality (Turton , 2003). A highly variable rainfall regime is not well suited to rainfed agriculture, necessitating the building of various dams and water transfer systems. The natural

climatic variability is the key driver of water management policies in the region, driving the responses of the other three components.

Rainfall throughout most of the region is both temporally and spatially variable. This can have a disastrous effect on people living in the area as was seen in the Mozambique floods of 2000 and more recently in Malawi. In the latter case a mild drought was followed in early 2001 by heavy flooding in many parts of the country. Seeds were washed away, resulting in a very low grain harvest for that year. In combination with a variety of other factors this had a catastrophic effect on household food security as many of the survival mechanisms had been depleted the previous year due to the drought.

The variable climate is impossible to control and difficult to predict. Certain cycles or oscillations have been observed, such as an 18-year one on the Okavango River and a possible 80-year cycle on the Zambezi River (Ashton & Neal, 2003). Since records of inflows to the Okavango Delta began in the early 1930s flows have varied from -45% to +60% of the mean annual flow (Ashton & Neal, 2003). A lack of detailed reliable long-term data for much of the region hampers attempts at developing models that can accurately predict wet and dry cycles. Not having a good understanding of the hydrology of the various rivers and aquifers of the region makes planning difficult.

The effect of the natural variability of the rainfall is compounded by the very high rates of evapotranspiration in the region. For many Southern African basins the ratio of mean annual runoff (MAR) to mean annual precipitation (MAP) is less than one in ten (O'Keefe , 1992). That is less than ten percent of the rainfall being available as stream flow, compared with a world average closer to 30 percent. The clearest example of this effect is the difference in aridity between London and Johannesburg. London receives less rainfall than Johannesburg annually – 583 mm compared to 713 mm (WMO, 2005). The high rate of evaporation in Johannesburg causes that city to be perceived as much drier than London.

The highly variable rainfall coupled with the low percentage released as runoff has prompted governments in the region to embark on large-scale dam and water transfer construction schemes. South Africa, at 539 large dams (over 15 metres in height), is ranked 11th in the world

and Zimbabwe 20th with 213 dams, placing them ahead of many developed countries in the world in terms of number of dams (WCD, 2000). Dams certainly are essential to the provision of water to a modern economy and may also form a stimulus to development. Water will always have to be stored and transported in order to use it in the most productive activity possible. Yet, large dams are certainly no panacea to the problems of variable rainfall and low runoff. Frequently they have unintended negative consequences, both for humans as well as the environment. There are numerous examples both regionally and internationally of dams actually increasing the hydropolitical vulnerability of communities and ecosystems to natural or anthropogenic changes. On the Zambezi River, the Cahora Bassa Dam in Mozambique was intended primarily as a hydroelectric generator, although also with a water supply function. During the years of civil war the dam was not operated effectively. Actions such as periodically releasing a large volume of water as a scouring flood are vital to the continued ecological functioning of downstream biota. Neglecting to release the required amounts of water resulted in the formation of sand islands in the estuary. Over time these islands were colonised by plants, animals and humans. The salinity of the estuary rose to levels too high for the existence of the mangrove swamps, which eventually started dying off (Turton & Earle, 2005). During the large floods of 2000, the loss of human life in the estuary area was high, because people had settled on the sand banks and no protection was offered by the mangrove swamps. To start releasing floodwater from the dam in an effort to restore the estuary is not feasible as the area is now heavily populated by communities of people. Moving them involves various political and economic costs judged too high, while allowing people to stay makes them vulnerable to periodic flooding.

Much of the dam building in the Southern African region was to cater for the needs of a rapidly growing population. The dry Southern African countries (South Africa, Botswana, Namibia, and Zimbabwe) are predicted to face high levels of water stress by 2025 (Turton , 2003). There will thus increasingly be calls for the construction of more dams and to embark on ever greater water transfer schemes. Although this can bring a measure of temporary relief to the situation

there is only a finite amount of water available. More recently the figures for water consumption over the next two decades have been adjusted downwards by varying degrees in an attempt to accommodate the effects of the HIV/AIDS pandemic. Schemes such as the second phase of the Lesotho Highlands Water Project have been rolled back, seemingly indefinitely, partly because of the effects of the pandemic.

However, the potential exists that the hydropolitical vulnerability in most of the region will not improve, even with the lower growth figures. The nature of the HIV/AIDS pandemic is such that large numbers of people will turn to cultivating marginal land in order to maintain food security. As remittances from urban areas decrease, children, and the aged have to rely on other coping mechanisms. This frequently places people in the position of cultivating land unsuited to agriculture. Areas on steep slopes are more susceptible to soil erosion when cultivated, while overgrazing can have the same effect on steep rangelands. As areas become denuded of vegetation so does the potential for a change in the local micro-climate increase. Vegetation, especially in wetlands, acts as a sponge, mitigating the impacts of both high and low rainfall years. Infiltration to the water table is substantially reduced on soils without vegetation.

It is likely that water demand in urban areas will continue growing, along with an increase in wastes & pollution released into water systems. This is likely to impact on downstream rural and informal communities who draw water directly from rivers close to them. Water-borne diseases, such as cholera, pose health risks especially to those affected by the HIV/AIDS. With the introduction of water-charges in some of the poorer rural areas, people have reverted to drawing water from nearby rivers, contributing to cholera outbreaks over the past few years in various countries in the region (Howard & Bartram, 2003). The trend of increased marginalisation is most likely within vulnerable sectors of the society. These include refugees fleeing war or economic turmoil who settle in more stable areas. The newcomers tend to settle on land disliked by the local communities, such as floodplains, placing them at risk of flooding.

Societal Responses

Water is a first-order resource and its distribution is fixed over the long run in terms of quantity (aside from possible changes due to climate change). It is not possible to add or deduct significantly from the stock, although quality aspects can be influenced greatly. A scarcity of first-order resources can be mitigated by high levels of second-order or social resources. Countries such as Israel, Cyprus, and Australia have overcome the limitations posed by their low levels of water resources by making use of their stocks of social resources (Earle & Turton, 2003). Figure 2 shows that there is no correlation between economic development of a country and the amount of water it has available per person.

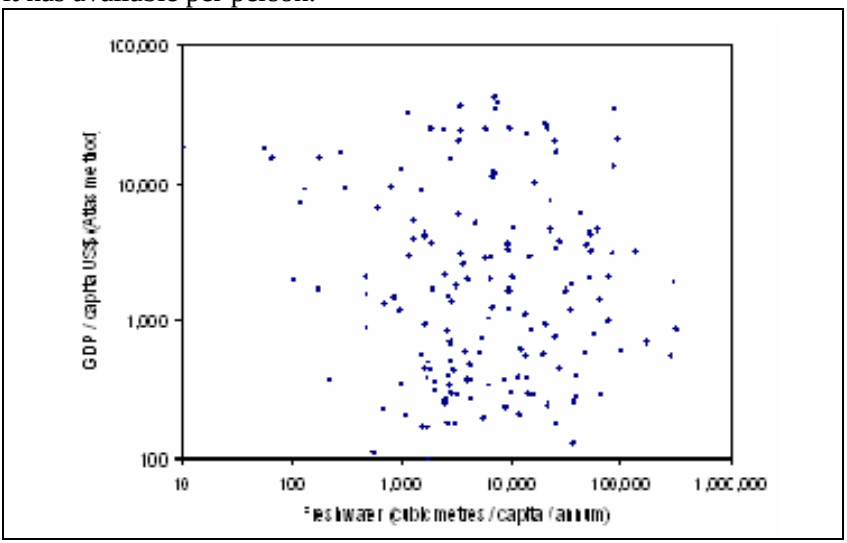

Figure 2: Water resources vs. economic development of 160 states – no correlation

Water passes through the various stages of the hydrologic cycle – precipitation, evaporation, infiltration, run-off etc. Physical water resources, which contribute to food security in an economy, can be either the rainfall crops use directly to grow (supplying over 60% of world food production) or the water available as runoff in rivers, lakes, and aquifers. The use of the former is free, while the latter requires storage and transfer costs. Together these two types of water

sometimes referred to as “green” and “blue” respectively form the basis of the natural water resource endowment of a country (see Figure 3). Technology can be harnessed to “create” fresh water to augment the natural supplies. This can be done in two ways.

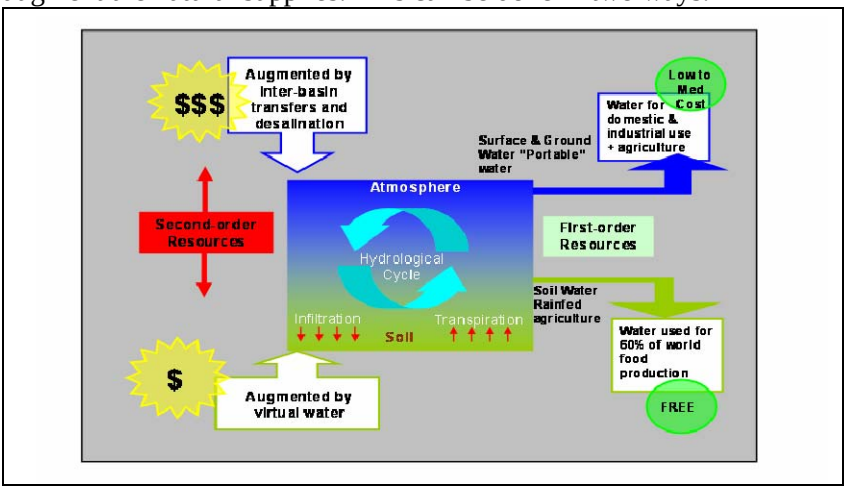

Figure 3: Water available to an economy

Physical water stocks can be augmented through inter-basin transfers or through the desalination of seawater. Both of these options supply an additional quantity of freshwater to an economy and are used in many parts of the world to compensate for water scarcity. The financial cost of both technologies is high. In addition, both have possible environmental and social impacts. The second method of augmenting the water available to an economy is by relying on virtual water[1] imports. Fundamentally, social resources (including economic wealth, level of education of the population, degree of trust between parties, political legitimacy of leadership etc) allow a sophisticated

[1] Virtual Water is the water embedded in a product and is equivalent to the quantity of water consumed in the production of that product. For example – in the production of a ton of wheat roughly 1,300 tons of water is consumed (Earle, 2001)

economy to use its scarce water resources in the most productive setting – typically some form of industry or eco-tourism. The income earned can then be used to procure staple foods on world markets. This shift of water from the production of staple food crops frees up vast amounts of water for more efficient uses in the economy as it takes over 1000 tonnes of water to produce one tonne of cereals.(Earle & Turton, 2003). The reliance on these virtual water imports is a policy option open to states with the economic resources to support it. Most countries in Southern Africa have large rural populations, for whom employment opportunities are few. In this situation, the social benefit of water contributing to household food security should be factored in.

Within the region, it is mainly Botswana, South Africa, and Namibia with the economic resources to start relying on virtual water as an addition to the local water resources. These states import about eight cubic kilometres of virtual water annually – a high figure compared with the flow of a large regional river such as the Okavango at ten cubic kilometres annually (Earle & Turton, 2003). However, there is a great need for rural development in the region, with various agricultural development schemes being promoted by countries. These are generally water intensive and have both water quantity as well as quality implications. The social resources – including economic wealth, institutions, education & skill level of the population and the stability and strength (legitimacy) of the government allow a range of policy options in the field of water resources management. Strategies such as water demand management, cost recovery for water supply and enforcement of land-use zoning are all politically stressful. They will only gain acceptance if the level of social resources is high enough to whether the re-allocation of water resources towards more efficient uses.

On a transboundary level, where a water supply is shared between two or more states, social resources become an effective tool in the promotion of cooperation over the water resource. They do this by shifting the debate away from pure water sharing (my rights vs. your rights) to a benefit sharing approach. Thus water becomes one component in a “basket of benefits” which can be shared between parties. This would see a resource such as the Okavango Delta

wetland conserved through the upstream riparians not exercising their rights to water from the river. In return the income generated from the delta is used to benefit the region by embarking on transfrontier tourism initiatives and development projects. The upstream counties would in this way be "compensated" for not using their share of the water, on the assumption that the use downstream brings a higher overall return to the water used.

This is pertinent to the Southern African region with such a high number of shared rivers – 16 shared basins amongst 12 countries (Wolf, 2003). The countries of the region bear no resemblance to the shapes of the river basins, with borders drawn by colonial powers to define spheres of influence. Frequently, due to the relatively small size (width) of the rivers there was a high level of interaction between communities on opposite banks. People have a shared history, culture and traditions often with relatives living on the other side of the river. Post-colonial Africa has upheld these borders, casting in stone the division of these once linked groups. The net result is that people living on the edge of many of these rivers now fall under the influence of an administrative government frequently very far away, yet have to compete or cooperate with people living opposite them, with whom they have more in common. People in the Southern African region frequently feel alienated by the concept of the state – identifying little with the values and aspirations espoused by politicians and government officials. In fact, nation building is a core strategic need for many of the Southern African states. Allegiance, bonds and responsibility tend to be strongest at the local level, with management based on networks of trust operating within and between communities (Turton & Earle, 2004). In this way, it is possible for cooperation over shared water resources to be focused around river basins. Communities dependant on the resource may be separated by nationality, yet they are bound by the water they share. The hydropolitical vulnerability to climatic and population pressures of such communities can be reduced by developing their social resources and promoting their cooperation with communities upstream and downstream of them.

Conclusion

It is not possible to predict what impact the introduction of a new variable, such as global climate change, will have on the levels of cooperation, conflict, vulnerability and preservation of water resources in the region. For as long as the level of social resources in the region remains low the threat of increased vulnerability to natural as well as human induced hazards remains high. The most important factor in ensuring long-term sustainable development of the water resources remains in the realm of social, economic and institutional development. The focus of cooperation should be on sharing the benefits of the water resource, rather than a strict adherence to sharing the water itself. A move from the "top-down" management approach towards a participatory system, which links communities who share a resource with each other, is needed. These communities need to be resilient to the drivers of change, such as those brought about by changes of climate and population, through the development of networks with other communities. The focus should be on trying to up-scale the local cooperation over shared water resources to the national and regional level.

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