

# A SOUTHERN AFRICAN PERSPECTIVE ON TRANSBOUNDARY WATER RESOURCE MANAGEMENT

By *Anthony R. Turton*

## Abstract

Southern Africa is characterized by a large number of international river basins, inherent climatic variability, and a natural maldistribution of perennial rivers. The region also has a history of political instability, driven by liberation struggles against the former colonial powers 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 explain and predict future patterns of conflict and cooperation.

**D**riven in part by the need to develop a new security paradigm in the wake of the Cold War's collapse, many

Gumbricht et al., 2002; McCarthy et al., 2000; Puckeridge et al., 1993; and Turton et al., 2003).

Climate variability also has a number of key environmental security ramifications: (a) the long-term impact of global climate change on both water availability and the incidence of extreme events; (b) the impact of growing populations on a relatively finite and variable water resource base; and (c) the existence of a large number of dams in order to store water during the unpredictable and often long dry periods. For example, South Africa and Zimbabwe have 752 large dams between them, while the region's other nine countries have only 55 among them (WCD, 2000). The region's wetter countries (such as Angola, Malawi, Mozambique, Tanzania, and Zambia) have among the lowest densities of dams in the world for non-karstic regions, with annual rainfall in the range of 600 to 2000 millimeters.

The region's eleven mainland countries are traversed by no less than fifteen international river basins (see Figure 1), including such major basins as the Zambezi (which is shared by eight states) and the Limpopo and Orange (which are shared by four states each). As a fundamental element of the environment, water has major strategic significance in Southern Africa.

Water scarcity acts as a limiting factor for the economic growth potential of the region, making water and associated ecosystems a key component of sustainable development. Fed by an increasingly complex series of

pipelines and water transfer schemes (which has given rise to the so-called "pipelines of power" thesis<sup>2</sup>), the dams of the Republic of South Africa and Zimbabwe support a vast array of economic activities (Turton, 2000).

These three fundamental drivers prompt a number of strategic considerations. For example, the four most economically developed states in Southern Africa—the Republic of South Africa, Botswana, Namibia, and to a lesser extent Zimbabwe—also happen to be water-stressed. In fact, these four countries have already reached the limitations of their readily available water resources and now need to develop increasingly sophisticated interbasin transfers of water to sustain their economic growth potential. Below are just a few illustrative examples of such transfers:

- In the Republic of South Africa—the most economically developed state in the Southern African region—interbasin transfers of water across various natural, provincial, and even international borders sustain 100 percent of the Gross Geographic Product<sup>3</sup> (GGP) in the Gauteng Province, and are responsible for more than 50 percent of the GGP in seven of the nine provinces (Basson et al., 1997; Turton, 2003). One of the key elements of these transfers is the Lesotho Highlands Water Project (LHWP), which transfers water by gravity to Johannesburg and Pretoria and could also supply water to Gaborone in Botswana if needed.
- Two strategic water transfers currently sustain the Botswana economy: (1) the transfer from the Molatedi Dam in South Africa (Conley, 1995; Heyns, 1995); and (2) the North-

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South Carrier in Botswana, which has a proposed future linkage to the Zambezi





Impacted Basin;

- Their current (or future) economic development has been or is likely to be limited by a Pivotal State with which they are co-riparians.

intuitively expect a high level of conflict potential as each state competes for a

*Impacted Basins*: There are at least seven Impacted Basins in the Southern African Hydropolitical Complex—Zambezi, Kunene, Okavango, Incomati, Maputo, Pungué, and Save. An Impacted Basin meets two criteria:

- A Pivotal State relies on the water from the Impacted Basin for current (or future) economic development;
- The development options of the Impacted State within the Impacted Basin have been or are likely to be limited by the actions or plans of the Pivotal State.

The interconnectedness of these concepts is self-evident when one assesses the implications of existing and planned interbasin transfers of water in Southern Africa.

### ***Conflict or Cooperation Within International River Basins?***

What are the possible strategic ramifications of the South African Hydropolitical Complex model and its fundamental drivers? Specifically, what are key areas in which policy interventions would be appropriate regarding these dynamics?

Since the economic growth potential of any state impacts deeply on the welfare of its citizens, economic growth acts as a powerful political driver in its own right. This driver is even more important when the state in question has (a) a high need for economic development as the result of rapid population growth, and (b) limited options for mobilizing secure water supplies. Such is the situation in Southern Africa, particularly for its Pivotal States and Pivotal Basins.

Under these conditions, one would

to compensate for environmental scarcity (Homer-Dixon, 1994). As such, technical ingenuity seems to focus on first-order resources because it deals specifically with the manipulation of the environment in order to mobilize more water (Turton, 2002b).

Social ingenuity is needed to create institutions and organizations that buffer people from the effects of (first-order) natural-resource scarcity and provide the right incentives for technological entrepreneurs to develop appropriate solutions (Homer-Dixon, 1994). As such, social ingenuity focuses on second-order resources because it deals with appropriate development, reform, or adaptation of water management institutions (Turton, 2002b).

Applying these new concepts to environmental security discourses reveals a previously hidden dimension of analysis. For example, the concepts make evident that the development of appropriate institutions is a key intervening variable in whether transboundary river basins are marked by conflict or cooperation. Central to this is the notion of adaptive institutions that has been developed by Molden et al. (2001) and

their own interests. Conversely, Impacted States have a lower capacity to mobilize the appropriate form of social ingenuity, which is one of the reasons why these states remain in a hydrologically vulnerable position.

### ***Policy Implications***

This research has a number of policy implications. First, dominant environmental security discourses generally tend to ignore the importance of what Ohlsson (1999) calls second-order resources and what Homer-Dixon (1994; 2000) calls ingenuity. But current research in Southern Africa suggests that second-order resources are the critical independent variable in mitigating resource conflict in industrialized economies—in particular, those second-order resources found in formal water management institutions (Turton, 2002a).

The identification of second-order resources also leads to two other subtle but important policy implications. First, *the capacity of a riparian state to generate hydrological data is critical*. Where uncontested basin-wide data is missing (as in the cases of the Okavango River Basin) or incomplete (as in the case of the Incomati, Maputo, and—to a lesser extent—the Limpopo River), transnational institutional development is likely to remain stunted.<sup>9</sup> This institutional underdevelopment leads to high potential for conflict in those river basins, particularly during times of regional drought—a natural recurring phenomenon likely to become more acute as global climate change takes effect.

Second, *the capacity of a riparian state to legitimize data via negotiations is also crucial*. Where a riparian state is unable to perform



for consideration by the Swedish Foreign  
Ministry and which now exists as the Water

<sup>3</sup>The GGP is equivalent to Gross Domestic Product but applies to a specific geographic area that is sub-national in size, usually a province.

<sup>4</sup> Earlier research by the author used the term “hydropolitical security complex” (Turton, 2001; 2003a; 2003b). However, water per se is insufficient to be the sole focus of the security complex—an important factor for Southern African regional security, but not the major driver.

<sup>5</sup> On the other hand, South Africa has historically securitized its water resources, particularly under apartheid



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