In: Violent Conflicts, Fragile Peace: Perspectives on Africa's Security, (N. Mlambo, Ed.).
London: Adonis and Abbey (In Press).

Disputes and Conflicts over Water in Africa

Peter J. Ashton

CSIR – Natural Resources and the Environment, P.O. Box 395, Pretoria 0001, South Africa

Introduction

Recent years have been marked by a growing awareness that the world's freshwater supplies represent a scarce and critically important resource that is also extremely vulnerable to human activities (Biswas 1993; Delli Priscoli 1998). Indeed, since water cannot be substituted, neither biological diversity nor social and economic development can be sustained in its absence. Every country faces the challenge that it is becoming increasingly difficult to provide sufficient supplies of good quality water to meet the growing needs of increasing populations (van Wyk 1998). These tensions are heightened as freshwater supplies decline due to resource depletion and pollution, coupled with rapid urbanization and industrialization (Falkenmark 1989; Ashton 2000, 2002). This situation is particularly significant in the more arid regions of the world such as Africa where water scarcity hampers social and economic development, prompts increased competition for water between different sectors of society, and is correlated to the prevalence of poverty, hunger and disease (Ashton 2002).

Another important aspect to emerge from the growing public awareness of the importance of water is the realization that water has both productive and destructive properties. Typically, adequate supplies of good quality water enable communities and countries to attain and sustain all of their social and economic development aspirations (Falkenmark 1989; Biswas 1993). In this process, water also acts as an important agent for co-operation and benefit sharing between communities and countries (Turton 2002). Conversely, communities and countries experience considerable hardship where water supplies are inadequate, or supplies are unpredictable, or insufficient resources and infrastructure are available to ensure the provision of adequate water supplies (Falkenmark 1989; FAO 2000). This situation becomes accentuated where a limited supply of water must be shared between communities or countries, and may lead to disputes and even conflicts over access to water (Ashton 2002). Water can also have an additional and highly destructive aspect, where 'excess' water in the form of floods can wreak havoc with the social and economic infrastructure within a country (Christie and Hanlon 2001).

Against a background formed by the availability and distribution of water and the likely trajectories of change in demand for water across the African continent, this paper briefly discusses the types of situations where disputes or conflicts have occurred over access to water. Specific consideration is given to the need for African countries to develop new collaborative policies and strategies that will allow them jointly to attain their development goals while simultaneously avoiding the looming potential for conflict over water resources.

The geographic and geopolitical reality of water in Africa

In contrast to many other parts of the world, Africa's water resources have a very variable distribution in both geographical extent and time. Large areas of the African continent experience prolonged and extreme droughts that are often "relieved" by equally extreme flood events (Ashton 2002). There are also suggestions that predicted trends in global climate change could accentuate this situation in many parts of the continent (Smakhtin et al 2001). However, despite seasonal and inter-annual variations in rainfall and river flows, the long-term average quantity of freshwater on the African continent appears to have remained almost constant over time while the rising demands for water have reduced the *per capita* availability

of water that can be provided by conventional technologies (Gleick 1998; Ashton 2000; Turton 2002). Future demands for additional supplies of fresh water will need to be met through the use of unconventional technologies, the exploitation of new or novel sources of fresh water, or through the long-distance transfer of ever-larger quantities of water from regions that have ample supplies (Smakhtin et al 2001). In addition, concerted attention must also be paid to reducing the demand for water and increasing the efficiency with which water is used (Ashton and Haasbroek 2002).

The populations of most African countries have grown rapidly during the past century and these trends are likely to continue, despite the ravages caused by the HIV/AIDS pandemic in many parts of the continent (Ashton and Ramasar 2002). In spite of the obvious inequalities caused by a variety of social, economic and political dispensations, population growth has been accompanied by an equally rapid increase in the demand for water (Falkenmark 1989; Gleick 1993). Several African countries have already reached or passed the point of severe water stress or water deficit, where the scarcity of water supplies hampers further development (Falkenmark 1989; Ashton 2000). Based on current population trends and patterns of change in water use, more African countries will exceed the limits of their economically usable, land-based water resources before 2025 (Falkenmark 1989; Ashton and Seetal 2002). These statistics emphasize the scale of the challenge each country faces in their attempts to achieve their national and regional water security goals.

In addition to natural patterns of climatic variability and unequal distribution of water across Africa, most of Africa's water resources are contained within large river basins or underground aquifers that are shared by several countries (SARDC 1996; Ashton 2002; Turton et al 2006). Importantly, the national boundaries of African countries are seldom aligned with the natural boundaries of river catchments or aquifers. This is part of the legacy of earlier colonial administrations that drew up the national boundaries of African countries in an apparently arbitrary fashion (Prescott 1979; Packenham 1991). Consequently, the extent to which the larger river systems are now shared by more than one country has often led to rivalry between countries as each strives to derive maximum benefits from the available water resources within its sovereign territory (Ashton 2000; Turton et al 2006). In such situations, "downstream" countries are more vulnerable than their "upstream" neighbours and therefore derive the least benefit (Pallett 1997). This situation has been accentuated in those cases where a downstream country may be economically "poorer" or politically and militarily "weaker" than its upstream neighbours (Turton 1999; Ashton and Turton in press).

What is a "water conflict"?

Much of the recent debate around existing water conflicts, and perceptions of possible future conflicts, has been phrased in highly dramatized terms of "water wars" or "water crises" (Business Report 1998; Delli Priscoli, 1998; Pretoria News 1998). This is unfortunate since growing awareness of the causes and implications of the different disputes and conflicts linked to water has revealed that such sensational terminology is inappropriate (Kirmani 1990; Turton 1999, 2000). In its simplest sense, the term "water conflict" describes any disagreement or dispute over or about water, where external social, economic, legal, political or military intervention is needed to resolve the problem. This broad definition spans a wide continuum of possible circumstances and situations, that could range from a relatively low-intensity dispute over stock watering rights between two adjacent landowners, to an armed confrontation between the governments of two countries that dispute each others "rights" to a particular proportion of the flow in a shared river basin (Ashton 2002).

In the range of possible types of disputes or conflicts that can be associated with, or driven by, water, it is important to understand that water is most often "incidental" and is seldom the primary cause, objective or "driver" of the conflict (Turton 1999; Ashton 2002). Furthermore,

other factors such as ideological differences can further complicate matters. A "true" water war can be defined as an armed conflict that is fought between countries with the sole or primary purpose of gaining access to water, or where water forms the central weapon of offence in the arsenal of an aggressor (Ohlsson 1995; Turton 1999). There is ample evidence (e.g. Wolf 1996; Pallett 1997) that, despite the dire predictions of some authors (e.g. Hudson 1996), "true" water wars have occurred very rarely if at all. Therefore, the broader term "water conflict" is preferred to cover the wide range of water-related disputes that have already been recorded.

Some causes of water conflicts in Africa

Water is a classical case of a "fugitive" resource that moves naturally from one area to another, is transformed rapidly from one state to another and, while water is widely seen to be a "renewable resource", the available evidence indicates that Africa's freshwater resources are finite (Conley 1995). Water is also extraordinarily vulnerable to human activities and both ground water and surface waters are easily polluted when effluent is discharged (Gleick 1998). This degrades the integrity of the receiving (aquatic) system and limits the degree to which other water users might use the water. The adverse effects of such incidents can persist for decades in the case of groundwater and are extremely difficult to reverse or remediate (Falkenmark 1989). In addition, it is almost impossible to define the ownership of water and water is now universally recognized as a "common good" that should not be privately owned; instead, governments should act as custodians of their national water resources (Asmal 1998).

The availability of adequate water supplies is critical to the national prosperity of a country since water is inextricably woven into irrigation and food production processes as well as into the provision of energy and, occasionally, transportation systems (Smith and Al Rawahy 1990; van Wyk 1998). The growing realization of water's strategic importance has fuelled most of the water resource development activities in Africa during the last century, including attempts to "trap" or impound water, so as to provide assured supplies during drier seasons when water is not easily available, or to transfer water from areas of ample supply to areas where water is in short supply (Ashton 2002; Ashton and Turton in press; Turton et al 2006).

Because very few rivers, other than relatively small systems, are contained within the borders of a single country, access to water increasingly becomes a source of potential conflict whenever a river crosses an international boundary (Delli Priscoli 1996; Wolf 1996; Pallett 1997). The potential for conflict in such situations is brought sharply into focus in the case of a country that obtains most of water supplies from inflows that originate outside its national borders (SARDC 1996; Pallett 1997). An additional complication arises where a river system forms the boundary between neighbouring states. Seasonal patterns of flow alter the shape and position of a river channel within a river valley, causing year-to-year changes in the geographical position of a boundary (Ashton 2000; Ashton and Seetal 2002). Where specific activities are associated with the "original" river channel (for example: traditional grazing rights on islands or the dredging of riverine mineral deposits), any alteration in the position of the river and an associated international boundary can lead to disputes over ownership.

At a strategic level, five key geographical and geo-political characteristics influence the ease with which water can become a source of strategic rivalry or confrontation between neighbouring states (Gleick 1998; Ashton 2002):

- The degree of water scarcity that already exists in the region;
- The extent to which a water supply is shared by one or more states or regions;
- The relative power relationships that exist between water-sharing states;
- The availability of alternative water sources and their accessibility; and
- The degree or extent to which a particular country's international boundaries are aligned with, or located along, shared river systems.

The areas where water-related conflicts and disputes have already occurred in Africa are shown in **Figure 1**. The locations of these water conflict sites correspond closely to the absence or scarcity of perennial rivers and lakes, and the transition zones where perennial river flows become ephemeral or episodic. This is clearly seen in **Figure 1** where most water conflicts have occurred in the dry Sahel region of West Africa, the arid north-eastern portion of East Africa and the dry south-western portion of southern Africa. Disputes over water have also occurred in some of the moister regions of Africa, such as around Lake Victoria in East Africa, and the middle and lower Zambezi River in southern Africa, though these have usually occurred during drought periods. In those cases where a conflict is linked to a specific river (such as the Incomati, Limpopo, Nile, Orange, Pagani, Senegal and Zambezi) or to a portion of that river, the river is a 'transboundary' or shared river system and the dispute relates most frequently to accusations that the water and other benefits derived by upstream countries are not equitable when compared to the benefits derived by downstream countries.

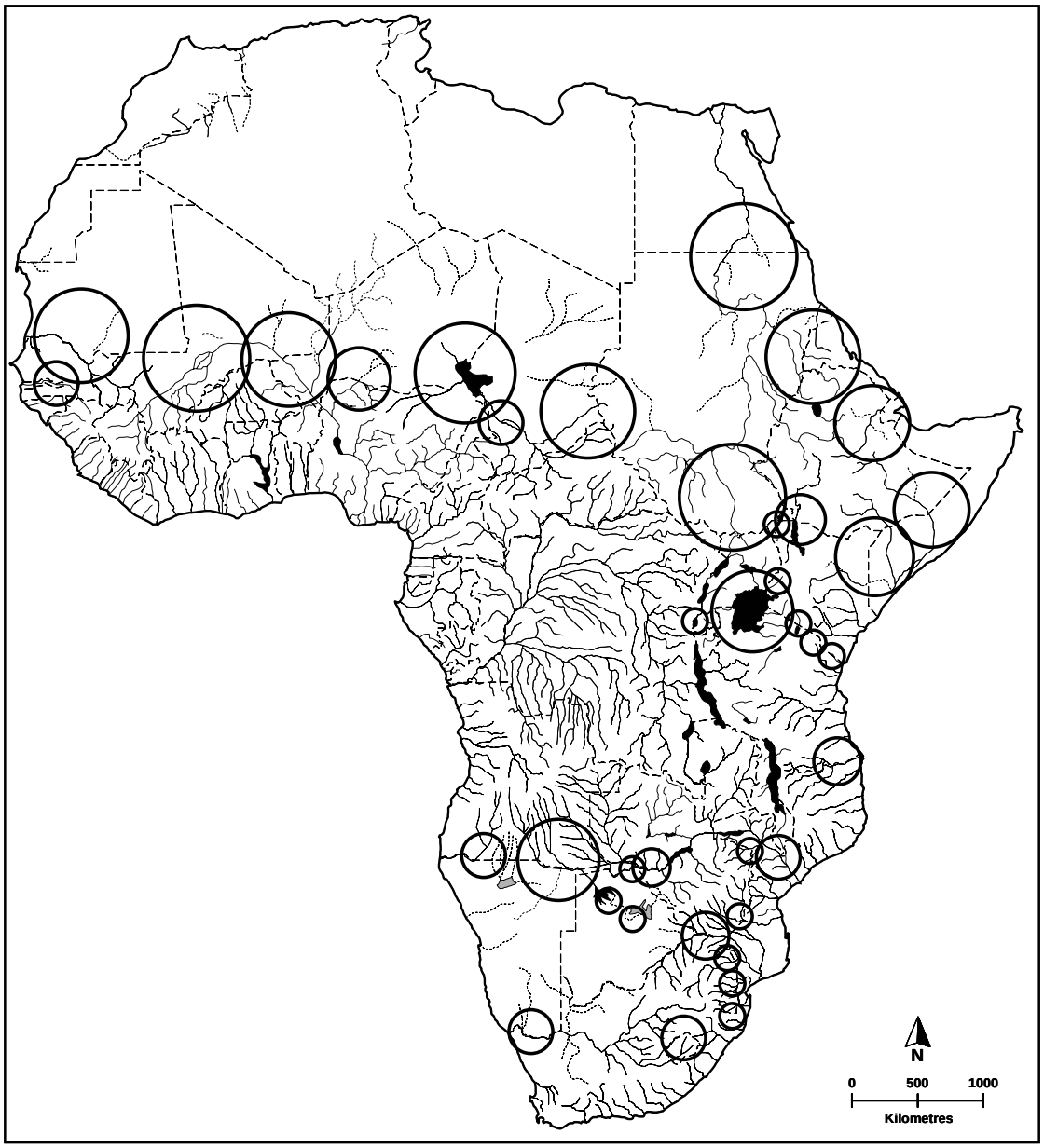

Figure 1. Map of Africa, showing major rivers and lakes as well as sites where disputes over water have occurred (circles). Note the size of a circle reflects the relative spatial extent influenced by the dispute. Map updated and redrawn from Ashton (2002).

A wide variety of more local, inter- and intra-community conflicts over water that occur within the boundaries of a single community or country can be added to these international dimensions of the causes of disputes over water in Africa (Ashton 2000, 2002). Perhaps the most frequently encountered of these smaller-scale conflicts relates to water quality problems that result from upstream activities within a single country, followed in importance by disputed local access to a single water source during critical periods such as droughts (Turton 1999). An additional source of dispute at both local and national scales can occur where insufficient provision is made to engage members of the public in decision-making processes around water-related issues that affect their lives and livelihoods (Ashton 2002; Turton et al 2006). Failure to provide opportunities for appropriate levels of public participation has led to several instances where the general public have openly expressed their dissatisfaction and, in some cases, rejected proposals for water infrastructure projects.

The importance of scale

The spatial (geographic) and temporal scales of disputes or conflicts over water can exert great influence on decision-makers when individuals, communities and governments are searching for appropriate solutions (Ashton, 2000). Therefore, it is appropriate to consider their correct context and importance in the debate around the potential for water-based conflicts in Africa.

A local-scale conflict between two adjacent landowners over access to water requires far less strategic (government-level) intervention than another water access problem that may be confounded by a dispute between countries over the precise location of an international boundary (Ashton 2002). Nevertheless, the smaller, local-scale conflicts can escalate very rapidly and require appropriately rapid responses. In contrast, most larger-scale or "international" conflicts tend to develop more slowly or gradually, and responses to these situations should also be appropriate to the scale of the problem confronted (Wolf 1996; Turton 1999; Ashton 2002). These differences are shown schematically in **Figure 2**. At the smallest or local scale, individuals and communities have relatively few options at their disposal to prevent conflicts from occurring. This is in sharp contrast to the situation at a larger national or regional scale, where countries are able to rely on a far wider range of laws, agreements and treaties to prevent or resolve conflict and, where these fail, also have access to the International Court of Jurisprudence, which will examine the merits of a dispute between parties and provide a ruling (Biswas 1993; Gleick 1998; ICJ 1999; Ashton 2000).

In terms of geographical scale, four separate groups of water conflicts can be recognized (Ashton, 2000):

- Within community, where conflict of some aspect of water may occur over a very small area between members of the same community;
- Between community, representing a slightly larger scale, where the individuals within each community present a united front in their dispute or conflict with a neighbouring community;
- National, where groups of communities or authorities within a single country may dispute the rights of a neighbouring communities or authorities in the same country to water that is not located within their geographical area of jurisdiction. This is typical of inter-basin water transfers, where "donor" catchments are seldom compensated adequately, and "recipient" catchments reap almost all of the benefits;
- International, where one country may contest the rights of a neighbouring country to use water from an aquatic system that it shares. Typical examples of this type would include so-called riparian rights to rivers that are located on international boundaries, and the situations where a river crosses an international boundary and gives rise to disputes between "upstream" and "downstream" countries.

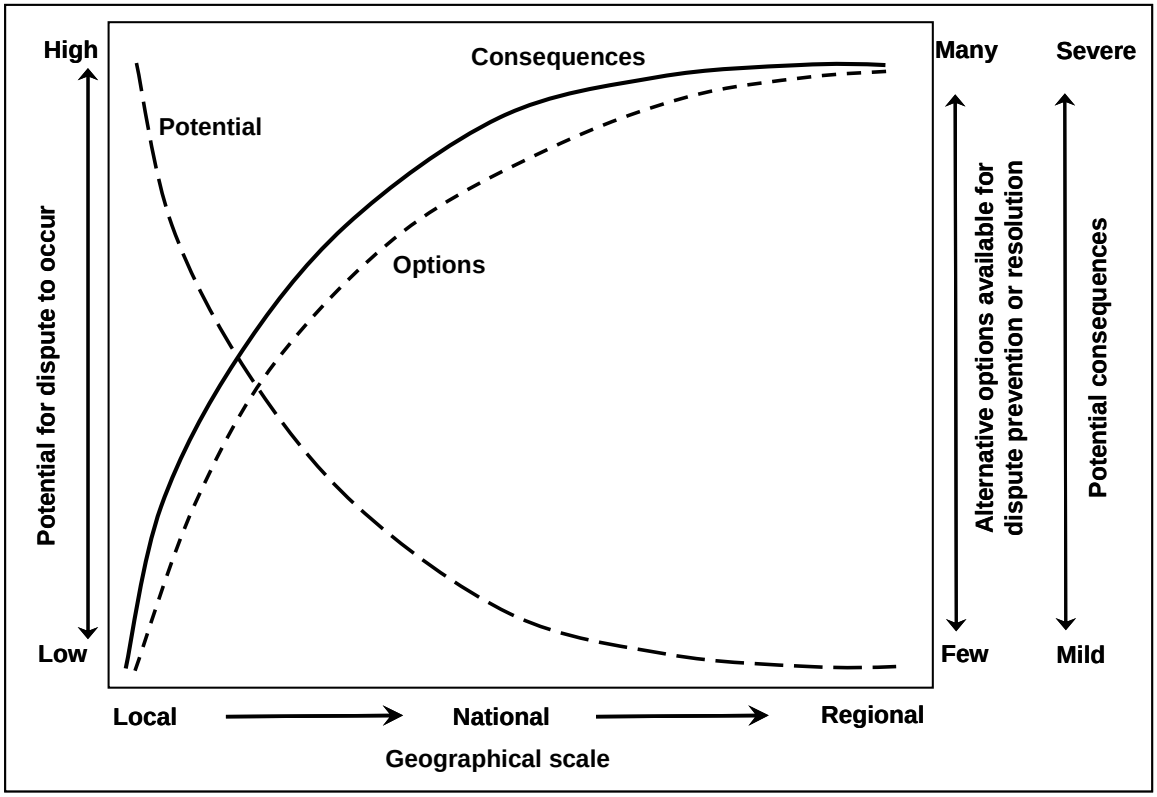

Figure 2. Diagram illustrating the influence of geographic scale (at local, national and regional levels) on the potential for a dispute to occur, the range of dispute prevention and resolution options that are available, and the potential consequences of a dispute.

In addition to these strictly spatial scales, geo-political considerations can add an additional dimension of conflict to those related to the spatial scales outlined above (Ashton 2002). Here, two typical examples would include:

- Disputes that arise between "upstream" and "downstream" countries as a result of specific activities or demands of one or both of the countries concerned; and
- A conflict that arises when two countries dispute the precise location of the international boundary that separates them and which also coincides with, or is aligned with, a river or other aquatic system.

The activities carried out by individual countries can also accentuate these problems of geographical and geo-political scale (Wolf 1996; Turton 1999; Ashton 2002). For example, where an upstream country constructs and operates a large impoundment, this will alter the timing, frequency, duration and quantity of water flows, as well as the corresponding silt loads and water quality received by a downstream country (Ashton and Turton in press). Similarly, effluent discharged by an industry in an upstream country can have adverse consequences for water users in the downstream country.

Can conflicts be prevented?

Given the evidence presented, it is important to understand that water conflicts are inevitable if nothing is done to prevent them from occurring (Ashton 2000, 2002). Whilst this response may appear to be simplistic, it is framed by the key insight that Africa's finite fresh water resources cannot continue indefinitely to support the escalating demands that are made of them.

Competition for the available water resources will continue to increase to a point where new and perhaps radically different interventions are needed (Falkenmark 1989).

The common-sense statement: "prevention is better than cure" provides a perfect outline of the goals and objectives that should direct strategies and actions aimed at dealing with the complex issues of water-related conflicts (Ashton 2002). However, despite its apparent simplicity, this ideal often eludes us in practice. A large part of the reason for this lies in the diverse and often contradictory ways in which communities and countries strive to derive both individual and collective benefit from the use of water (Turton et al 2006). Management approaches too often have a short-term, local focus aimed at meeting objectives and solving problems today, rather than a far longer-term focus on the sustainable and equitable use of water resources on a regional or continental scale (FAO 2000; Ashton 2002).

Turton (2000) has argued convincingly that water is most unlikely to be the direct cause of a "war" over water in Africa. Nevertheless, there is a distinct possibility that increasing demands for water could contribute to regional instability if the demands approach the limits of the available supplies and the "competing" societies are unable to adapt appropriately to this situation (Ashton 2000, 2002). Clearly, where more than one country or an entire region is involved in a dispute, a wide array of coping strategies and mechanism can be deployed to resolve the problem. The presence of effective communication mechanisms and efficient institutional structures forms an extremely important component of all such strategies (Turton et al 2006).

If a country's demands for water outstrip its ability to manage water as a focus for cooperation and the achievement of common goals, there is a very real risk that it will enter an ever-tightening spiral of poverty, where social, economic and environmental consequences will threaten the fabric of society (Falkenmark 1989; Biswas 1993). In contrast, where an equitable balance can be attained between the demands made for the services and goods derived from the use of water, and effective custodianship of water resources, a far more harmonious and sustainable situation can be achieved (Turton et al 2006). However, to achieve this, all water-related policies and strategies must be guided by the values of sustainability, equity, mutual cooperation, and the attainment of optimal benefit for society (Asmal 1998; Ashton 2002).

Whilst water allocation and distribution priorities in each country need to be closely aligned with national and regional development objectives, greater emphasis now needs to be placed on concerted efforts to ensure that the continent's scarce water resources are used to derive the maximum long-term benefits for the peoples of Africa as a whole (Ashton and Haasbroek 2002; Turton et al 2006). However, achievement of this desirable goal requires water resource management to be judicious, cautious and collaborative. As a country's water supplies become scarcer, greater attention needs to be given to reallocating water from less productive sectors to those that are able to derive greater long-term economic returns per unit of water used (Ashton and Haasbroek 2002). Here, it is critically important to ensure that every community still has equitable access to the available water resources to meet their basic human needs. This aspect is particularly important in the case of Africa's shared river basins (Biswas 1993). Ideally, each country's water resource management strategies need to be closely aligned with that of its neighbours if peace and prosperity are to be maintained and conflict is to be avoided (Ashton 2002).

Neighbouring countries that share a single water resource need to answer four key questions (Ashton 2002), namely:

- How will the water resource be managed to ensure compliance with any agreement?
- What fraction or proportion of the water can be allocated for society's use without impairing the resource beyond unacceptable limits?

- How will the water requirements of rural and urban populations in each country be met equitably and timeously, within the constraints of national economies and international treaties?
- What constitutes a fair and equitable share of the water resource for each country?

Clearly, the countries concerned should not attempt to answer these questions in isolation from one another. Instead, the states sharing a river basin should first agree to form an appropriate, formal institutional structure that will take responsibility for the judicious management of the shared water resource (Lundqvist 2000). Several such institutional structures or river basin organizations already exist in Africa and elsewhere in the world. The formation of a suitable institutional structure should then be followed by agreement as to the most appropriate technical or investigative methods to use to answer the key questions, and, finally, agreement to abide by the results or findings produced.

One of the greatest obstacles that states sharing a river basin need to overcome is the formation of a suitable institutional structure, since this will formalize and legitimize the technical deliberations that take place (Turton 2000; Turton et al 2006). The question as to what fraction of the water can be allocated for society's use without jeopardizing or impairing the water resource will depend on the importance that each country attributes to the necessity to maintain essential ecosystem functions (SARDC 1994; Pallett 1997; Ashton 2002). This can be achieved by consensus-seeking approaches based on a thorough analysis of the structure, functioning and characteristics of the water resource and associated terrestrial systems in the catchment (Ashton 2000; Lundqvist 2000).

The final question as to what constitutes a fair and equitable share of the water resource, is often viewed as the most difficult one to answer. Clearly, the answer will depend on the relative degree of importance that the participating states attach to balancing the needs of their people for water, and the necessity to maintain essential ecosystem functions and services (Wolf 1999; FAO 2000). Unfortunately, the principle of "reasonable and equitable use" embodied in Article 5 of the United Nations Convention is vaguely worded, provides little guidance, and is prone to subjective interpretations (Van der Zaag et al 2000).

Essentially, each participating state needs to agree on the fraction of water to be reserved for ecosystem functions, and the criteria that should be used to calculate the "fair and equitable share" that each country is entitled to (Wolf 1999; Van der Zaag et al 2000). Preliminary evaluations have demonstrated that, if agreement can be reached on the precise nature of the criteria, then it is a relatively simple procedure to derive the respective shares of the available water (Van der Zaag et al 2000). This approach has an inherent simplicity that makes it attractive to decision-makers, though further development and testing are needed before it can be adopted.

Conclusions

The available evidence (e.g. Biswas 1993; Ashton 2002) suggests very strongly that water conflicts in Africa are inevitable unless appropriate and concerted preventive actions are taken. This assertion is underpinned by the continual increase in demands for water that a finite resource base cannot support indefinitely. Most of the preventive measures to avoid conflict centre on processes of joint decision-making, within suitable institutional and legislative frameworks. It is important to note that the possible options for conflict prevention are generic in nature, but these must be customized to make them site-specific, to suit the individual needs of the communities and countries involved (Turton et al 2006).

The issue of the scale of actual or potential conflict is important, as well as the specific circumstances that have given rise to the problem (Ashton 2000, 2002). The relatively smaller-

scale situations of water-related conflict consist mainly of intra-community and inter-community disputes over access to water, or to services associated with water. These disputes usually occur within a small geographical area and seldom escalate to involve communities from neighbouring countries (Turton 1999, 2000). Whilst these small-scale conflicts are very real to those involved, and can result in the death of individuals or their livestock, they are not considered to be true water wars in the widely accepted sense of a military conflict between two or more countries. Their smaller scale makes them more amenable to resolution by peaceful, negotiated means, and the resulting solutions tend to persist because each individual is involved in the resolution process (Ashton 2002).

It can be concluded that "true" water wars comprise only those extreme cases of water conflicts whose primary focus is to secure access to water or where water is the primary offensive weapon (Turton 2000; Ashton 2000). Despite the dire predictions of many authors, the available evidence has shown that it is highly unlikely that "true" water wars will ever occur in Africa. However, this should not be a reason for complacency, since every person shares the responsibility of ensuring that water wars never occur in Africa or elsewhere (Ashton 2002).

Similarly, every individual has a responsibility to promote the principles of equity and sustainability in all dealings with water users and water resource managers throughout Africa. New ways must be sought to convince water management institutions and authorities to focus their efforts on longer-term policies, plans and actions that will prevent water conflicts, rather than retaining a short-term focus and then trying to resolve conflicts after they have occurred (Turton et al 2006). Failure to achieve this is likely to result in an increased number of water-related disputes with the strong likelihood that their intensity may escalate progressively over time to intolerable levels of conflict between communities and, even worse, between countries.

References

Ashton PJ (2000). Southern African water conflicts: are they inevitable or preventable? In: *Water Wars: Enduring Myth or Impending Reality*, In: H Solomon and AR Turton (Eds), Africa Dialogue Monograph Series No. 2. The African Centre for the Constructive Resolution of Disputes (ACCORD), Durban, South Africa, pp. 62-105.

Ashton PJ (2002). Avoiding conflicts over Africa's water resources. Ambio, 31(3): 236-242.

Ashton PJ (in press). The role of good governance in sustainable development. Chapter 5, in: AR Turton, J Hattingh, GA Maree, DJ Roux, M Claassen and WF Strydom (Eds.) *Governance as a Trialogue: Government-Society-Science in Transition.* Berlin: Springer-Verlag. Pages 78-100.

Ashton PJ and Haasbroek B (2002). Water demand management and social adaptive capacity: A South African case study. In: AR Turton and R Henwood (Eds), Hydropolitics in the Developing World: A Southern African perspective. Pretoria: African Water Issues Research Unit (AWIRU) and International water Management Institute (IWMI).

Ashton PJ and Ramasar V (2002). Water and HIV/AIDS: Some strategic considerations for southern Africa. In: *Hydropolitics in the Developing World: A Southern African Perspective*, Turton, A.R. and Henwood, R. (Eds), Pretoria, African Water Issues Research Unit (AWIRU). Pp. 217-235.

Ashton PJ and Seetal A (2002). The challenges of water resource management in Africa. In: Baijnath H and Singh Y (Eds), *The Rebirth of Science in Africa*. Pretoria: Umdaus Press.

Ashton PJ and Turton AR (in press). Water and Security in Sub-Saharan Africa: Emerging Concepts and their Implications for Effective Water Resource Management in the Southern African Region. Chapter 55, in: HG Brauch, J Grin, C Mesjasz, NC Behera, B Chourou, UO Spring, PH Liotta and P Kameri-Mbote, (Eds), *Globalisation and Environmental Challenges – Volume II*. Berlin: Springer-Verlag.

Asmal K (1998). Water as a metaphor for governance: issues in the management of water resources in Africa. *Water Policy*, 1: 95-101.

Biswas AK (1993). *Management of International Water: Problems and Perspective*. UNESCO, Paris. 142 pp.

Business Report (1998). *"Ethiopia challenges Sudan, Egypt on use of Nile water"*. Business Report article, 1 September 1998.

Christie F and Hanlon J (2001). African Issues: Mozambique and the Great Flood of 2000. Bloomington: The International African Institute, Indiana University Press.

Conley AH (1995). A synoptic view of water resources in southern Africa. *Proceedings of the Conference of the Southern Africa Foundation for Economic Research on Integrated Development of Regional Water Resources*, Nyanga, Zimbabwe, 13-17 November 1995. 32pp.

Delli Priscoli J (1996). *Conflict Resolution, Collaboration and Management in International Water Resource Issues*. Alternative Dispute Resolution Series, Working Paper #6. Institute for Water Resources, U.S. Army Corps of Engineers, Washington DC. 48 pp.

Delli Priscoli J (1998). Water and civilization: Conflict, cooperation and the roots of a new eco-realism. *Proceedings of the Eighth Stockholm World Water Symposium*, 10-13 August 1998, Stockholm, Sweden. 17 pp.

Falkenmark M (1989). The massive water scarcity now threatening Africa: why isn't it being addressed? *Ambio*, 18(2): 112-118.

FAO (2000). *New Dimensions in Water Security – Water, Society and Ecosystem Services in the 21st Century*. FAO Report AGL/MISC/25/2000. Rome: Food and Agriculture Organization of the United Nations.

Gleick PH (1993). Water and conflict: fresh water resources and international security. *International Security*, 18(1): 84-117.

Gleick PH (1998). *The World's Water 1998-1999: Biennial Report on Freshwater Resources*. Island Press, Washington DC. 217 pp.

Hudson H (1996). Resource based conflict: water (in)security and its strategic implications. In: (H Solomon, Ed.), *Sink or Swim? Water, Resource Security and State Co-operation*. ISS Monograph Series No. 6, Institute for Security Studies, Halfway House, South Africa. Pp 3-16.

ICJ (1999). *International Court of Justice - Press Communiqué 99/53 - Kasikili/Sedudu Island (Botswana/Namibia)*. International Court of Justice, The Hague, Holland. 13 December 1999. 2 pp. [Also available at: http://www.icj-cij.org].

Kirmani SS (1990). Water, peace and conflict management: the experience of the Indus and Mekong basins. *Water International*, 15: 200-205.

Lundqvist J (2000). Rules and roles in water policy and management – need for clarification of rights and obligations. *Water International*, 25(2): 194-201.

Ohlsson L (1995). The role of water and the origins of conflict. In: (L. Ohlsson, Ed.), *Hydropolitics: Conflicts Over Water as a Development Constraint*. Zed Books, London. 236 pp.

Packenham T (1991). *The Scramble for Africa*. Doubleday Publishers, London.

Pallett J (1997). *Sharing Water In Southern Africa*. Desert Research Foundation of Namibia, Windhoek, Namibia. 121 pp.

Prescott JRV (1979). Africa's boundary problems. *Optima*, 28(1): 2-21.

Pretoria News (1998). *"Water could be cause of future conflict in SADC states"*. Pretoria News article, 18 November 1998.

SARDC (1996). *Water in Southern Africa*. Harare: Southern African Research and Documentation Centre.

Smakhtin V, Ashton PJ, Batchelor A, Meyer R, Maree JP, Murray R, Barta B, Bauer N, Terblanche D and Olivier J (2001). Unconventional water supply options in South Africa: Possible solutions or intractable problems? *Water International*, 26(3): 314-334.

Smith SE and M Al-Rawahy (1990). The Blue Nile: Potential for conflict and alternatives for meeting future demands. *Water International*, 15: 217-222.

Turton AR (1999). Water and conflict in an African context. *Conflict Trends*, 5: 24-27.

Turton AR (2000). Water wars in southern Africa: Challenging conventional wisdom. *Proceedings of the African Dialogue Lectures "Hydropolitical Hotspots in Southern Africa: Will There be a Water War?"*, University of Pretoria, 20 March 2000. 24 pp.

Turton AR (2002). Water and state sovereignty: The hydropolitical challenge for states in arid regions. In: AT Wolf (Ed.), *Conflict Prevention and Resolution in Water Systems*. Edward Elgar: Cheltenham.

Turton AR, Earle A, Malzbender D and Ashton PJ (2006). Hydropolitical vulnerability and resilience along Africa's international waters. Chapter 3, in: AT Wolf (Ed.), *Hydropolitical Resilience and Vulnerability along International Waters*. Nairobi: United Nations Environment Program. Report No. UNEP/DEWA. 58 pages.

Van der Zaag P, Seyam IM and Savenije HHG (2000). Towards objective criteria for the equitable sharing of international water resources. In: *Proceedings of the Fourth Biennial Congress of the African Division of the International Association of Hydraulic Research*. Windhoek: International Association of Hydraulic Research.

van Wyk JA (1998). Towards water security in southern Africa. *African Security Review*, 7(2): 59-68.

Wolf AT (1996). *Middle East Water Conflicts and Directions for Conflict Resolution*. 2020 Brief No. 31, April 1996. (http://www.cgiar.org/ifpri/2020/briefs/number31.htm). 4 pp.