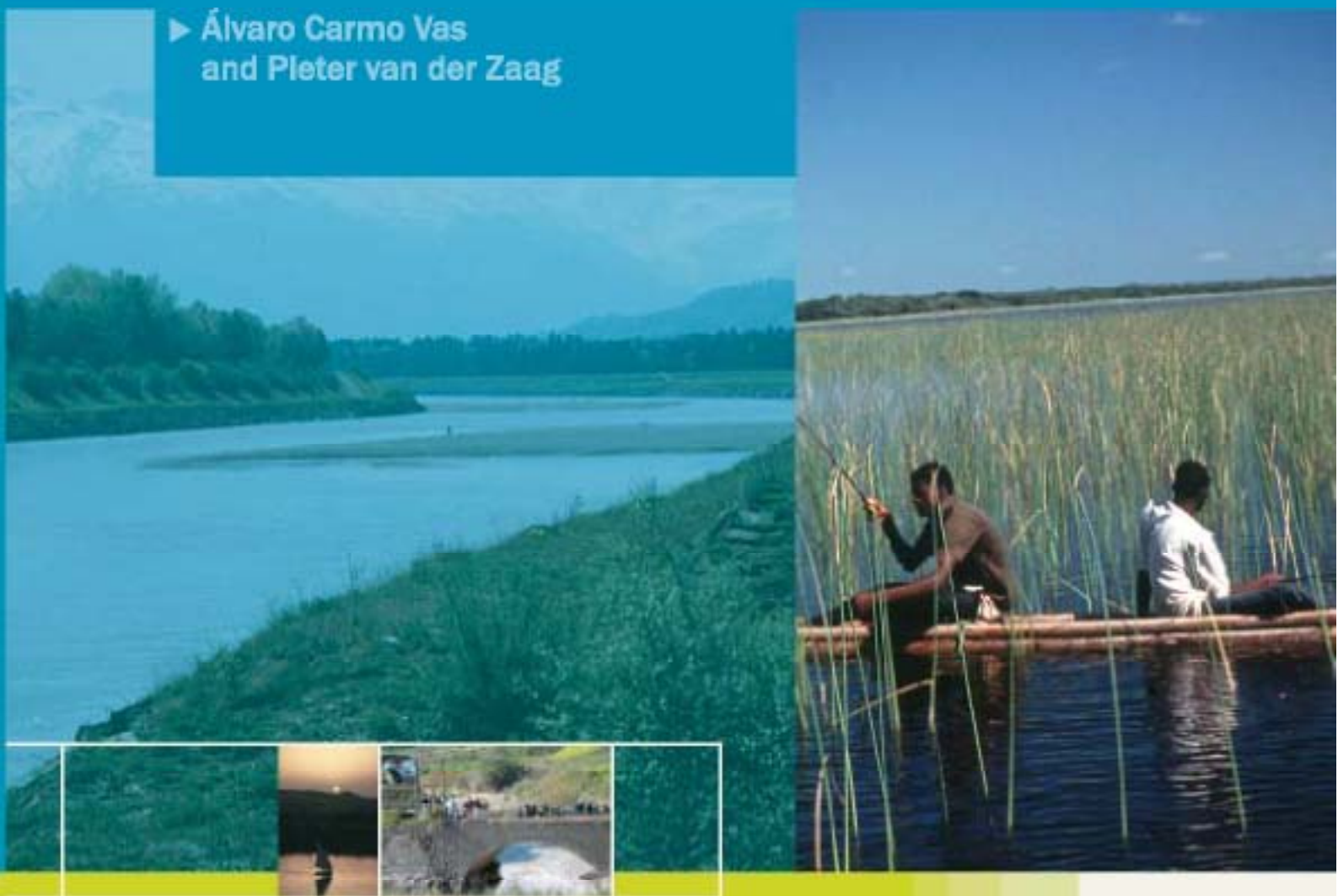


Sharing the Incomati Waters: Cooperation and Competition in the Balance

► Álvaro Carmo Vas
and Pieter van der Zaag



PCCP Publications 2001-2003

1. Frederick M. Lorenz, *The protection of water facilities under international law*, UNESCO-IHP, 46 p.
2. Sergei Vinogradov, Patricia Wouters and Patricia Jones, *Transforming potential conflict into cooperation potential: The role of international water law*, UNESCO-IHP, 106 p.
3. Stefano Burchi and Melvin Spreij, *Institutions for international freshwater management*, UNESCO-IHP, 51 p.
4. K.D.W. Nandalal and Slobodan P. Simonovic, *State-of-the-art report on systems analysis methods for resolution of conflicts in water resources management*, UNESCO-IHP, 127 p.
5. Ali M. Vali, Sree N. Sreenath and Gundo Susiarjo, *An educational tool to examine the development constraints in the Limpopo river basin*, UNESCO-IHP, 50 p.
6. Fekri A. Hassan, Martin Reuss, Julie Trotter, Christoph Bernhardt, Aaron T. Wolf, Jennifer Mohamed-Katerere and Pieter van der Zaag, *History and future of shared water resources*, UNESCO-IHP, 150 p.
7. Yona Shamir, *Alternative dispute resolution approaches and their application*, UNESCO-IHP, 43 p.
8. Branko Bošnjakovic, *Negotiations in the context of international water-related agreements*, UNESCO-IHP, 50 p.
9. Philippe Barret, Alfonso Gonzalez avec les contributions de Yannick Barret et Céline Olivier, *Société civile et résolution des conflits hydriques*, UNESCO-IHP, 78 p.
10. Ti Le-Huu and Lien Nguyen-Duc in cooperation with Apichart Anukulamphai, Do Hong Phan, Khammone Ponekao, Pech Sokhem and Zhang Hai-Lun, *Mekong Case Study*, UNESCO-IHP, 56 p.
11. Viktor Dukhovny and Vadim Sokolov, *Lessons on cooperation building to manage water conflicts in the Aral sea basin*, UNESCO-IHP, 50 p.
12. Keith W. Muckleston, *International management in the Columbia river system*, UNESCO-IHP, 47 p.
13. Peter Nachtebel, *Donube case study*, UNESCO-IHP (to be published)
14. Álvaro Carmo Vaz and Pieter van der Zaag, *Sharing the Incomati Waters: Cooperation and competition in the balance*, UNESCO-IHP, 102 p.
15. Munther J. Haddadin and Uri Shamir, *Jordan case study*, UNESCO-IHP, 41 p.
16. Alan Nicol, *The Nile: Moving beyond cooperation*, UNESCO-IHP, 33 p.
17. Ine D. Frijters and Jan Leentvaar, *Rhine case study*, UNESCO-IHP, 33 p.
18. Raúl Artiga, *The case of the Trifinio plan in the Upper Lempa: Opportunities and challenges for the shared management of Central American transnational basins*, UNESCO-IHP, 13 p.
19. Eric Mostert, *Conflict and co-operation in the management of international freshwater resources: A global review*, UNESCO-IHP, 63 p.
20. Aaron T. Wolf, Shira B. Yoffe and Mark Giordano, *International waters: indicators for identifying basins at risk*, UNESCO-IHP, 30 p.
21. Pal Tamas, *Water resource scarcity and conflict: Review of applicable indicators and systems of reference*, UNESCO-IHP, 29 p.
22. Jerome Delli Priscoli, *Participation, consensus building and conflict management training course*, UNESCO-IHP, 179 p.
23. WaterNet, CCR, ISRI, Catalic, UNESCO-IHE Delft, UZ, *Basics of water resources -Course book*, UNESCO-IHP, 97 p.
24. WaterNet, ISRI, Catalic, UNESCO-IHE Delft, ZU, *Basics of water resources -Reader*, UNESCO-IHP, 66 p.
25. WaterNet, ISRI, Catalic, UNESCO-IHE Delft, ZU, *Conflict prevention and cooperation in international water resources - Course book*, UNESCO-IHP, 269 p.
26. WaterNet, ISRI, Catalic, UNESCO-IHE Delft, ZU, *Conflict prevention and cooperation in international water resources - Reader*, UNESCO-IHP, 211 p.
27. WaterNet, ISRI, Catalic, UNESCO-IHE Delft, ZU, *Conflict prevention and cooperation in international water resources - Hand outs*, UNESCO-IHP, 84 p.
28. WaterNet, CCR, ISRI, Catalic, UNESCO-IHE Delft, UZ, *Advanced mediation skills - Course book*, UNESCO-IHP, 83 p.
29. William J. Cosgrove (compiled by), *Water security and peace: A synthesis of studies prepared under the PCCP - Water for Peace process*, UNESCO-IHP, 108 p.
30. *A summary of PC->CP publications 2001-2003*, UNESCO-IHP, 34 p.
31. Janos Bogardi and Saskia Castelein (eds.), *Selected papers of the International Conference From Conflict to Co-operation in International Water Resources Management: Challenges and Opportunities*, UNESCO-IHE Delft, The Netherlands, 20-22 November 2002, UNESCO-IHP, 600 p.



SHARING THE INCOMATI WATERS

Cooperation and Competition in the Balance

Álvaro Carmo Vaz

Universidade Eduardo Mondlane, Maputo, Mozambique

and

Pieter van der Zaag

UNESCO-IHE Institute for Water Education, The Netherlands and University of Zimbabwe, Harare, Zimbabwe

The designations employed and the presentation of material throughout this publication do not imply the expression of any opinion whatsoever on the part of UNESCO concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.

The authors are responsible for the choice and the presentation of the facts contained in this book and for the opinions expressed therein, which are not necessarily those of UNESCO and do not commit the Organization.

ACKNOWLEDGMENTS

This case study is a contribution from UNESCO's International Hydrological Programme to the World Water Assessment Programme. It was prepared within the framework of the joint UNESCO–Green Cross International project entitled "From Potential Conflict to Cooperation Potential (PCCP): Water for Peace," and was made possible by the generous financial assistance of the Japanese government.

The study could not have been written without using and quoting extensively from the many data and analyses presented in the recently concluded Joint Inkomati Basin Study (JIBS). We gratefully acknowledge support and comments received from individual TPTC members (present and past), including Sidney Dhlamini, Dumsane Mndzebele, Raphael Sangweni, and Gebre Libsekal (Swaziland), Mike Muller, Peter Niekerk, Niel Van Wyk, and Theo Van Robbroeck (South Africa), Francisco Álvaro and Suzana Saranga (Mozambique). We hope to have done justice to their important insights.

We are indebted to the following experts who contributed data or shared analyses in critical areas: Sakhiwe Nkomo (Swaziland), Tendani Nditwani, Kelatwang Sebueng, Claus Triebel, and Mike Warren (South Africa), Patrício José and Dinis Juizo (Mozambique), and Hubert Savenije and Ismael Seyam at IHE Delft (the Netherlands). We thank António Sopa (Mozambique) for providing the empirical material and analysis of Section 4 on the political history of the basin. Dr Jens Andersson drew the figures.

We thank Janos Bogardi and Léna Salamé of UNESCO for launching this initiative and inspiring us during the study, and Bill Cosgrove for reviewing an early draft.

Despite all the assistance and support we received, we take responsibility for any factual errors and errors of judgment we may have made.

CONTENTS

	Summary	1
1.	Introduction	2
2.	Natural Characteristics	4
2.1.	Physical Geography and Geology of the Incomati Basin	4
2.2.	Climate	4
2.3.	Hydrology	5
2.4.	Natural Flora and Fauna Dependent on Water Resources	6
2.4.1.	Flora	7
2.4.2.	Fauna	7
2.4.3.	Conservation Status	7
2.4.4.	The Estuary	8
3.	A Political-Historical Overview	9
3.1.	Prior to 1948: The Colonial Experience	9
3.2.	The Period 1948–74: Economic Development	10
3.3.	The Period 1975–94: Political Turmoil and Peace	11
3.4.	The Period 1995–2002: Liberalization and Regional Integration	12
4.	Socioeconomic Developments and Water Use	15
4.1.	Economic Developments in the Basin: The Case of Sugar	15
4.1.1.	Sugar Production in South Africa	15
4.1.2.	Sugar Production in Mozambique	16
4.1.3.	Sugar Production in Swaziland	16
4.1.4.	Reaping the Benefits	16
4.2.	Dam Development	17
4.3.	Consumptive Water Uses in the Basin	18
4.3.1.	Domestic and Municipal Water Use	19
4.3.2.	Industry	19
4.3.3.	Livestock and Game	20
4.3.4.	Rain-fed Agriculture	20
4.3.5.	Exotic Tree Plantations (Afforestation)	20
4.3.6.	Irrigation	21
4.3.7.	Water Transfers	21
4.3.8.	Other Water Uses	22
4.4.	Recent Trends	22
5.	Legal and Institutional Framework	24
5.	Legal and Institutional Framework	25
5.1.	National Legislation and Institutional Set-up	25
5.2.	Relevant Bilateral and Trilateral Agreements Concerning the Incomati Basin up to 1999	25
5.2.1.	Agreement in Regard to Rivers of Mutual Interest of 1964	27
5.2.2.	Agreement Relative to the Establishment of a Tripartite Permanent Technical Committee	27
5.2.3.	Agreement reached at the Tripartite Ministerial Meeting of February 15 1991	27
5.2.4.	Joint Inkomati Basin Study (JIBS)	28
5.2.5.	Treaty on the Development and Utilization of the Water Resources of the Komati River Basin and Treaty on the Establishment and Functioning of the Joint Water Commission	28
5.2.6.	Bilateral Agreement Between Mozambique and South Africa	28
5.2.7.	Bilateral Agreement Between Swaziland and Mozambique	29
5.3.	Relevant Transboundary Legal Conventions	29

5.3.1.	Towards the SADC Protocol	29
5.3.2.	The SADC Protocol on Shared Watercourses (2000)	30
5.4.	The Tripartite Interim Agreement of 2002	32
5.4.1.	Tripartite Interim Agreement for Cooperation on the Protection and Sustainable Utilization of the Water Resources of the Incomati and Maputo Watercourses, August 29 2002	32
6.	Water-Related Conflict and Cooperation: 1967–2002	35
6.1.	The Situation in the 1960s and 1970s: The First Dams and Formal Contacts	35
6.1.1.	The Period up to 1972	35
6.1.2.	The Period 1972–81	35
6.2.	The Situation in the 1980s: Tensions in the Basin	37
6.2.1.	The Period 1982–4	37
6.2.2.	The Period 1985–91	38
6.3.	The Situation in the 1990s: Peace, Protocols, and Bilateral Projects	40
6.3.1.	The Period 1991–7	40
6.3.2.	The Bilateral Komati Development Project	41
6.3.3.	Developments on the Incomati, 1996–8	41
6.3.4.	The SADC–EU Conference: May 1997	42
6.4.	The Situation since 1999: Towards a New Agreement	43
6.4.1.	The Year 1999: a Turning Point?	43
6.4.2.	The Floods of February 2000	44
6.4.3.	The Joint Incomati Basin Study (JIBS), 2001	44
6.4.4.	Towards an Interim Agreement: 2000–2	45
6.4.5.	A Preliminary Analysis of the Interim Agreement of 2002	46
7.	From Competition to Cooperation: a Conclusion	48
7.1.	Socio-Politics at the Level of the Nation-States	48
7.2.	Can More Water Be Squeezed out of the Incomati?	49
7.3.	The Role of Interest Groups and Stakeholder Participation	50
7.4.	Negotiating a Water Sharing Agreement: Some Practical Lessons	51
7.4.1.	Widening the Scope of Negotiations to the Entire Basin	51
7.4.2.	Broadening the Scope of Negotiations to Include Other Issues	51
7.4.3.	Structuring the Negotiations: A Phased Approach	51
7.4.4.	The Unique Role of the Downstream Country	52
7.4.5.	Technical Negotiations may Continue when Politics Fail	52
7.4.6.	The Need for Capacity Building	52
7.5.	From Conflict to Cooperation	52
	Notes	53
	Bibliography	55
Annex 1:	Agreement between the Government of the Republic of South Africa, the Government of the Kingdom of Swaziland and the Government of the People's Republic of Mozambique Relative to the Establishment of a Tripartite Permanent Technical Committee. Signed at Pretoria, February 17 1983	57

Annex 2:	Tripartite Interim Agreement between the Republic of Mozambique and the Republic of South Africa and the Kingdom of Swaziland for Cooperation on the Protection and Sustainable Utilization of the Water Resources of the Incomati and Maputo Watercourses	59
Annex 3:	Revised Protocol on Shared Watercourses in the Southern African Development Community (SADC)	79
Annex 4:	Timetable of Developments in the Incomati River Basin 1962–2002	90
	Annex Notes	102

SHARING THE INCOMATI WATERS

This case study deals with the Incomati river basin, which is relatively small but has some interesting features, both in terms of socio-political developments and water use. The basin is situated in a part of Africa that over the last forty years has experienced a dynamic, sometimes turbulent and volatile, political history. Water use is intense, with at least 50 percent of the water generated in the basin being withdrawn, in a context of recurring droughts sometimes alternated by dramatic floods. These factors might have led to confrontations over water between the three countries sharing the basin, namely Mozambique, South Africa and Swaziland, yet these did not materialise. The central question raised is: why did cooperation prevail? To answer it, the case study presents information about the natural characteristics of the basin, its political history, water developments, the legal framework, and the negotiations that took place during the period 1964–2002.

It is concluded that cooperation prevailed, first, because there is an apparent pressure on neighbouring countries to behave as good neighbours, even when political ideologies diverge. This is possibly linked to the fact that such countries comprise people who share a common space and a common history. Furthermore, there are outside pressures on nation-states to act responsibly, and to honour regional and international conventions. A second cause relates to the particular political developments in both Mozambique and South Africa. Just when the need for an agreement was highest, the cold relations between the two countries started to thaw, allowing an important agreement to be reached in 1991. Third, there was a third riparian country whose role as broker was accepted by the other two due to its particular political and hydrological position vis-à-vis them. Finally, potential conflicts were evaded by allowing more water to be abstracted and more dams to be built.

The negotiations so far can therefore be considered non-zero sum games. However, as the Incomati basin fast approaches closure this situation is bound to change. Water sharing will increasingly be a delicate balancing act between cooperation and competition.

The hypothesis that water drives peoples and countries towards cooperation is supported by the developments in the Incomati basin. Increased water use has indeed led to rising cooperation. When the next drought comes and Mozambique, South Africa, and Swaziland enforce the new agreement of 2002 and voluntarily decrease those water uses deemed less essential, then the hypothesis will have to be accepted.

1. INTRODUCTION

The Incomati river basin is situated in the southeastern corner of the African continent (see Figure 1).¹ The basin is shared between South Africa, Swaziland, and Mozambique, and discharges in Maputo Bay in the Indian Ocean. Two adjacent basins, the Umbeluzi and Maputo basins, also discharge in Maputo Bay, and are also shared by the three countries.² In fact, the three basins cover the entire territory of Swaziland (see Figure 2).

The Incomati basin is small compared to some other international rivers. Yet its history of water sharing commands attention for two main reasons:

- a. Water use is intense, with 50 percent of the water generated in the basin being withdrawn. Water scarcity has been evident since the mid-1980s, and has become more severe in the last decade. Competition over water is real, and water abstractions are fast approaching the limits of sustainability. The effects of droughts, but also floods, become ever more pronounced.
- b. The basin is situated in a part of Africa that over the last forty years has experienced a dynamic, sometimes turbulent and volatile, political history. The basin has seen a change from colonial rule to independent one-party states and subsequently a transition to democratic rule as well as the end of the apartheid regime. These changes were frequently accompanied by violent interventions.

Either ingredient might have been sufficient for the emergence of confrontations over water. Yet these did not occur. Tensions between Mozambique, South Africa, and Swaziland over Incomati waters existed but never escalated. This is the major interest of the case of the Incomati: the tensions translated into agreements and deepened the level of cooperation between the riparian countries. This is not to say that the road towards cooperation was easy and self-evident. It was a difficult and often frustrating process. But the realization by the three riparian countries that they shared a common space, a common though checkered, history, and hopefully a common future may explain their deep-seated commitment to proceed with seeking negotiated arrangements over the water resources of the Incomati. The new water sharing agreement, signed by the three water ministers during the World Summit on Sustainable Development in Johannesburg in August 2002, demonstrates this.

This case study attempts to find an answer to the following question: Why did open conflict not emerge between the riparian countries over the water resources of the Incomati, and why did cooperation prevail?

In order to answer this question, the case study presents, in separate sections, information about the natural characteristics of the basin, its political history, socioeconomic developments, and the existing legal and institutional framework. A subsequent section provides detailed empirical information about the negotiations that took place during the period 1967–2002. The concluding section attempts to answer the central question raised.

The Incomati case shows that water can indeed drive peoples and countries towards cooperation. Increased water use has led to intensified cooperation. However, as the Incomati basin approaches closure, water sharing will increasingly be a delicate balancing act between cooperation and competition.

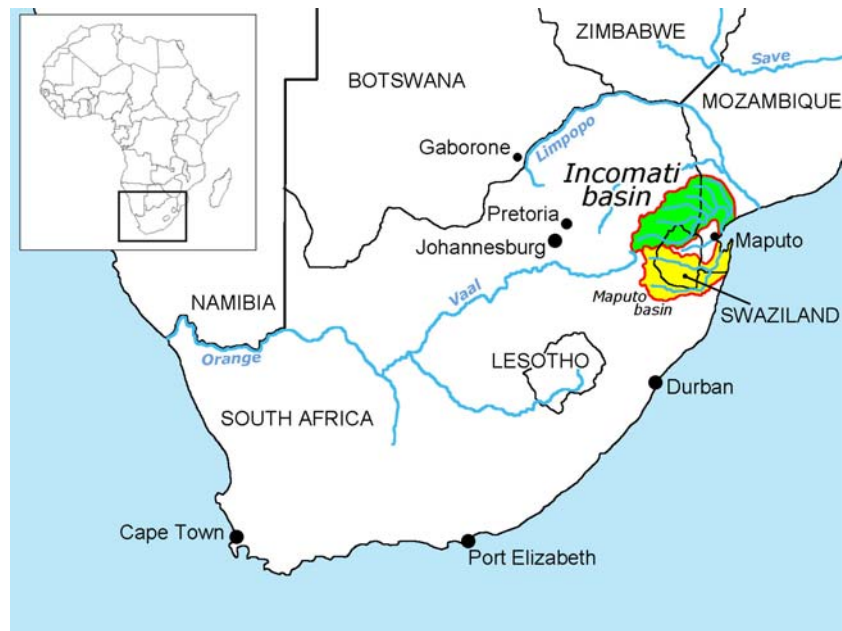


Figure 1. The Incomati basin in Southern Africa

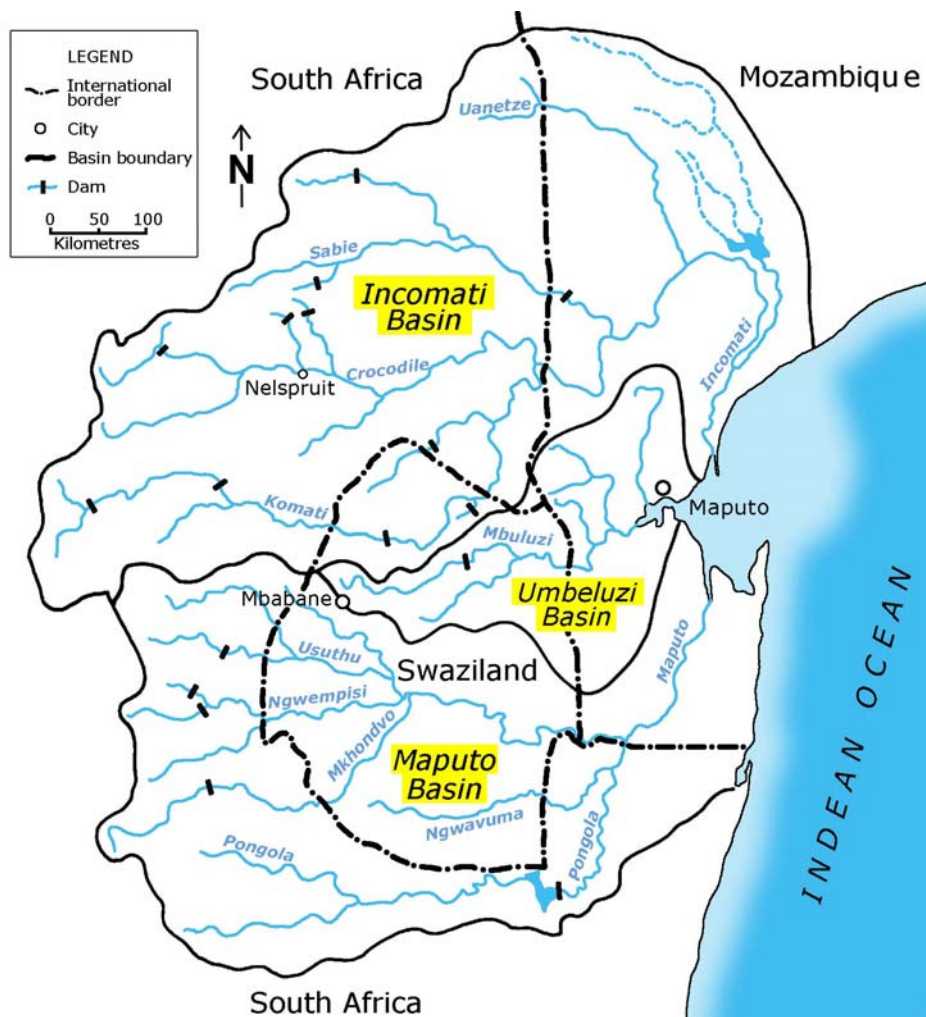


Figure 2. The Incomati, Umbeluzi, and Maputo basins, discharging in Maputo Bay

2. NATURAL CHARACTERISTICS

2.1. Physical Geography and Geology of the Incomati Basin

The Incomati river basin is located in the southeastern part of the African continent and covers a land area of about 46,700 Mm². It occupies 2,500 Mm² of the Kingdom of Swaziland, 15,600 Mm² of the Republic of Mozambique, and 28,600 Mm² of the Republic of South Africa (see Figure 3).

The Incomati river basin rises in the mountains and plateau (2,000 meters above sea level) in the west of the basin and drops to the homogeneous flat coastal plain to the east of the Lebombo mountains at elevations below 150 m. Five of the six main rivers in the basin originate in the plateau area, namely the Komati, Crocodile, Sabie, Massintonto, and Uanetze.

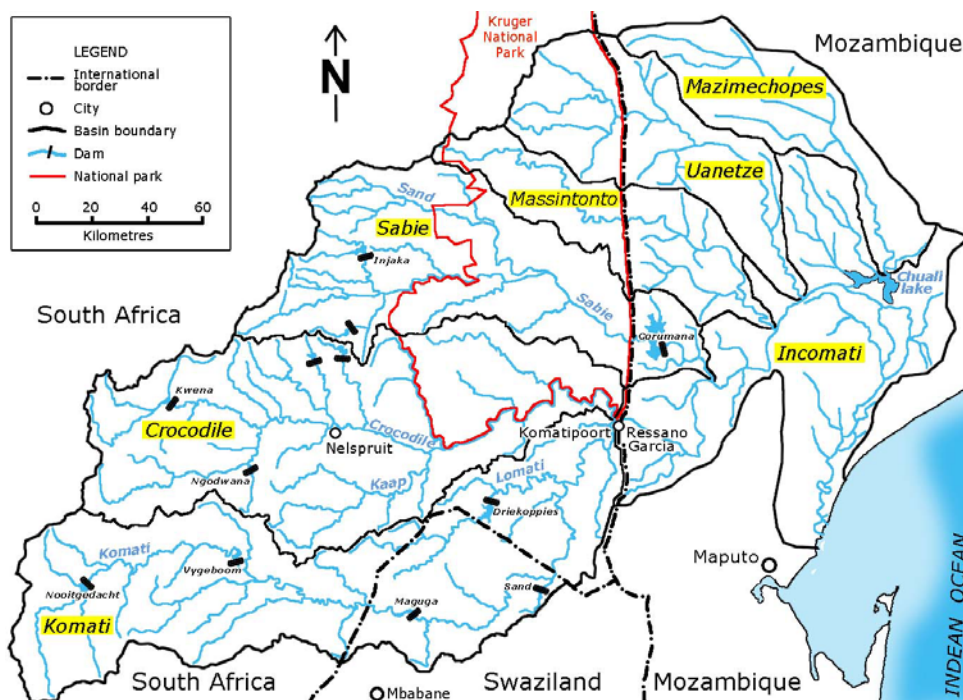


Figure 3. The Incomati basin and its catchment areas

The geology of the basin is characterized by sedimentary, volcanic, granitic, and dolomitic rocks, and quaternary and recent deposits. There are occurrences of various minerals but only coal, asbestos, and gold are mined. The basin is characterized by a wide variety of natural vegetation types. These vary between beaches and recent dunes, tropical bush and forest, and different types of savannah and grassveld.

2.2. Climate

The general climate in the Incomati river basin varies from a warm to hot humid climate in the Mozambique Coastal Plain and the Lowveld to a cooler dry climate in the Transvaal Plateau and South African Highveld in the west. The entire Incomati river basin lies within the summer (October–March) rainfall region, with a mean annual precipitation of about 740 mm/a, which generally increases from east to west (see Figure 4). The highest precipitation occurs in the upper Sabie (around 1,200 mm/a). The mean annual potential evaporation for the basin as a whole is about 1,900 mm/a, which generally decreases from east to west. Consequently, the deficit between

rainfall and potential evaporation increases from west to east, irrigation becoming more important for crop production towards the east. Winds over the entire Incomati river basin are generally light, with occasional gales before and during thunderstorms. The low lands are prone to tropical cyclonic storms.

Climatic cyclicity between dry and wet periods (an eighteen-year cycle) has been identified for the Lowveld region, and has been linked to the influence of El Niño on the region. This is reflected in the flow pattern of the Sabie River (Jewitt et al., n.d.).

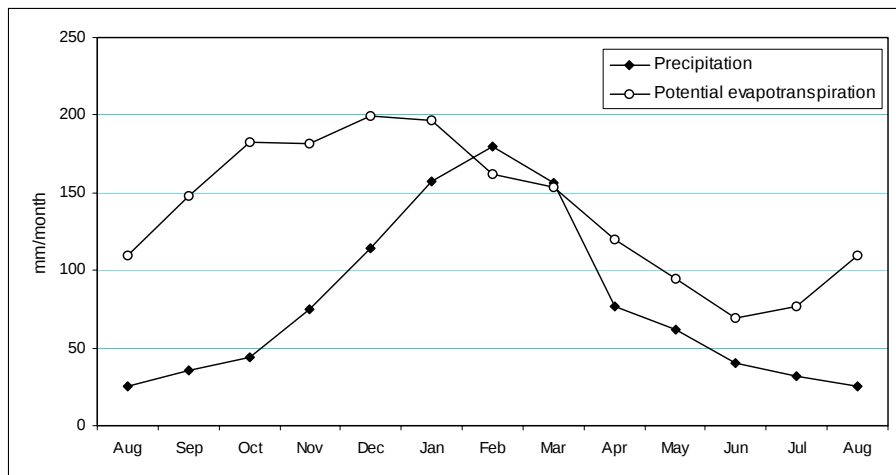


Figure 4. Average precipitation and potential evapotranspiration, Macia, Mozambique

Source: data from Van der Zaag, 1984.

2.3. Hydrology

The Joint Inkomati Basin Study (JIBS) conducted thorough investigations to quantify the surface and groundwater resources of the Incomati. JIBS estimated the net virgin runoff of the Incomati river basin at 3,587 Mm³/a (see Tables 1 and 2). In the year 2002 the estimated total consumptive water use was about 1,800 Mm³/a, including consumptive use of exotic forest plantations. Total consumptive water use therefore represents 50 percent of the virgin runoff (see Chapter 4). This level of commitment is high, and frequently leads to water shortages, given the high variability of flow, both within and between years (see Figures 5 and 6).

Within the hydrological year (October–September), some 80 percent of all runoff occurs during the months November–April. Variations of discharge from year to year are significant, with a coefficient of variation of around 50 to 65 percent. Floods occur, as well as droughts. During the four-year period starting in October 1991, average annual runoff at Ressano Garcia was only 12 percent of the long-term average measured over 1952–79. During the floods of February 2000, the Sabie River at Skukuza (catchment area 2,500 Mm²) had a peak discharge of 3,500m³/s (Smithers et al., 2001).

Storm floods take with them soil particles, causing erosion. JIBS (2001) estimated that an average of 150 t/km²/a of soil is carried with the water annually, occasionally increasing to 450 t/km²/a. Surface water quality is generally adequate for the purpose of domestic and urban use after normal treatment. It is also suitable for irrigation.

Groundwater occurs in sufficient quantities for large-scale development only in the dolomites of the Transvaal Sequence, the Barberton Greenstone Belt, the alluvium of the Incomati river valley in the Mozambique coastal plain (with an estimated rate of

recharge of about 150 Mm³/a), and in the Aeolian sands in the east of the Mozambique coastal plain (recharge is about 29 Mm³/a).

Table 1. Water generation in the Incomati basin, by catchment

<i>Catchment</i>	<i>Catchment area</i>	<i>Virgin discharge</i>	
	<i>Mm²</i>	<i>Mm³/a</i>	<i>Mm/a</i>
Komati	11 209	1 420	127
Crocodile	10 468	1 226	117
Sabie	7 048	750	106
Massintonto	3 429	22	6
Uanetze	3 932	14	4
Mazimechopes	3 970	21	5
Incomati	6 692	134	20
Total	46 748	3 587	77

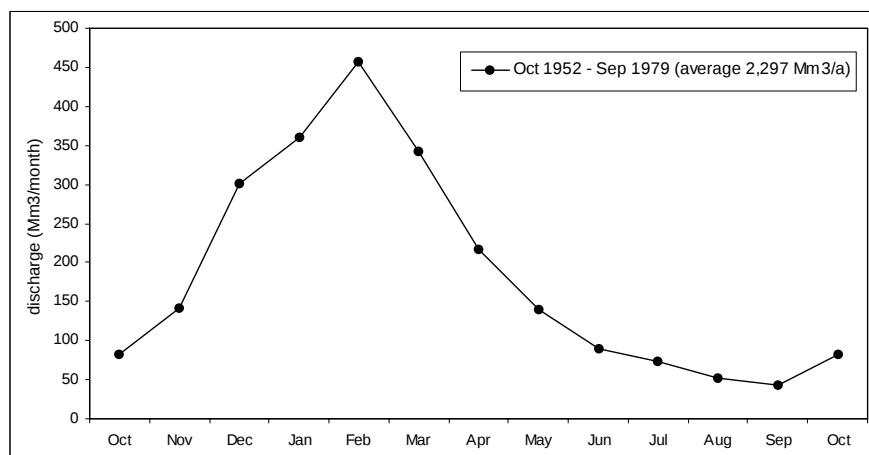
Source: JIBS, 2001.

Table 2. Water generation in the Incomati basin, by country

<i>Country</i>	<i>Catchment area</i>		<i>Virgin discharge</i>	
	<i>Mm²</i>	<i>%</i>	<i>Mm³/a</i>	<i>%</i>
South Africa	28 556	61	2 937	82
Swaziland	2 545	5	479	13
Mozambique	15 647	33	171	5
Total	46 748	100	3 587	100

Source: JIBS, 2001.

Figure 5. Average monthly discharge at Ressano Garcia (station E23), 1953–79



2.4. Natural Flora and Fauna Dependent on Water Resources

The Incomati provides habitats for a rich variety of species, including those classified as threatened. Some species provide essential economic and social services, including those to the poor. The basin provides refuge to at least forty threatened bird species, eleven threatened terrestrial mammal species, twelve threatened fish species, and eight threatened reptile and amphibian species, which are all wholly or partly

dependent on water and/or riverine vegetation. In addition to these, about 104 threatened plant species are found in the basin.

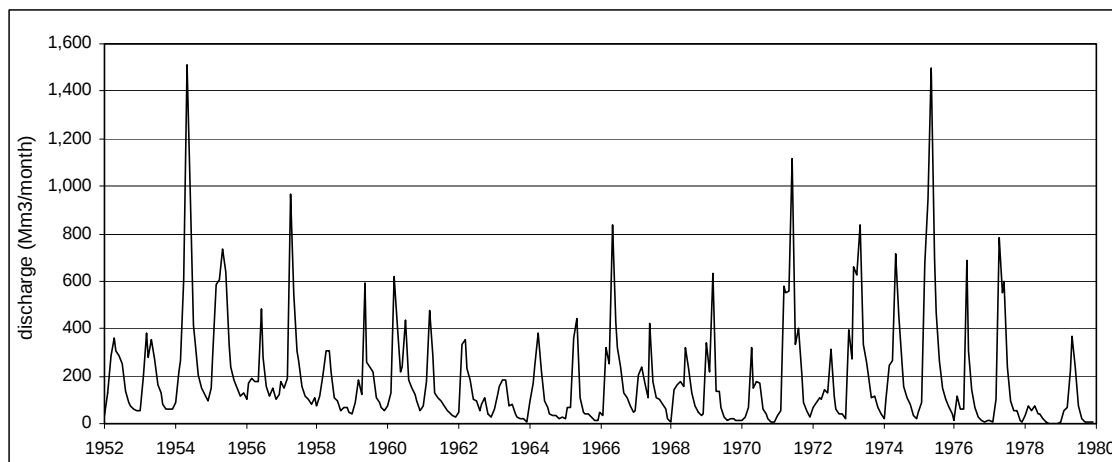


Figure 6. Monthly discharge at Ressano Garcia (station E23) 1952–80

2.4.1. Flora

Cycads (*Encephalartos* spp.) are vulnerable to disturbance, and of the twenty-eight *Encephalartos* species listed as either endangered, rare, or vulnerable, six species occur in the Incomati river basin, of which five species are endemic. *Aloe thorncroftii* occurs in the Barberton area. Endangered orchids such as *Ansellia giganta* (Pakama in Changané) occur in sand forests in Mozambique. *Raphia australis* is an endangered palm naturally occurring only along valleys of small rivers in southern Mozambique and Kosi Bay (in Natal).

2.4.2. Fauna

There is an abundance of bird life in the Incomati river basin, because of the occurrence of a wide variety of natural habitats, such as grasslands, bushveld with mixed tree types (broad-leaved and thorny species), coastal bush, evergreen forest (including riverine forest), and aquatic habitats. Well over 500 bird species have been recorded in the Incomati river basin, of which seventy-three species are listed as threatened in South Africa. Among the endangered bird species occurring in the basin are the Wattled Crane, the Blackrumped Buttonquail, the Blue Swallow, the Egyptian Vulture, and the Yellowbilled Oxpecker. Endangered terrestrial mammals occurring in the Incomati basin include the *Hippotragus equines* (roan antelope) and the *Lycaon pictus* (wild dog). Numerous rare reptiles, amphibians, and butterflies also occur.

2.4.3. Conservation Status

There are many areas of particular conservation importance within the basin. The most famous is the Kruger National Park, part of the recently proclaimed Great Limpopo Transfrontier Park. The conservation status of the main rivers in South Africa has been described as modified but primarily natural. The exceptions are the completely altered areas along the middle Crocodile River, the lower Komati and Lomati rivers, and some tributaries of the Sabie River. In Swaziland the conservation status of the rivers is considered close to natural for most stretches. In Mozambique, the flow regime of the main stem of the Incomati has been altered significantly because of upstream abstractions.

The most important anthropogenic changes in the river environment are caused by dams and reservoirs, water abstractions from these, and interbasin transfers. Section 4 provides details of dams and transfers that have modified the natural system. The resulting modified river flow regime affects structural and functional attributes of the biotic communities.

2.4.4. *The Estuary*

The Incomati estuary is an important sanctuary for breeding colonies of aquatic birds and provides water and other ecological services to local populations. The estuary also plays a major role in the lifecycles of the economically important shrimp, finfish, and shellfish species. It is the second most important area of shrimp production in Mozambique.

The estuary has an extensive mangrove forest covering approximately 5,000 ha around the mouth area that influences the health of the coastal zone and adjacent marine habitats and protects the coast from erosion provoked by the prevailing easterly winds. The positive relationship between mangrove areas and production of valuable fish and prawns is well documented. A number of commercially important fish, shrimp, crab, and mollusk species use mangroves as nursery grounds (for feeding and shelter) during the juvenile and adult stages of their development. Six species of mangrove occur in the estuary. Mangroves at the estuary have suffered anthropogenic impact and large areas are being harvested for construction, charcoal production, and firewood.

The direct effect of freshwater in an estuary is to reduce the water salinity and increase nutrient supply (from sediment deposition) for the primary productivity of the estuarine ecosystems, namely mangroves and reed beds. Upstream abstractions have reduced freshwater flows into the estuary and changed the flow regime. This may negatively affect the estuarine ecosystem and consequently the shrimp and fish production in Maputo Bay.³

3. A POLITICAL-HISTORICAL OVERVIEW

3.1. Prior to 1948: The Colonial Experience

The Incomati basin is not only a system of watercourses that are interconnected; the basin also encompasses a space that is of significance in terms of culture, history, politics, and economy, comprising parts of southern Mozambique, northern Swaziland, and eastern South Africa, as well as Maputo Bay (formerly known as Delagoa Bay) in the Indian Ocean.

According to Newitt (1995) the bay has deeply influenced early developments in southeastern Africa, as people settled round its shores and along its rivers. Its people engaged in activities such as fishing, hunting whales, trading ivory, and maintaining an economy of cattle keeping and agriculture. The influence of the bay stretched across the Lebombo mountains to the interior, for instance through the trade of copper. The first Europeans to arrive were the Portuguese, who for some 200 years focused on the ivory trade. Most ivory had to be brought from considerable distances, and deepened and expanded the long-distance commercial networks to the hinterland (Newitt, 1995).

In 1721, a Dutch expedition build a fort in what was to become the city of Lourenço Marques, now the city of Maputo. Fifty-seven years later an Austrian settlement was created, and after 200 years of contact the Portuguese established their first permanent trading station there in 1781. Towards the end of the eighteenth century the bay was a hive of activity, with the British having established a post at the southern shores of the Bay. The city of Lourenço Marques was, however, founded only in 1790. In the nineteenth century, it became "the major trading port for the Swazi and Zulus, for the Tsonga chieftainships to the north and, after the Great Trek, for the Transvaal Boers as well" (Newitt, 1995, p. 293). The Boers first settled in the former Transvaal (now Mpumalanga) in the late 1830s.

By the 1850s, however, a hunting and slaving frontier community, barely controlled by the Republican government, had established itself in the Zoutpansberg and begun to form links with the Portuguese traders and ivory hunters from Inhambane and Lourenço Marques. . . . For two decades the region north-west of the Bay saw a mixed community of Boer and Afro-Portuguese traders and elephant hunters, cooperating to a greater or lesser extent with local chiefs . . . in developing a trade in ivory, slaves and cattle which made use of the Portuguese ports.

(Newitt, 1995, p. 327).

Both Britain and the Transvaal Boers claimed Delagoa Bay (in 1861 and 1868, respectively). Portugal protested, and in 1869 the Boers and the Portuguese signed a treaty that recognized Portugal's possession of the Bay, drew the eastern frontier of Transvaal along the ridge of the Lebombo Mountains, and agreed to build a road linking the highveld and the port. In 1875 Britain recognized Portuguese control over the Bay.

The discovery of important minerals in the Transvaal area during the second half of the nineteenth century reinforced the emerging regional economy. The enormous mine developments required an intensive support network in terms of transport, communication, agriculture, trade, and labor. Lourenço Marques with its harbor was strategically positioned. The construction of a railway connecting the city to Johannesburg, and passing through Ressano Garcia where the Komati and Crocodile rivers join to form the Incomati, was completed in 1895 (Libby, 1987).

Labor movement intensified after 1850, when migrant workers from southern Mozambique traveled via Johannesburg to Durban to work in the sugar industry. The discovery of diamonds in Kimberley in 1869 and gold in the Rand area (Gauteng) and near Barberton in 1886 further intensified this traffic of human labor (Nyathi, 1977).

From the middle of the nineteenth century the economy of southern Mozambique was thus dominated by its link with South Africa. This link was formalized by the signing of three treaties between Portugal and South Africa, including one on free trade (signed in 1875) and one on traffic with the Transvaal (1895), and legislation concerning the recruitment of mine workers from Mozambique in 1896 (Katzenellenbogen, 1982). In 1901, just after the South African War, the British High Commissioner renegotiated an agreement with the Portuguese to allow recruitment of mineworkers in exchange for direct payment in gold and preference for Delagoa Bay as a port. During 1903–7 southern Mozambique supplied some 50,000 laborers annually, or 60 percent of the total black labor force on the mines. By 1909, Lourenço Marques dominated 65 percent of all trade with the Transvaal, while Durban had 22 percent and the Cape ports only 13 percent (Beinart, 1994).

At the turn of the century the Sabi Game Reserve was proclaimed, encompassing an area between the Crocodile and Sabie rivers that would later form part of the much bigger Kruger National Park (proclaimed in 1926), extending north up to the Limpopo river. Despite the threat of malaria, pockets of European agriculture emerged along the river valleys of the Crocodile river near the towns of Barberton and Nelspruit. White settlement increased rapidly in the lowveld of the South African part of the Incomati basin after the First World War. The major crops cultivated were citrus, cotton, and tobacco (Packard, 2001).

During the same period, irrigation development started in the Incomati plains. A British-owned company established the sugarcane plantation and sugar mill at Xinavane in Mozambique around 1910. In 1914 it was linked by rail via Moamba to the Lourenço Marques–Rand railway. Portuguese industrialists created Maragra, which first cultivated bananas for export to Transvaal, but this venture collapsed because of export restrictions to South Africa.

3.2. The Period 1948–74: Economic Development

By 1952, some 250,000 Mozambican workers were staying in South Africa, of whom only 100,000 were there legally. In 1967, the earnings by these Mozambican migrant workers was estimated to be eight times the value of marketed agricultural produce of southern Mozambique (Coles and Cohen, 1977; Murteira, 2000).

The swift decolonization of the continent in the 1960s drove Portugal and South Africa closer together. This is most clearly demonstrated by the construction of the massive Cahora Bassa dam on the Zambezi. This project was a joint venture in which the Anglo American Corporation, as well as Portuguese capital, had a strong interest. A generous concession was given to Eskom, the South African electricity company, which would buy the electricity generated by the dam (Minter, 1977). This electricity was seen as crucial for the further economic development of the Transvaal (Cliffe, 1976; Minter, 1977). Dam construction started towards the end of the 1960s, and coincided with increased guerrilla activities by Frelimo, the liberation movement that came into power at Mozambique's independence in 1975. South Africa sent some 1,000 soldiers to protect the construction site (Coker, 1985; Cawthra, 1996).⁴

During this period agricultural development in the Incomati basin increased significantly. In the lowveld of the South African part of the basin, DDT was introduced in 1945 to control malaria (Packard, 2001). This led to the opening up of the area for commercial farming, and the forced removal of black farmers from areas designated for white farmers (Packard, 2001). The KaNgwane "homeland" along the

lower Komati was created. Transvaal Suiker Beperk (TSB) started to develop irrigated sugarcane from 1965 onward along the Crocodile river, and constructed Malelane sugar mill. A paper mill was constructed in 1966 in the upper parts of the Crocodile river (Ngodwana). In 1960 Swaziland started to establish sugar plantations along the Umbeluzi river, adjacent to the Komati, with support from the Commonwealth Development Corporation (CDC), in which the King acquired a 50 percent shareholding after the country gained independence in 1968. In the Incomati plain the area cultivated with sugarcane increased both at Xinavane and at Maragra. New Portuguese settlers started to cultivate irrigated rice.

3.3. The Period 1975–94: Political Turmoil and Peace

Mozambique and Angola attained independence in 1975 as a result of the collapse of the Portuguese colonial regime in 1974. The Soviet Union and Cuba became directly involved in both countries, while the support of the African National Congress (ANC) within South Africa increased dramatically. These developments forced South Africa to revisit its regional strategy. Its military budget increased by 50 percent in the fiscal year 1974–5, and was further doubled by 1977–8. South Africa invaded Angola in 1975 and started to destabilize Mozambique by supporting Renamo, the resistance movement that competed for power with Frelimo. The killing of Steve Biko in 1977 caused a wave of international indignation, which resulted in the Security Council of the United Nations imposing an arms embargo on South Africa (Davies and O'Meara, 1985; Price, 1990).

In order to address the political crisis, the newly appointed South African Prime Minister, P. W. Botha, forged a strong alliance between financial and military interests, adopting the "Total Strategy" (Davies and O'Meara, 1985; Hanlon, 1986). One offshoot of this strategy was the establishment of the Development Bank of Southern Africa (DBSA), in which the private sector participated. This bank was supposed to support infrastructure developments in allied states, which would serve as a buffer against the frontline states. This strategy failed with the landslide electoral victory in 1980 of Robert Mugabe in Zimbabwe. Zimbabwe became the last country to join the frontline states, which transformed into the SADCC the same year.⁵ South Africa remained politically isolated (Davies and O'Meara, 1985; Hanlon, 1986; Price, 1990). However, in terms of trade and commerce, South Africa's role in the region actually increased: during the 1970s its regional exports doubled. Despite the political rhetoric the frontline states did not cut their commercial ties with South Africa, since they were too dependent on it. Also the electricity supply from Cahora Bassa to South Africa continued, providing 10 percent of Eskom's electricity requirements (Bienen, 1985; Libby, 1987).

In the meantime South Africa unilaterally decreased the number of Mozambican mineworkers allowed into South Africa from 127,000 in 1975 to 38,000 in 1978, and stopped the payments in gold to Mozambique that were part of the migrant mineworkers' salaries (Davies and O'Meara, 1985; Green and Thompson, 1986). In accordance with its socialist policies, Mozambique for its part nationalized many industries, including the sugar industry at Xinavane and Maragra. During the 1980s, South Africa increased its destabilizing activities in neighboring countries, and its support to Renamo in Mozambique. The result was that by 1983 the countryside in southern Mozambique had become unsafe. Many rural people had to find refuge around Maputo. At the end of 1983, South Africa signed a secret non-aggression pact with Swaziland. In the midst of the insurgent activities, negotiations started between Mozambique and South Africa, which culminated in the signing of the Komati Agreement in March 1984.

Beinart (1994) explains why South Africa wanted to reach an agreement with Mozambique: it experienced severe economic problems after the gold price declined sharply in 1983; production from its manufacturing industry stagnated, and unemployment increased. This fuelled political turmoil. South Africa's interest in entering into a new agreement may therefore be seen as a desperate effort to position itself as the key to regional peace, and in so doing regain some confidence of foreign investors.

Mozambique was faced by an even more dramatic collapse of its economy. It wanted to increase the volume of goods ferried through Maputo, to regularize the export of electricity from Cahora Bassa (and to stall the sabotage of electricity lines), and to increase the number of mineworkers allowed into South Africa. New agreements were reached on all three issues (Davies and O'Meara, 1985). Mozambique also sought openings to the West. In 1985 it became a member of the IMF and World Bank, and in 1987 it started constitutional reforms towards multi-party democracy (Hanlon, 1986; Libby, 1987; Minter, 1998; Cabaço, 1991; Zacarias, 1991).

The Komati agreement did not have the intended effect. A further increase in politically motivated violence within South Africa triggered a flight of capital and the rand lost half of its value (Beinart, 1994). Rather than decreasing, Renamo's destabilizing activities increased and developed into a fully-fledged civil war. The death of Samora Machel in an unexplained plane crash in December 1986 shocked the world. It was only after Nelson Mandela was released from prison in February 1990 that the political atmosphere improved. In the same year the Mozambican government introduced a new constitution that provided for multi-party democracy, and started negotiations with Renamo. This resulted in the Peace Accord signed in October 1992. A UN peacekeeping force arrived in the country in 1993, and after some delays multi-party elections were held in November 1994. This development, together with the attainment of majority rule in South Africa after the elections in April 1994, put the lid on more than a decade of regional violence and heralded a new era of peace and regional cooperation.

During this period, irrigation areas in the South African parts of the Incomati basin increased rapidly, in the context of subsidies to white commercial farmers. Afrikaner capital (the Rupert family with their Rembrandt group of companies, as well as the Development Bank of Southern Africa – DBSA – and its chairman Simon Brand) was instrumental in further developing sugarcane cultivation along the Crocodile and Lomati rivers in South Africa. Swaziland commissioned a second sugar mill on the Umbeluzi. In Mozambique, new irrigation infrastructure was established – for instance, the Sabie–Incomati irrigation scheme (3,500 ha) – but the area actually irrigated dropped because of the civil war.

3.4. The Period 1995–2002: Liberalization and Regional Integration

New initiatives and developments in the Incomati basin indicate that political, commercial, and cultural ties across national borders have been intensifying since 1995. The most obvious political development was that South Africa was accepted into the fold of the Southern African Development Community (SADC) in that year. South Africa hosted the SADC summit in August 1995, and three months later also the SADC conference of water ministers.

Because of the new peace, investment of private South African capital in Swaziland and Mozambique rose dramatically. An example was the so-called "Maputo corridor," which involved the construction of a new highway (toll) between Maputo and the border at Ressano Garcia, improving communications between Gauteng and Maputo. Another massive multinational investment was the construction of an

aluminum smelter in the estuary of Maputo Bay, which involved many players, including South African mining interests and cheap energy from Cahora Bassa, supplied through Eskom.

South African sugar business took advantage of the new liberal policies of Mozambique, Tongaat-Hulett and Illovo obtaining equity in the two Mozambican sugar estates in the Incomati, Xinavane, and Maragra, respectively. As a result, the three sugar companies that dominate the South African market now all have interests in the Incomati water resources, the two largest ones in the Mozambican part of the basin. In 1997 the smallest of these three companies, TSB, which operates in South Africa, commissioned a second mill at Komatipoort. Indicative of the new South African political dispensation, TSB boasts that a significant proportion of sugar deliveries (40 percent) comes from small-scale producers.

The commitment to advance the plight of small-scale farmers runs through the recent policies of all three countries. Swaziland developed the Komati Downstream Development Project, which will irrigate 6,000 ha of sugarcane for smallholders from the new Maguga Nkomati Basin dam, a joint venture with South Africa (Mwendera et al., 2002). In the lower Komati and Lomati rivers in South Africa, the Nkomazi Irrigation Expansion Program involves the development of 6,500 ha of irrigated sugarcane for emergent black farmers, drawing water from the Maguga dam in Swaziland and Driekoppies dam in South Africa (Waalewijn, 2002). In Mozambique, the efforts are focused on rehabilitating existing irrigation infrastructure.

An icon of the new era of regional integration is the "peace park" concept, which involves the merging of three National Parks in three countries located in the Incomati and Limpopo river basins, namely Gaza (in Mozambique), Kruger (in South Africa), and Ghonarezhou (in Zimbabwe). The idea was mooted by Anton Rupert, the founder and chairman of the South African chapter of the World Wildlife Fund, who presented his initiative to the Mozambican President Chissano as early as 1991, just after Nelson Mandela was released and Mozambique had adopted its new constitution. Mr Rupert was well acquainted with the area, as he owned a private park adjacent to Kruger, as well as the TSB sugar company. By 2002, the Great Limpopo Transfrontier Park was a fact, the first elephants having been moved across the borders.

In sum, the contrast between the 1980s and the 1990s could hardly have been starker. Developments during the 1990s were characterized by cooperation and economic integration, and a new thrust of economic development. This rosy picture was temporarily disturbed by the floods of February 2000 that devastated southern Mozambique (see Box 1). The floods triggered immediate assistance by South Africa and a watershed of relief support by the international community, and emphasized once more the need for further regional cooperation.

Box 1. The floods of February 2000

Heavy rains, which started in early February 2000, flooded parts of Mozambique's southern provinces. The Save, Limpopo, Incomati, and Umbeluzi rivers, which have their head-waters in Zimbabwe, Botswana, South Africa, and Swaziland, reached their highest-ever recorded levels in early March, and many riparian communities were submerged for weeks. There were 699 deaths, ninety-five people disappeared, and a million required some form of emergency assistance.

Large sections of the major road connecting Maputo to the north were demolished. Bridges along the Limpopo flood plain and the railroad were damaged. About 20,000 cattle drowned and 140,000 hectares of crops were destroyed, with the largest irrigation scheme in the country (25,000 ha, along the Limpopo) seriously damaged. Health centers as well as water supply and

sanitation infrastructure in many towns and villages suffered extensive damage, exposing a million people to water-borne diseases such as cholera, malaria, and diarrhea. The destruction caused by the floods is estimated at \$600 million. Mozambique's economic growth declined from 10 percent in 1999 to 2 percent in 2000.

Source: Brito, 2002.

4. SOCIOECONOMIC DEVELOPMENTS AND WATER USE

4.1. Economic Developments in the Basin: The Case of Sugar

Despite its economic significance, the Incomati basin has no major urban developments. The nearest large city is Maputo which lies just outside the basin at the mouth of Maputo Bay. Founded in 1790, the city became an important commercial center towards the end of the nineteenth century. Economic development in the upper parts of the Incomati basin started to become significant around the same time, when the first towns such as Barberton and Nelspruit were established. No other major urban centers developed in the basin, but many smaller towns exist, such as Carolina, Eerstehoek, Kamaqhekeza, Komatipoort, Ngodini, Malelane, and Sabie en Graskop in South Africa, Piggs Peak in Swaziland, and Moamba, Magude, Palmeira, Manhica, and Marracuene in Mozambique. It is estimated that currently 2 million people reside in the basin.

The basin provides an important transport and communication axis between the Gauteng area and the Indian Ocean. Also here we see that developments towards the end of the nineteenth century were decisive, in that they laid out the basic structure of a network of roads and railways that persists until the present.

Mineral deposits found in the basin area at the end of the nineteenth century appeared promising, but never lived up to the high expectations. Existing mining activities in the Incomati river basin are limited to coal mining in the upper reaches of the Komati river catchment and relatively small-scale gold mining in the Barberton and Sabie areas (Box 2).

Box 2. Mining activities in the Incomati basin

- Coal mining in the upper reaches of the Komati river catchment in the Carolina and Breyten area. Mining of the coal deposits along the Lebombo mountain range south of Komatipoort.
- Mining of the nickel and copper deposits in the upper Elands and Komati river catchments.
- Gold reserves are being mined in the Barberton district.
- Isolated small gold deposits are being mined near Sabie.

The sectors providing the mainstay of the economy in the basin are agriculture and forestry. It is significant that both sectors are large water consumers, which justifies a basin perspective for analyzing economic development. In terms both of land and water use and of the economy, two crops dominate the basin: rain-fed commercial tree plantations (some 340,000 ha), and irrigated sugarcane cultivation (42,800 ha, excluding 10,800 ha in the Umbeluzi basin that is irrigated with Incomati water) and the related sugar industry. Because of the lack of data on afforestation the remainder of this section sketches the significance of the sugar industry.⁶ Sugarcane production in the basin captures as much as 67 percent of all water used for irrigation, provides employment to a large labor force (some 30,000 directly employed), and generates between \$50–100 million per year.

4.1.1. Sugar Production in South Africa

It is estimated that in the South African part of the Incomati basin some 83,000 ha is irrigated, of which nearly 30,000 ha (36 percent) is given over to sugarcane. This is crushed and converted to sugar in two sugar mills, both owned by TSB (Transvaal

Suiker Beperk, a Rembrandt company controlled by Anton and later Johann Rupert). Malelane Sugar Mill along the Crocodile river was established in 1965 and has a capacity to crush some 1.8 million tons of cane into 200,000 tons of sugar per year. The mill at Komatipoort (commissioned in 1997) has a slightly higher capacity. Sugar production at the two mills contributes about 17 percent of total sugar production in South Africa.⁷

4.1.2. Sugar Production in Mozambique

Irrigation development in the Incomati plains in Mozambique started around 1910 with the establishment of the sugarcane plantation and sugar mill at Xinavane by a British-owned company. The estate was taken over by a Portuguese company in the early 1950s and changed its name to Sociedade Agricola do Incomati. In 1954, the company doubled the capacity of the mill and installed state-of-the-art (mostly French) technology. In 1975, the state took 51 percent equity in this company. In 1998, Tongaat-Hulett Sugar, a South African company, purchased the remaining 49 percent. A rehabilitation program for the mill and estates commenced in 2000 and raised the crush capacity to 461,000 tons of cane per year, producing 50,000 tons of sugar.

Around 1910, Portuguese industrialists created Maragra near the town of Manhica, which first cultivated bananas for export to Transvaal. It turned to growing sugarcane in 1960. A sugar mill was built in 1968, attaining a peak production of 44,000 tons of sugar in 1973. In 1975 it was nationalized and production collapsed. Maragra was re-privatized in 1994. In 1998, Illovo Sugar Ltd of South Africa took 50 percent ownership in Maragra Açúcar. Affected by the February 2000 flood, sugar production resumed in 2001 with some 12,000 tons of sugar produced in 2001–2. The capacity of the mill has since been upgraded to 100,000 tons of sugar per year, with loans from, among others, the Development Bank of Southern Africa (DBSA), the European Union, and the International Finance Corporation.

4.1.3. Sugar Production in Swaziland

Sugarcane is the dominant agricultural crop in Swaziland. The sugar industry, which produces about 530,000 tons of sugar per year, is the country's leading export earner and largest private sector employer (Mwendera et al., 2002). Sugarcane cultivation started in the mid-1950s with the construction of the Ubombo sugar mill in the south of the country. The Commonwealth Development Corporation, together with the Inyoni Yami Irrigation Scheme (IYSIS), constructed Mhlume Mill (Mhlume Swaziland Sugar Company) on the Umbeluzi River, neighboring the Komati, in 1960. Part of the sugarcane of IYSIS is irrigated with Incomati water conveyed from Sand River dam through the Mhlume Canal (1958). In 1980 the Royal Swaziland Sugar Corporation constructed a third sugar mill, Simunye, not far from Mhlume.⁸ Currently 13,500 ha of sugarcane is irrigated with Incomati water, 10,800 ha of which are situated along the Mbuluzi River in the Umbeluzi basin. This area includes 3,100 ha of sugarcane grown since 1957 on Tambankulu Estate. This estate was bought in 1998 by Tongaat-Hulett, the South African sugar company.⁹

4.1.4. Reaping the Benefits

The obvious question to ask is: "Why is sugarcane production dominant in the Incomati basin?" The answer is twofold. First, the crop requires much water, and water is available in the basin. Second, in all three countries the crop has a regulated market, which is fairly complex.¹⁰ The result, however, is fairly straightforward: farm-gate prices are artificially held stable, and have been higher than the world market price for the last decade or so. From a commercial perspective it is therefore

worthwhile to produce sugar. This may explain the magnitude of sugarcane in the Incomati.

Sugarcane processing in the Incomati basin is in the hands of few players: three, to be precise (Table 3). These are the same three companies that dominate the South African sugar market. To understand why this so, two more characteristics of sugar production must be considered. First, crushing cane and converting it to sugar is a fairly complex industrial process, requiring large investments that are beyond the reach of individual farmers. Second, sugarcane is a “high volume–low value” crop and it is therefore not economic to transport it over long distances. This means that once an investor has established a mill it becomes a monopolist: producers have few options other than to sell their cane to it.

Table 3. Sugar mills in the Incomati basin

<i>Mill</i>	<i>Country</i>	<i>Capacity (ton/a)</i>	<i>Company</i>	<i>Owner</i>	<i>Market share in South Africa</i>	<i>Mills elsewhere</i>
Komati	South Africa	240 000	TSB	Rembrandt	17%	
Malelane	South Africa	200 000	TSB			
Xinavane	Mozambique	50 000	Tongaathulett	Anglo American	34%	Zimbabwe
Maragra	Mozambique	100 000	Illovo	Illovo	49%	Swaziland

Note: The Mhlume and Simunye mills in Swaziland are located in the Umbeluzi basin and have been omitted from this table.

4.2. Dam Development

In 1960 water use of the Incomati was still modest, and no major dams existed. However, developments were happening quickly and the first ideas for further water development had crystallized, mainly focusing on the Komati River. In 1962, South Africa commissioned Nooitgedacht dam with a capacity of 81 Mm³. Its purpose was to supply cooling water to a major Eskom thermal power station on the highveld (in the Olifants catchment of the Limpopo river basin). This power station was appropriately named Komati, after the river supplying it with water.¹¹ Swaziland followed suit and in 1966 commissioned the Sand River dam (also on the Komati River and with a capacity of 49 Mm³), supplying water for irrigated sugar cane production. Five years later South Africa constructed the Vygeboom dam (84 Mm³), also on the same river, for further cooling water requirements for thermal power production outside the Incomati basin.

Mozambique already had extensive irrigation works established. An estimated 5,000 ha of maize, vegetables, potatoes, and citrus were irrigated at Moamba, Magude, and Manhica, as well as significant rice cultivation near Macia. In addition, the sugar companies at Xinavane (CAI), Palmeira, and Manhica (Maragra) irrigated about 12,000 ha of sugarcane, which produced around 80,000 tons of sugar in 1970, or a quarter of Mozambique’s total sugar production (Wuyts, 1989; Hanlon, 1984). These estates irrigated their crops through off-river pumping. This was feasible since the minimum flow of the lower Incomati, until that time, seldom dropped below 10 m³/s. Moreover, Mozambique had ambitious plans to build major storage dams on the Incomati near Moamba (Moamba Major) and the Sabie (Corumana).

During the period 1972–81, four relatively small dams were built (each smaller than 15 Mm³), three on the Crocodile, and one on the Sabie, all in South African territory. The Kweni dam on the Crocodile (155 Mm³), commissioned in 1984,

increased the total storage capacity in the basin to some 430 Mm³, of which 89 percent was in South Africa, and none in Mozambique.

By 1988, South Africa and Swaziland were making progress with their joint development plan for the Komati, while Mozambique unilaterally (without seeking an agreement from South Africa) commissioned the biggest dam on the Incomati, Corumana dam (850 Mm³) on the Sabie River, tripling the total storage capacity in the basin (Figure 7). In the same year, Mozambique also completed Pequenos Libombos dam (400 Mm³) in the Umbeluzi basin (neighboring the Incomati basin), meant to secure Maputo's water supply.

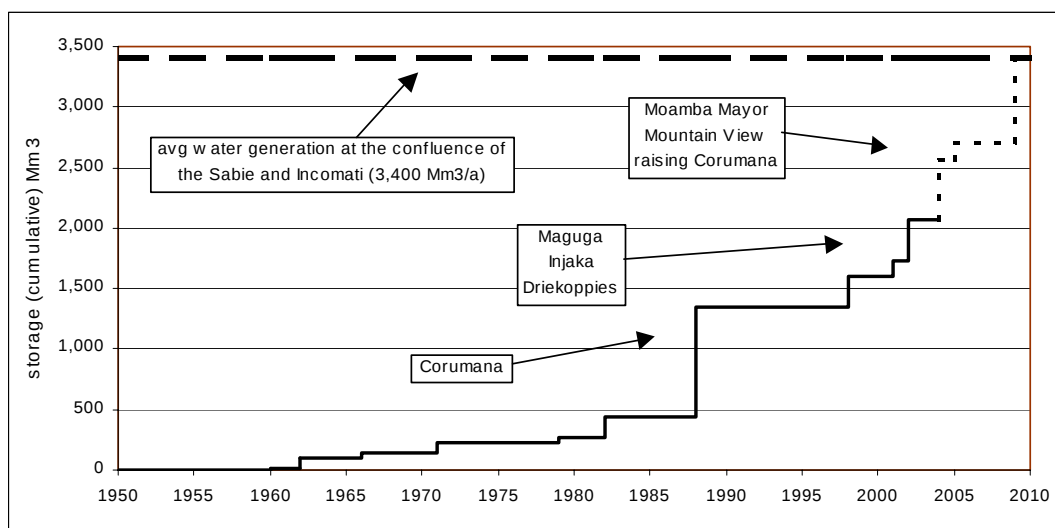


Figure 7. Development of storage capacity in the Incomati basin, 1950–2010

During 1991–7 no major new dam was commissioned on the Incomati basin. In the meantime, with the emerging peace and stability in the region, water use increased sharply. As an example, in the lower Komati and Lomati rivers (in South Africa) alone, 5,300 ha of new irrigated sugarcane was established between 1993 and 2001 under the Nkomazi Irrigation Expansion Program, mainly meant to benefit small and medium-scale emergent black farmers. A new sugar mill was constructed in Komatipoort in 1997 (Waalewijn, 2002).

In 1998 South Africa completed Driekoppies Dam (251 Mm³) on the Lomati River, which was one of the two dams being constructed under the bilateral agreement between Swaziland and South Africa. During 2001 and 2002, two other dams were commissioned in the basin: Injaka (120 Mm³) on the Sabie River in South Africa, and Maguga Nkomati Basin dam (332 Mm³) on the Komati River in Swaziland. This brought the total storage capacity in the basin to 2,060 Mm³ (Table 4).

4.3. Consumptive Water Uses in the Basin

Consumptive use of surface water amounts to 51 percent of the average amount of surface water generated in the basin, which is considered relatively high (Table 5). The major water consumers are the irrigation and forest plantation sectors, followed by interbasin water transfers. These represent 91 percent of all consumptive water uses. Other water uses include domestic, municipal, and industrial use as well as water for livestock and game. Table 5 does not include water requirements for the environment, which are difficult to assess and often are only partly consumptive (see below), nor does the table include evaporation losses from dams. These losses are

estimated to be in the order of 65 Mm³/a for the dams that were in place in the year 2002.¹²

Table 4. Major dams (> 10 Mm³) in the Incomati basin

<i>Tributary</i>	<i>Country</i>	<i>Major dam</i>	<i>Year commissioned</i>	<i>Storage capacity (Mm³)</i>
Komati	South Africa	Nooitgedacht dam	1962	81
Komati	South Africa	Vygeboom dam	1971	84
Komati	Swaziland	Maguga Nkomati Basin dam	2002	332
Komati	Swaziland	Sand River dam	1966	49
Lomati	South Africa	Driekoppies dam	1998	251
Crocodile	South Africa	Kwena dam	1984	155
Crocodile	South Africa	Witklip dam	1979	12
Crocodile	South Africa	Klipkopje dam	1979	12
Sabie	South Africa	Da Gama dam	1979	14
Sabie	South Africa	Injaka dam	2001	120
Sabie	Mozambique	Corumana dam	1988	879

Table 5. Estimated consumptive water use (Mm³/a) in 2002 in the Incomati basin, excluding evaporation losses from dams

<i>Country</i>	<i>Water generated</i>	<i>Domestic & municipal</i>	<i>Industry</i>	<i>Livestock & game</i>	<i>Exotic tree plantations</i>	<i>Irriga- tion</i>	<i>Inter-basin transfer</i>	<i>Total</i>	<i>% of water use</i>	<i>% of water generated</i>
South Africa	2 937	90	35	8	473	670	132	1 408	78	48
Swaziland	479	6	1	2	46	48	135	238	13	50
Mozambique	171	3	11	1	2	150	0	167	9	97
Total	3 587	99	47	11	521	868	267	1 813	100	51
Percent		5	3	1	29	48	15	100		

Source: Estimated from JIBS (2001); table 2.19; TIA (2002), Annex I, and own estimates.

4.3.1. Domestic and Municipal Water Use

Although agriculture is by far the largest water user in the basin, it is prudent to start with the water use that is generally given highest priority, namely that for human beings. Present water consumption of the 2 million people living in the basin represents a mere 5 percent of total consumptive water use, and only 3 percent of average water generation. It is expected that, with a growing population and increasing economic development, water use in this sector will increase rapidly. The city of Maputo may soon require water from the Incomati to supplement its current source from the Umbeluzi River, if the alternative source from the Maputo basin is not utilized.

4.3.2. Industry

In general, the existing industries in the Incomati river basin are concentrated in the urban centers and their water requirements are considered part of the municipal water requirements. Major industries not located in urban centers are: the Mhlume sugar mill in Swaziland; the SAPPI paper mill at Ngodwana and the TSB sugar mills at Malelane and Komatipoort, in South Africa; and the Xinavane and Maragra sugar mills and the textile factory at Marracuene, in Mozambique (Table 6).

4.3.3. Livestock and Game

The total amount of livestock and game within the Incomati basin is about 700,000 equivalent livestock units (ELSU), of which some 520,000 are in South Africa, some 120,000 in Swaziland, and the balance in Mozambique. Water use by livestock and game is relatively small, in the order of 11 Mm³/a.

Table 6. Water use of major industries outside urban areas

Country	Factory	Net water use (Mm ³ /a)
South Africa	SAPPI paper mill at Ngodwana on the Elands river	12.4
South Africa	TSB sugar mill at Malelane on the Lower Crocodile	9.0
South Africa	TSB sugar mill at Komatipoort on the Komati	n.a.
Mozambique	Xinavane sugar mill on the Incomati at Xinavane	5.0
Mozambique	Maragra sugar mill on the Incomati near Manhica	5.0
Mozambique	Riopele textile plant on the Incomati near Marracuene	0.6

Note: Mhlume sugar mill in Swaziland is excluded from this table as it is situated outside the basin; the mill uses 3.2 Mm³/a of Incomati water for its operations.

Source: JIBS, 2001

4.3.4. Rain-fed Agriculture

Rain-fed agriculture is widespread throughout the basin. This type of agriculture uses rainfall directly, and is in this sense one of the largest water users. Compared to the natural vegetation, the use of rainfall is in the same order of magnitude, except for exotic tree plantations (see below).

Rain-fed crop production in the sandy uplands of the coastal Incomati plain is mainly by small family-farming units. Food crops grown include cassava (*Manihot* sp.), maize (*Zea mays*), groundnut (*Arachis hypogea*), sweet potato (*Ipomea batatas*), cowpea (*Vigna* sp.), pigeonpea (*Cajanus cajan*), and vegetable crops such as squashes, pumpkins (both *Cucurbita* sp.), tomatoes, and okra (*Hibiscus esculentus*) (Schouwenaars, 1988).

Because of the variability of rainfall, crops frequently suffer moisture stress and yields often are low (Schouwenaars, 1988). Typical grain yields are around 1 t/ha. However, smallholder farmers often cultivate the valley bottoms, utilizing the relatively shallow groundwater. This allows crop cultivation even in the dry season. Gomes and Famba (1999) emphasized the importance of such wetlands (*machongos*) for crop production.

4.3.5. Exotic Tree Plantations (Afforestation)

Extensive areas of exotic tree plantations occur mainly in Swaziland and South Africa, and are entirely rain-fed. They consume large quantities of water from rainfall, and thereby alter the natural hydrology to the extent that runoff is significantly reduced. Exotic afforestation in both Swaziland and South Africa is therefore controlled by means of a permit system. The existing exotic afforestation in Mozambique is negligible and is apparently not controlled officially, although there are plans to expand the area to about 25,000 ha (see Table 7). JIBS (2001) estimated that the

total permitted afforestation areas in South Africa and Swaziland (nearly 400,000 ha) cause a flow reduction of 518 Mm³/a, that is, equivalent to 130 mm/a.

4.3.6. Irrigation

Irrigated agriculture is the largest user of surface and groundwater in the Incomati. The area presently being irrigated is estimated at 102,000 ha (excluding 10,800 ha outside the basin proper), consuming 870 Mm³/a of water. In addition, all three countries were planning to expand the irrigated area with another 74,800 ha, which would require an additional 780 Mm³/a of water (Table 8). JIBS (2001) calculated that such amounts of water are simply not available. It concluded that Mozambique must scale down its plans for future new irrigation development, and JIBS suggested a more realistic expansion of 36,600 ha for Mozambique. The recently concluded Tripartite Interim Agreement (TIA, 2002), however, states that Mozambique may not expand its irrigated area beyond the area that already has irrigation infrastructure (part of which is currently not irrigated).

Table 7. Exotic tree plantations in the Incomati basin (ha)

<i>Country</i>	<i>Established (1991)</i>	<i>Maximum permitted/planned</i>
Mozambique	2 400	25 000
South Africa	310 000	367 300
Swaziland	29 400	32 400
Total	341 800	424 700

Source: JIBS, 2001

#Table 8. Area with irrigation infrastructure in the Incomati basin (ha)

<i>Country</i>	<i>Area with irrigation infrastructure in 2002</i>	<i>New planned in 2000 (JIBS)</i>	<i>Additional irrigation allowed by TIA (2002)</i>
Mozambique	23 300	52 300	0
South Africa	83 000	15 100	15 100
Swaziland	4 500 *	7 400	7 400
Total	110 800	74 800	22 500

* Excluding 10,800 ha outside the basin

The dominant irrigated crop in all three countries is sugar cane. With 42,800 ha (excluding 10,800 ha in the Umbeluzi basin) sugarcane represents 42 percent of the entire irrigated area in the basin proper. Other dominant crops include orchards, summer grains, and winter vegetables (see Table 9).

4.3.7. Water Transfers

Surface water is being exported from the Incomati basin to neighboring basins. This type of consumptive water use represents the third largest water use in the basin, after irrigation and water consumption by exotic tree plantations. Two bulk water transfers exist in the Incomati river basin. South Africa exports 132 Mm³/a from the upper Komati river catchment as cooling water for thermal power generation in the adjacent Olifants catchment.¹³ Swaziland exports 136 Mm³/a from the Komati River in Swaziland, which comprises 128 Mm³/a for irrigating 10,800 ha of sugarcane on the Umbeluzi, 3 Mm³/a for the Mhlume sugar mill, and 5 Mm³/a for domestic use in the three villages in the vicinity of the irrigation scheme.

In the near future, another water transfer might be established in the Incomati basin, near the town of Moamba or at the confluence with the Sabie River, for the urban water supply of Maputo. Some 90 Mm³/a will be required for this purpose.¹⁴

4.3.8. Other Water Uses

Some of the dams generate hydropower, but all such dams have as a primary purpose to provide water for other sectors. Electricity production is therefore a secondary benefit derived from water releases made to other users.

Another type of water use is water required to maintain the riverine ecosystems. JIBS (2001) made a first estimate of how much water should remain in the river (Table 10). It observed that the amounts required are fairly high, and will constrain other water uses. It recommended therefore that further detailed studies be conducted to ascertain these values. The Tripartite Interim Agreement of 2002 includes a provision for maintaining environmental flows in the river, albeit at levels that differ somewhat from those estimated by JIBS.

Table 9. Irrigated crops in the Incomati basin (ha), 2002 estimate

<i>Crop</i>	<i>Mozambique</i>	<i>South Africa</i>	<i>Swaziland*</i>	<i>total</i>
Perennial crops				
Orchards	500	19 700	1 200	21 400
Bananas	500	7 100	0	7 600
Sugar cane	10 000	30 100	2 700	42 800
Pasture	0	2 800	0	2 800
Subtotal	11 000	59 700	3 900	74 600
Summer crops				
Summer grain	1 900	11 200	400	13 500
Summer vegetables	1 000	2 900	200	4 100
Tobacco	0	8 800	0	8 800
Rice	400	0	0	400
Subtotal	3 300	22 900	600	26 800
Winter crops				
Winter grain	1 000	2 600	0	3 600
Winter vegetables	1 500	9 500	200	11 200
Subtotal	2 500	12 100	200	14 800
Total annual irrigated	16 800	94 700	4 700	116 200
Irrigated area	14 300	83 000	4 500	101 800
Irrigation intensity	117%	114%	104%	114%

* The figures for Swaziland exclude 10,800 ha sugarcane in the neighboring Umbeluzi basin that are irrigated with water from the Incomati.

4.4. Recent Trends

This section has demonstrated that water use is high in the Incomati basin. As a result, certain parts of the basin experience severe water stress during certain periods of the year, and during years with below normal rainfall and runoff. Notable are the high commitment levels in the Komati and Lomati rivers, as well as in the upper Sabie and the central Crocodile. Since most consumptive water uses occur in the upper parts of the basin, the lower parts are affected by it. Figures 8 and 9 clearly show this effect, by comparing the average runoff pre- and post-1980 for two rivers, namely the Incomati near Ressano Garcia in Mozambique, just below the confluence of the Komati and Crocodile, and the Sabie at Machatuine, just upstream of Corumana dam in

Mozambique. In both cases, average runoff measured during 1980–99 is less than half of that measured between 1953 and 1979.

Table 10. Environmental water requirements, Incomati (annual values (Mm³/a) of a seasonally varying flow)

River stretch	JIBS estimate	TIA agreement
Sabie river, downstream of Corumana Dam	223	200
Crocodile river (Tenbosch)	208	245
Komati river, downstream of Maguga Dam (Mananga)	152	200
Incomati river (Ressano Garcia)	471	290
Incomati river, at the estuary (Marracuene)	642	450
and a minimum flow in the estuary of *	5 m ³ /s	3 m ³ /s

* Minimum flow required in the estuary to control salt-water intrusion.

Source: JIBS, 2001; TIA, 2002

Further development of water use in the three riparian countries will require coordination. Without such coordination, problems will be inevitable, possibly with significant economic and political repercussions. JIBS (2001) analyzed the possibilities of coordinated development of water projects, and concluded that a further increase of irrigation development is constrained, even with the planned construction of two new dams (Mountain View on the Crocodile in South Africa, and Moamba Major on the Incomati in Mozambique), and increasing the capacity of Corumana dam. Given this situation, it is encouraging that on August 29 2002 the ministers responsible for water of the three riparian countries reached an interim agreement over the utilization of the waters of the Incomati basin and the Maputo basin (TIA, 2002).

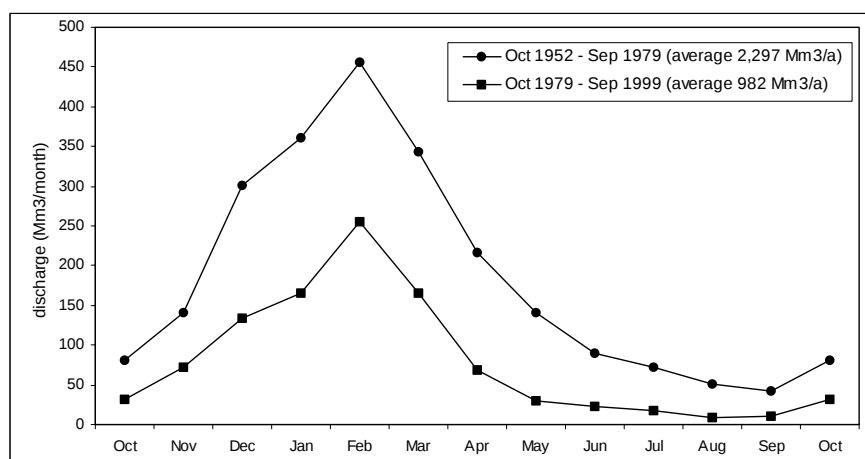


Figure 8. Average discharge of the Incomati at Ressano Garcia (station E23); 1953–79 and 1980–99

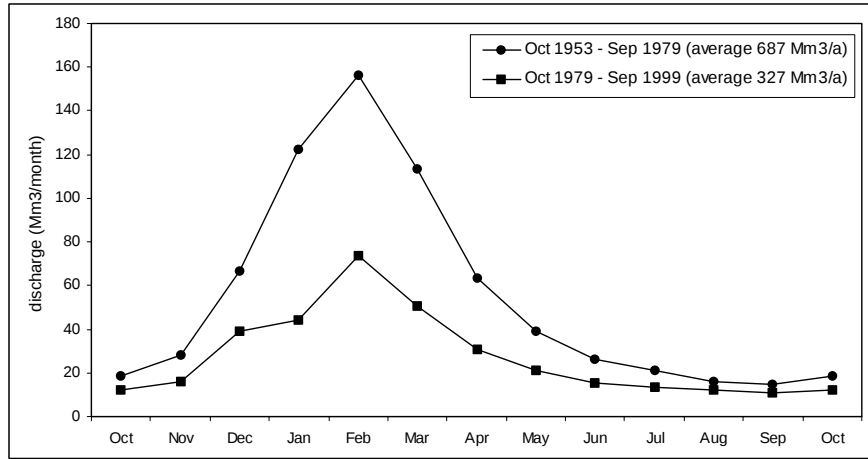


Figure 9. Average discharge of the Sabie at Corumana (station E 30); 1954–79 and 1980–99

5. LEGAL AND INSTITUTIONAL FRAMEWORK

5.1. National Legislation and Institutional Set-up

Their respective water laws govern water resources allocation and management in Mozambique, South Africa, and Swaziland. Whereas Mozambique and South Africa have recently enacted new water laws (in 1991 and 1998, respectively), the Water Act of Swaziland currently in force dates back to 1967 (and amended by Act 1 of 1969, Act 40 of 1970, Act 12 of 1971, and Act 5 of 1972). In 2001 a new Water Bill came before parliament for final approval, incorporating some fundamental changes for the water sector in Swaziland, with some new features that already exist in South Africa and Mozambique (Mwendera et al., 2002).

The new water law regimes in the three countries have the following characteristics:

- Ownership of water is vested in the head of state, who holds the water resources in trust for the people.
- All people have a right to a basic amount of water, for which they do not require a right or permit.
- The environment is considered a legitimate water user; its needs have to be considered along with other types of water requirements.
- The allocation of water for uses other than primary purposes and the environment – that is, for productive processes such as agriculture, mining, and manufacturing – follows either a riparian system (Swaziland) or is subject to licenses/permits (Mozambique and South Africa).
- All these uses of water are regulated by a central water management body within a particular ministry (the Department of Water Affairs and Forestry (DWAF) in South Africa, or the National Water Directorate (DNA) in Mozambique, or, as is proposed in the Water Bill of Swaziland, the Department of Water Affairs and its executive arm, the National Water Authority).
- Day-to-day water allocation and management tasks are delegated to decentralized bodies that are constituted along hydrological boundaries. In Mozambique these are the regional water administrations (ARAs), and in South Africa the Catchment Management Agencies (CMAs). In Swaziland, River Basin Authorities will be created (see Box 3).
- The decentralized water management bodies incorporate representatives of water-user groups, who have a say in the allocation of water.
- The sharing of the water resources of international basins is explicitly mentioned in both the Mozambican and South African water acts. The South African National Water Act, for instance, states that international water resources will be managed in a manner that optimizes the benefits for all the parties in a spirit of mutual cooperation. Allocations agreed for downstream countries will be respected. Mozambique has a special department dealing with international waters: the International Rivers Office.

5.2. Relevant Bilateral and Trilateral Agreements Concerning the Incomati Basin up to 1999

A number of agreements were reached between the three countries riparian to the Incomati basin during the period 1967–99. This section provides a chronological overview.

Box 3. Decentralized water management bodies in the Incomati river basin

Mozambique: The Water Law of 1991 adopted the principle of decentralization in water resources management, particularly at the operational level. Therefore Regional Water Administrations (ARAs) were created, organized on the basis of one or more (contiguous) river basins. The ARAs are public institutions, with administrative and financial autonomy, under the supervision of the Ministry of Public Works and Housing, via the National Directorate of Waters. ARA-Sul was created in 1993 and its Incomati basin management unit (UGBI) is responsible for the operational management of the Incomati basin. The Incomati Basin Committee, made up of water users, is a consultative body to the UGBI.

South Africa: The National Water Act of 1998 states that a Catchment Management Agency may be established for a specific water management area, on the initiative of the minister or of the community and stakeholders concerned. A Catchment Management Agency has as major functions: to investigate and advise interested persons on the protection, use, development, conservation, management, and control of the water resources in its water management area; to develop a catchment management strategy; to coordinate the related activities of water users and of the water management institutions within its water management area; and to promote community participation in the protection, use, development, conservation, management, and control of the water resources.

The Inkomati Catchment Management Agency, comprising the Komati, Crocodile, and Sabie rivers, is currently being established, with each of these rivers having a sub-catchment organization. The existing irrigation boards in these rivers (in the Komati River these have been merged into the N'komazi Major Irrigation Boards) will be transformed into Water Users Associations, as per the new National Water Act.

Swaziland: A Government Water Control Area may be declared if it is deemed necessary in the public interest to control the abstraction, utilization, supply, or distribution of the water of any public stream within the relevant area. The Komati River and all its tributaries within Swaziland have been proclaimed a Government Water Control Area. The Water Apportionment Board has determined apportionments based on normal flow. When the flow is not available, the flow to irrigators must be reduced proportionally. The Water Bill of 2002 was designed to strengthen the role of the Water Apportionment Boards, and envisaged that they would be transformed into River Basin Authorities (Mwendera et al., 2002).

The minister may, on his or her own accord or at the request of a number of proprietors of land riparian to a public stream, declare any area as an Irrigation District. An Irrigation District is administered by the River Basin Authority, and has an Irrigation Board. The Board comprises mainly members elected by the relevant proprietors. An Irrigation Board is charged with such functions as: the protection of the water source; preventing waste of the water; preventing unlawful abstraction or storage of public water; exercising general supervision over all public streams within the District; recording the entitlements to any share in the use of the water and the times when such shares may be taken; and supplying water to any person or local authority for primary, urban, or industrial purposes.

5.2.1. Agreement in Regard to Rivers of Mutual Interest of 1964

The "Agreement between the Governments of South Africa and Portugal in regard to Rivers of Mutual Interest and the Cunene River Scheme" (October 13 1964) (also known as the "Cunene Agreement") started off as a bilateral agreement between South Africa and Portugal, to which Mozambique succeeded at independence. Swaziland acceded to Part I (Rivers of Mutual Interest) of this agreement in 1967. The agreement acknowledges the importance of rivers as water resources for the development of the respective territories of the parties as well as the advantages of collaborating in the development of such water resources.

The operative paragraphs of Part I record agreement on three so-called "principles":

- The application of the principle of "best joint utilization" in the development of water resources of "common interest rivers."
- The manner in which cooperation should take place is by way of exchange of hydrological and other data, consultations regarding the execution of major hydraulic works affecting the interests of the states concerned, and joint studies regarding "general plans for the development of water resources of each basin."
- Negotiations at the diplomatic level and the conclusion of agreements in respect of particular basins are recommended.

5.2.2. Agreement Relative to the Establishment of a Tripartite Permanent Technical Committee

A Tripartite Permanent Technical Committee (TPTC) was established in February 1983, consisting of three representatives from each of the three governments concerned (see Annex 1). The TPTC is convened on an ad hoc basis, as and when circumstances require. All decisions are to be taken by consensus. The functions and duties of the TPTC are mainly of an advisory nature with regard to:

- Measures to alleviate short-term problems regarding water shortages on rivers of common interest during drought periods.
- The division of flows in rivers of common interest, arrangements for the investigation of common watersheds, and joint water schemes on rivers of common interest.
- Mechanisms to coordinate and integrate the findings and plans of each country.
- Report on the optimum joint scheme or schemes catering for the needs of all three countries.

5.2.3. Agreement reached at the Tripartite Ministerial Meeting of February 15 1991

At this meeting the recommendations of the TPTC were accepted and agreed upon by the three ministers responsible for water in the three states concerned. Agreement was recorded on the following matters:

- To conduct a joint study of the water resources, demands, and development potential of the whole Incomati river basin.
- To proceed with implementing the first phase of the Komati River Development Plan (that is, the construction of the Driekoppies and Maguga Nkomati Basin dams).
- Pending the results of the Joint Study, to implement the following interim measures:

- A cross-border release of 2 m³/s averaged over a cycle of three days in order to satisfy demands in the reach from Ressano Garcia to the confluence of the Sabie River.
- South Africa would refrain from constructing any new waterworks with a storage capacity in excess of 250,000 cubic meters or with an abstraction rate exceeding 110 liters per second in the Sabie river catchment, without prior consultation at TPTC level in accordance with the Helsinki rules and the 1964 Rivers Agreement.

5.2.4. Joint Inkomati Basin Study (JIBS)

Following the tripartite agreement of 1991, the Joint Inkomati Basin Study (JIBS) was launched in 1992. However, because of the impossibility of obtaining the required information from Mozambique, the study was concluded in curtailed form in 1995. The study was re-initiated in 2000 (JIBS Phase 2) and concluded towards the end of 2001.

5.2.5. Treaty on the Development and Utilization of the Water Resources of the Komati River Basin and Treaty on the Establishment and Functioning of the Joint Water Commission

Both treaties were signed by South Africa and Swaziland in March 1992, and explicitly deal with the Komati River, a sub-basin of the Incomati basin. The preamble to the first treaty records the commitment of both countries to pursue their common water interest on the basis of the provisions of the Helsinki Rules, and to develop the water resources of the Komati river basin by means of a comprehensive development plan. The Joint Water Commission (JWC) and the Komati Basin Water Authority (KOBWA) are the two main institutions entrusted with the different aspects of the implementation of the Project and the development plan. Both countries expressly declared that they:

Recognize the right of the Republic of Mozambique to a reasonable and equitable share in the use of the waters of the Inkomati River Basin of which the Komati River Basin is an integral part. The Parties agree to enter into negotiations with each other when such share is claimed by the Government of the Republic of Mozambique.

(Article 3, section 5)

In the terms of the second treaty, a Joint Water Commission (JWC) is established and its duties and functions determined. The JWC consists of the two delegations representing both countries and all decisions are taken on the basis of consensus. In the main, the JWC acts in an advisory capacity with regard to the various aspects of the joint development of water resources of common interest to the parties. The JWC is charged in particular with the duty of having regard for the interests of Mozambique.

5.2.6. Bilateral Agreement Between Mozambique and South Africa

A formal agreement was signed between Mozambique and South Africa in July 1996 to create a Joint Water Commission. The structure and content of this agreement are quite similar to the one between the South Africa and Swaziland for the Komati river basin. The main functions and powers of the JWC are to give advice on all technical matters. The JWC must have due consideration for the interests of Swaziland, Zimbabwe, and Botswana in any water resources of common interest between the parties and one or more of those countries.

5.2.7. *Bilateral Agreement Between Swaziland and Mozambique*

In July 1999, Mozambique and Swaziland signed an agreement to establish a Joint Water Commission, in similar terms to the one established between Mozambique and South Africa in 1996.

5.3. Relevant Transboundary Legal Conventions

For the sharing of the water resources of the Incomati basin, three conventions are of relevance. They are, in chronological order, the Helsinki Rules of 1966, the UN Convention on the Law of the Non-Navigational Uses of International Watercourses (1997), and the SADC Protocol on Shared Watercourse Systems (in force since 1998, and revised as the Protocol on Shared Watercourses in 2000).

The Helsinki Rules have been used by Mozambique, South Africa, and Swaziland as a basis for negotiating on issues of common river basins, even if not accepted in a formal way. The UN Convention is presently the more advanced legal document on the issue of international watercourses and, although it has lapsed, it contains the fundamental principles of water management, conflict resolution, and environmental safety that have been developed during the last three decades.

The UN Convention inspired the revision of the SADC Protocol on Shared Watercourse Systems and many of its clauses were incorporated in the revised Protocol.¹⁵

5.3.1. *Towards the SADC Protocol*

The SADC Protocol would have implications for the sharing of the Incomati waters. At the same time, experiences in the Incomati, among others, have influenced the text of the revised protocol as adopted by SADC in 2000.

The SADC Protocol has its roots in the Zambezi River Action Plan (ZACPLAN) of 1987. One of the projects under ZACPLAN was ZACPRO 2, "the development of regional legislation necessary for the management of the Zambezi and minimum national legislation required by riparian states for enforcement." Out of this project grew, in a sometimes tortuous process, the Protocol on Shared Watercourse Systems in the SADC Region, originally planned for acceptance at the 1993 SADC summit, but not agreed upon until 1995 (Ohlsson, 1995).

One explanation why this initially basin-specific initiative was adopted SADC-wide is the regional drought of 1992. This devastating drought impressed upon all SADC member states the need for a regional arrangement with respect to shared watercourses.

The new South Africa, in a bid to show its regional goodwill, joined SADC in 1995 and immediately hosted the SADC summit of heads of state or government, in August that year. During the summit, ten of the eleven heads of state signed the "Protocol on Shared Water Course Systems in the SADC Region." This was the first of a long series of SADC Protocols to be signed, covering a variety of subject areas.

Three months later South Africa hosted the SADC conference of water ministers in Pretoria (November 23–24 1995), when it was decided to establish the SADC Water Sector, separate from the existing Environment and Land Management Sector. The Water Sector Coordination Unit became operational in 1996. One of its immediate tasks was to get the protocol ratified by the member states, since it would only enter into force after two-thirds of the members had ratified it. Most SADC states complied and the protocol came into force in September 1998. Mozambique was the only country that refused to ratify it.

Mozambique refused to ratify because it wanted the definition of two crucial concepts used in the protocol, namely "drainage basin" and "watercourse system," to

be clarified. More precisely, it wanted both concepts to explicitly state that the downstream boundary of both concepts is the sea, and only in exceptional cases a desert or a lake (as is the case with the Okavango). Carmo Vaz and Lopes Pereira formulated the point thus:

This definition of basin boundaries is not always accepted as such and creates additional difficulties in studies, proposals and negotiation for the sharing and common use of water resources. There is a certain tendency among the countries that are located along the upstream reaches of an international river basin to treat the basins of the tributaries as not being part of the basin. In this perspective, for example, the water developments in the Kafue basin would be a matter of planning and decision solely for Zambia, although it is a sub-basin of the Zambezi river basin. Mozambique has always considered this position to be unacceptable and it is one of the reasons why the Government of Mozambique asked for modifications of the SADC Protocol on Shared River Basins.

(Vaz and Pereira, 2000, p. 101–2)

It is clear that the concerns of Mozambique were, among others, informed by its experience in the Incomati, where South Africa and Swaziland were signing treaties on the Komati River without involving Mozambique.

The other SADC members could have ignored Mozambique's concerns, since many countries were of the opinion that Mozambique was complicating things unnecessarily. However, an interesting twist of events occurred when the United Nations adopted in May 1997 the "Convention on the Law of the Non-navigational Uses of International Watercourses." Key concepts used in the SADC Protocol (drainage basin, watercourse system) were inconsistent with the new concept of watercourse used by the UN Convention. And yet, seven (Angola, Botswana, Malawi, Mozambique, Namibia, South Africa, and Zambia) of the then eleven SADC member states had voted in favor of the UN convention (Tanzania abstained, while Lesotho, Swaziland, and Zimbabwe did not vote).

Given this situation, SADC could do little else than decide to revise the protocol, so as to make it consistent with the UN Convention. This would obviously make the protocol acceptable to Mozambique, as it had signed the UN Convention. The revision of the protocol took three years (from 1998–2000), and was signed by thirteen of the now fourteen member states in Windhoek in August 2000. The Democratic Republic of Congo was the only country not to sign.

By September 2002, eight SADC countries had ratified the revised Protocol (Botswana, Lesotho, Malawi, Mauritius, Mozambique, Namibia, South Africa, and Swaziland). Once nine countries (two-thirds) have ratified it, it will enter into force and replace the 1995 protocol.

5.3.2. The SADC Protocol on Shared Watercourses (2000)

The new Protocol on Shared Watercourses (see Annex 3) has a total of sixteen articles following a preamble where reference is specifically made to the Helsinki Rules and to the UN Convention on the Law of Non-Navigational Uses of International Watercourses. The overall objective of this Protocol is to foster closer cooperation for judicious, sustainable, and co-coordinated management, protection, and utilization of shared watercourses, and to advance the SADC agenda of regional integration and poverty alleviation. Reference is made to:

- The promotion of shared watercourse agreements and management institutions.

- Sustainable, equitable, and reasonable utilization of shared watercourses.
- Co-coordinated and integrated environmentally sound development and management of shared watercourses.
- Harmonization and monitoring of legislation and policies for planning, development, conservation, and protection of shared watercourses, and allocation of the resources thereof.
- Research and technology development, information exchange, capacity building, and the application of appropriate technologies in shared watercourses management.

The following general principles apply:

- Unity and coherence of each shared watercourse, consistent with the sustainable development of all watercourse states and observing the objectives of regional integration and harmonization of their socioeconomic policies and plans.
- Utilization of shared watercourses open to each watercourse state, in accordance with the principles contained in the protocol.
- Utilization by each state, within its own territory, of a shared watercourse in an equitable and reasonable manner, taking into account all relevant factors and circumstances.
- In utilizing a shared watercourse in its territory, each state will take all appropriate measures to prevent the causing of significant harm to other watercourse states.
- Respect for the existing rules of customary or general international law relating to the utilization and management of the resources of shared watercourses.
- Maintenance of a proper balance between resource development and conservation of the environment to promote sustainable development.
- Close cooperation with regard to the study and execution of all projects likely to impact on the regime of the shared watercourse.
- Exchange of available information and data regarding the hydrological, hydro-geological, water quality, meteorological, and environmental condition of shared watercourses.

The Protocol includes specific provisions that cover the following aspects:

- planned measures
- environmental protection and preservation
- management of shared watercourses
- prevention and mitigation of harmful conditions
- emergency situations.

The institutional mechanisms responsible for the implementation of the protocol are the SADC Water Sector Organs (Committee of Water Ministers, Committee of Water Senior Officials, Water Sector Co-coordinating Unit, Water Resources Technical Committee and subcommittees), and the Shared Watercourse Institutions (watercourse commissions, water authorities or boards, established by the watercourse states).

The protocol includes articles on shared watercourse agreements (following closely the UN Convention) and settlement of disputes, establishing that the state parties shall try to resolve their disputes amicably and in accordance with the principles enshrined in the SADC Treaty or, when disputes cannot be solved in this way, referring them to the SADC Tribunal for decision.

5.4. The Tripartite Interim Agreement of 2002

In 1999, Mozambique, South Africa, and Swaziland initiated discussions to reach an interim agreement for the Incomati and Maputo river basins. This agreement is intended to cover the period of time until comprehensive water agreements can be reached for both basins. After more than three years of sometimes tedious negotiations, the ministers responsible for water in the three countries signed the Interim Agreement on August 29 2002, during the World Summit for Sustainable Development, held in Johannesburg, South Africa (see Annex 2).

5.4.1. Tripartite Interim Agreement for Cooperation on the Protection and Sustainable Utilization of the Water Resources of the Incomati and Maputo Watercourses, August 29 2002

This agreement, abbreviated as TIA, aims to promote cooperation among the three countries to ensure the protection and sustainable utilization of the water resources of the Incomati and Maputo watercourses (Article 2), and will be valid until 2010 or until superseded by a new "comprehensive water agreement" (Article 18). The joint body for cooperation between the countries shall be the TPTC, and is tasked to implement the agreement (Article 5). Existing watercourse agreements will remain in force as far as they are not in conflict with this agreement (Article 17). The agreement uses the same definition of watercourse as used in the UN Convention and the revised SADC Protocol (Article 1). The general principles of the SADC Protocol apply, especially the following: sustainable utilization, equitable and reasonable utilization and participation, the prevention principle, and the cooperation principle (Article 3).

The responsibilities of the three countries are defined in Article 4, and imply that the parties shall, individually and, where appropriate, jointly, develop and adopt technical, legal, administrative, and other reasonable measures in order to, among other measures:

- coordinate management plans and planned measures
- monitor and mitigate the effects of floods and droughts
- provide warning of possible floods and implement agreed upon urgent measures during flood situations
- exchange information on the water resources' quality and quantity, and the uses of water
- implement capacity building programs.

Article 6 on the "Protection of the Environment" states that the three countries shall, individually and, where appropriate, jointly, protect and preserve the aquatic environment and ecosystems of the Incomati and Maputo watercourses, taking into account generally accepted international rules and standards.

Article 7 on "Sustainable Utilization" is derived from the revised SADC Protocol and states that the three countries shall be entitled, in their respective territories, to optimal and sustainable utilization of, and benefits from, the Incomati and Maputo water resources, taking into account the interests of the other countries concerned, consistent with adequate protection of the watercourses for the benefit of present and future generations. The three countries shall coordinate their management activities by the exchange of information, and coordinate management plans and measures. This article also states that the three countries are committed to developing measures towards improvement of efficiency and rational use of water and its conservation and to promote more efficient water use through adopting better available technology.

Article 9 states that any abstraction of waters from the Incomati or Maputo watercourses, regardless of the use or geographic destination of such waters, shall be

in conformity with the flow regimes of Annex I (see Box 4). The article explains that the following criteria were considered in establishing the flow regimes:

- the geographic, hydrological, climatic, and other natural characteristics of each watercourse
- the need to ensure water of sufficient quantity with acceptable quality to sustain the watercourses and their associated ecosystems
- any present and reasonably foreseeable water requirements, including afforestation
- existing infrastructure that has the capacity to regulate the streamflow of the watercourses
- agreements in force among the Parties.

The following short to medium-term water requirements of each of the three countries were recognized in particular:

- the strategic importance to Mozambique of augmenting the water supplies to the city of Maputo and its metropolitan area from one or both of the Incomati and Maputo watercourses
- the importance to Swaziland of developing the Lower Usuthu Smallholder Irrigation Project (LUSIP) on the Usuthu river in the Maputo basin
- the importance to South Africa of establishing and developing emerging irrigation farmers in the Incomati river catchment.

Further articles deal with "Droughts and Floods," "Incidents of Accidental Pollution and Other Emergency Situations," and "Exchange of and Access to Information." The latter article, interestingly, states that information on matters covered by this Agreement should be made available to whoever makes a reasonable request. The resolution by the TPTC on exchange of information and water quality (August 13 2002) further details this article.

Article 13 on "Transboundary Impacts" states that any planned water resources development projects and water utilization projects (whether or not listed in Annex II "Reference Projects"), shall not commence if they, by themselves or in combination with the existing ones, have the potential of a significant transboundary impact on the watercourse. These projects may only commence if the provisions of Article 4(1) of the revised SADC Protocol, on the procedure of notifying other riparian countries of planned measures, have been complied with.

It is quite unique that the Agreement contains an article on capacity building (Article 14), acknowledging that the three countries must have sufficient human and institutional capacity to implement and monitor this agreement. Consequently, the countries shall, individually and, where appropriate, jointly, be responsible for ensuring that capacity is developed to effectively implement this Agreement.

Article 15 on "Settlement of Disputes" states that any dispute between the countries concerning the interpretation or implementation of the agreement shall be settled amicably through consultation and negotiations between the parties. Where the dispute has not been settled within one year, either party may submit it to arbitration. If the disputing parties do not agree on the subject matter of the dispute, the arbitral tribunal shall determine the subject matter. This article further contains detailed procedures how the arbitration should be conducted.

Finally, this agreement is of an interim nature, because it sets out to reach a so-called "Comprehensive Agreement" for the Incomati watercourse in 2006, and a similar agreement on the Maputo watercourse in 2010. Annex V of TIA provides a

time schedule of activities leading to both agreements. For the Incomati agreement, it is envisaged that the following important activities will be concluded before 2006:

- updating the Joint Inkomati Basin Study with data on the present-day situation¹⁷
- outlining the technical and institutional requirements
- determining ecological water requirements
- carrying out a feasibility study on how water requirements will be reconciled with water availability.

Box 4. Water allocations in the Tripartite Interim Agreement ¹⁶

The interim water use allocations in Annex I ("Flow Regime") of the Agreement make allowance for the supply of water to those users envisaged in previous bilateral and trilateral water use agreements. The expected growth in water requirements for domestic, livestock, and industrial use to 2010 has also been included.

The water allocations in this annex can all be supplied at acceptable levels of assurance from the watercourses with the existing infrastructure (dams) or infrastructure under construction at the time that the interim agreement comes into force. New interbasin transfers are not included in this annex, except that water for the City of Maputo has been reserved.

The water allocations for irrigation are for existing developments that are either in use or that have fallen into disuse and will be rehabilitated, as well as for those planned new land uses where the water is already available but not yet utilized. Examples of the latter are the irrigation projects downstream of Maguga, Driekoppies, and Corumana dams.

Water utilization projects ("Reference Projects") listed in Annex II of the agreement are those that require water allocations in addition to those given in Annex I. These projects cannot be supplied with water at acceptable levels of assurance from the watercourses with the existing infrastructure. New infrastructure (dams) must therefore first be developed in order to supply these water utilization projects. Examples of these are the LUSIP from the Maputo watercourse and the possible water supply to Maputo from the Incomati or Maputo watercourse.

6. WATER-RELATED CONFLICT AND COOPERATION: 1967–2002

6.1. The Situation in the 1960s and 1970s: The First Dams and Formal Contacts

6.1.1. *The Period up to 1972*

The First Tripartite Technical Conference on Rivers of Common Interest between South Africa, Swaziland, and Mozambique (the latter two still under colonial rule) was held in Mbabane, April 24–25 1967, where it was agreed:

- To adopt the principle of “best joint utilization.”
- That Swaziland would accede to Part I (Rivers of Mutual Interest) of the 1964 Cunene Agreement (Bipartite Agreement between South Africa and Portugal in regard to Rivers of Mutual Interest and the Cunene River Scheme).
- The full and free exchange of hydrological data.
- Studies to be done leading to an integrated plan for each of the shared river basins.
- Technical studies to be done for an international flood warning system.

The background of this meeting remains unclear, but as is indicated in Section 4, interest in the water resources of the Incomati was rising sharply in all three countries and unilateral development plans were formulated.¹⁸ Two follow-up conferences were held (in 1969 in Lourenço Marques, and in 1972 in Mbabane), but no progress on the preparatory studies was made. During the 1969 meeting, the three countries agreed that projections for water requirements in the year 2000 had to be made. However, at the meeting of 1972 no data on actual water use were shared. It was therefore agreed that the countries would make available such data by March 1973. During the same meeting, South Africa committed itself not to proceed with further developments in the Incomati basin without first consulting the other two riparian states.¹⁹

During these initial meetings on the Incomati, Swaziland’s main concern was a guaranteed minimum flow during the dry season in the Komati River. As a trade off it was prepared to forego the floods for storage in upstream South Africa (that is, in Vygeboom dam). Swaziland accepted the recommendations of a technical committee, which set low flow levels to be guaranteed.²⁰ The meeting of March 1973 never took place. The next tripartite meeting was only held in 1982 (exactly ten years after their last meeting), as the Tripartite Permanent Technical Committee (TPTC). It is likely that the three countries found it difficult to meet during 1972–81 because of developments in Mozambique.

6.1.2. *The Period 1972–81*

After Mozambique attained independence in 1975, its relation with South Africa quickly deteriorated. At the political level relations between Mozambique and South Africa remained strained, and only improved substantially from 1990 onwards. It is therefore important to acknowledge that the three countries remained on speaking terms with regard to the water resources of the Incomati.

In contrast, the relation between Swaziland and South Africa grew closer, though not always without tension.²¹ Between 1978 and 1981, Swaziland and South Africa delegations formally met at least eleven times, negotiating the uses of the Komati River. Of these eleven meetings, seven were of the Joint Permanent Technical Committee (JPTC), the bilateral counterpart of the TPTC. In order to dispel

Swaziland's fear of being pushed into an agreement, South Africa agreed to pay half the cost of an independent consultant to act on Swaziland's behalf.²² During this flurry of meetings and negotiations the first ideas of a joint Komati Basin Development Plan were conceived. In 1992, these ideas would culminate in a treaty on the development and utilization of the water resources of the Komati river basin, the establishment of the Komati Basin Water Authority (KOBWA), and the construction of the Maguga dam in Swaziland and Driekoppies dam in South Africa. But before this treaty was signed, both countries would still meet bilaterally many times (thirty-three times, including those at ministerial level, between 1982–91).

During the period 1976–80, Mozambique and Swaziland held talks on the Umbeluzi waters, on which the city of Maputo depends. This resulted in the signing in 1976 of the "Umbeluzi Agreement," in which Swaziland committed itself to leaving 40 percent of the flow in the White and Black Umbeluzi in the river for use by Mozambique.²³ When in May 1979 the lowest flow ever in the Umbeluzi at the Mozambican side was recorded because of the filling of the new Mnjoli dam (capacity 153 Mm³) in Swaziland, and Maputo experienced severe shortages, both countries held successful negotiations on respecting this bilateral agreement. After the talks the river flow significantly increased.

Given the political context of the time, it is remarkable that South Africa and Mozambique met twice in 1978 to discuss issues related to shared waters. The first meeting was held on May 8, and was discretely organized under the auspices of the CEO of the South African Railways. A month later, an official delegation of the South African Department of Water Affairs visited Maputo and met a delegation of the Direção Nacional de Aguas (DNA).

By 1980, Swaziland and South Africa acknowledged that Mozambique was an interested party in the Incomati, and that its interests had to be taken into account. In February 1981, floods occurred in the Save, Limpopo, Incomati, and Umbeluzi rivers. In the southern rivers floods were modest, but in the Limpopo and Save extensive flooding occurred. In a subsequent meeting held in 1981 between representatives of Mozambique and South Africa on Inhaca island (off the coast of Maputo), issues related to flood management were discussed. The local newspaper in Mozambique excitedly spoke of "water diplomats" from South Africa and Mozambique meeting.²⁴ This must have been quite an event, given that official contacts between both countries were extremely limited.

The few contacts that existed between Mozambique and the other two riparian countries centered on the exchange of hydrological information and plans for future developments. Although hydrological information was shared more or less freely (which proved important during the floods of 1981 and 1984), there was great reluctance to inform each other frankly on actual water use and plans for future development. In addition there was a considerable language gap. Mozambique was Portuguese-speaking and not many nationals had mastered the English language. Expatriates who spoke on behalf of the Mozambican delegation often facilitated negotiations. The Swaziland delegation also made use of expatriates, mainly to bring in expert knowledge.

Another characteristic of the negotiations on the Incomati can be discerned from the above, and would be repeated in the years to come: Swaziland and South Africa held many more bilateral meetings than there were tripartite meetings. This must have made Mozambique feel uneasy, as it was clear that it was negotiating with two partners that, at least during trilateral negotiations, formed a closed front, and talked a common language, literally and figuratively speaking. Swaziland, however, views its role of having facilitated the coming on board of Mozambique in the tripartite talks as crucial.²⁵

6.2. The Situation in the 1980s: Tensions in the Basin

6.2.1. The Period 1982–4

The year 1982 was a drought year. Many people in southern Mozambique died of starvation. Water levels in the Incomati basin were low. The sugar companies on the Incomati suffered severe crop losses. For the first time it was realized by many that the water resources of the river were limited, and that the steadily increasing upstream uses (Kwena dam on the Crocodile river (155 Mm³) had just been commissioned) directly impacted on downstream users.

When, after a ten-year lull, the fourth tripartite meeting between Mozambique, Swaziland, and South Africa was held in Mbabane on July 6 1982, the Incomati River, as measured at the border between South Africa and Mozambique, only carried a trickle (40 l/s) where it used to carry at least 6 m³/s. It ran completely dry two months later in September 1982, the first time since recording started in 1953. During this meeting the following was agreed:

- Mozambique recognized the 1964–7 Rivers Agreement, accepting the agreement made by its former colonial power, Portugal.
- The Tripartite Permanent Technical Committee (TPTC) was formally established (this meeting would be known as the first TPTC meeting, although the formal agreement between the three governments establishing the TPTC was only signed on February 17 1983 during the third TPTC meeting in Pretoria; see Annex 1).
- In the near future a report would be prepared outlining the water developments in each country during the period 1972 to 1982.
- In view of present developments, talks should start on the Incomati (rather than on the Maputo river, the only other river of common interest to the three countries).

Less than two months later the second TPTC meeting was held, this time in Maputo (the venue would rotate among the three countries). By now, the drought was a fact. Mozambique expressed its concern about the lack of water in the Incomati during the dry season at the border. South Africa explained that because of upstream developments it was no longer possible to release water during the dry season. Both countries agreed that there was an urgent need to coordinate further plans of water development, and that they would exchange information on studies already undertaken. Reference was made to the Komati river basin development plan being formulated jointly by South Africa and Swaziland.

Four subsequent TPTC meetings were held in 1983 and 1984.²⁶ The topics discussed during these meetings all centered on the exchange of information. Mozambique asked South Africa to provide discharge data on the Komati and Sabie rivers near its border. South Africa obliged. Mozambique informed the other riparians that construction of the Corumana dam had started.

Knowing what South Africa and Swaziland's development plans were in the upstream part of the Incomati basin was an important issue for Mozambique. South Africa and Swaziland first submitted short abstracts on their joint Komati basin development plan, but Mozambique wanted to see the full report. This was made available; the draft development plan, as formulated by the JPTC, envisaged the construction of Driekoppies (South Africa) and Maguga (Swaziland) dams. The dams would "stabilize existing water use and allow for modest irrigation expansion." Mozambique expressed its satisfaction with this draft interim report.

For its part, Mozambique presented, during the fifth TPTC meeting (Maputo February 27–8 1984), its "framework" report on the Incomati, inspired by Article 5 of

the Helsinki Rules (which provides a list of all factors to be taken into account when establishing "a reasonable and equitable share" of the water resources of an international basin). South Africa agreed with Mozambique's suggestion to formulate a single "framework" for the entire Incomati basin. In the next meeting (sixth TPTC meeting, Berg en Dal, August 30 1984), Swaziland and South Africa accepted Mozambique's Incomati report. But when, during the same meeting, Swaziland and South Africa submitted their joint report on the Komati, Mozambique observed that the format used differed from its "framework" document. Mozambique further observed that similar documents would have to be made for the Sabie and Crocodile rivers. South Africa promised to make available a preliminary report on the Sabie River to Mozambique.

In the corridors of this meeting, the head of the Mozambican delegation mentioned that his country eventually aimed at reaching an agreement on the Incomati basin that would have to address two key issues, namely:

- No further developments in the South African part of the Sabie River, in order not to harm the Corumana dam (under construction) on the Mozambican side of the Sabie.
- A guaranteed minimum flow in the Incomati at Komatipoort/Ressano Garcia.²⁷

More than six years later, both issues would be addressed in the Piggs Peak agreement.

An unrelated natural event reinforced the need for speedy information exchange: the Demoina flood that hit the lower Incomati in early 1984. During the fifth TPTC meeting (Maputo, February 27–8 1984) the countries noted the difficulty in communicating flood warnings speedily because conventional communication systems failed. Swaziland and South Africa promised to explore satellite communication options. During the sixth TPTC Mozambique presented a report on the 1984 floods, and South Africa committed that in future occasions the South African Broadcasting Corporation (SABC) would transmit messages via TV and radio in case telephone links were destroyed, as well as by satellite communication via Portugal.

6.2.2. The Period 1985–91

From 1985 to 1988 the TPTC did not meet. In the same period, Swaziland and South Africa met at least nineteen times, fourteen times as a JPTC, and five times at ministerial level. Swaziland and South Africa were making progress with formulating their joint Komati basin plan. A small hitch in the negotiations was that Swaziland did not accept financing through the Development Bank of Southern Africa, DBSA.²⁸

South Africa and Mozambique only met at the highest level: first at a meeting at Komatipoort between P. W. Botha, the premier of South Africa, and Samora Machel, the president of Mozambique (March 16 1984), when they signed the Komati Agreement. This agreement focused entirely on immediate security issues, and not on water. In 1985, two meetings were held between the ministers of water (April 17 at Komatipoort, and May 9 in Maputo). From 1985–8, as the security situation in southern Mozambique further deteriorated, the possibilities of Mozambique and South Africa negotiating water issues at technical and political levels were further curtailed.

Despite Mozambique's political and security problems, and after it had completed the massive Corumana Dam, the TPTC met twice in 1989. The need for such a meeting was possibly reinforced by South Africa and Swaziland's urgent wish to proceed with the building of two new dams on the Komati River, in accordance with their joint Komati basin plan. The hydrological context was that again the Incomati River fell dry in September that year.

The seventh TPTC meeting (Mbabane, February 21 1989) was characterized by a hardening of positions between the three countries. The eighth TPTC meeting, held one month later, was one of tough negotiations. This was probably when the clashes of interests between South Africa and Swaziland on one hand, and Mozambique on the other, were made explicit for the first time.

During the seventh TPTC meeting, Mozambique acknowledged receipt of the First Phase Komati Basin Development Plan (dated February 1987), but stated that the plan did not take into account its needs. South Africa announced that it intended to construct Driekoppies Dam as soon as possible, and Swaziland stated that it would make a final decision on the construction of the Maguga dam by the end of 1989. South Africa stated that the purpose of Driekoppies and Maguga dams was to utilize floodwater not used by Mozambique. Mozambique retorted that it already experienced severe shortages, and that the JPTC plan itself stated that "serious shortages of water are expected to occur along the Incomati River in Mozambique." Mozambique further accused South Africa and Swaziland of transferring Komati water out of the basin. Mozambique further denied ever having agreed to the construction of the two dams.

In an effort to resolve the deadlock, South Africa invited Mozambique to define its immediate needs but only along the Incomati upstream of the confluence with the Sabie, since the remaining needs could be met from the recently completed Corumana dam. Mozambique did not accept this suggestion, arguing that the Komati could not be separated from the rest of the basin, and that it required sufficient flow for present and future needs. The meeting finally agreed that South Africa would draft a position paper answering Mozambique's questions concerning Driekoppies dam, and that Mozambique would make its water needs known.

The eighth TPTC met only four weeks later in Maputo (March 21 1989). South Africa submitted its position paper, presented as a joint paper with Swaziland under the aegis of the JPTC. Mozambique, for its part, stated that its actual, short-term, medium-term, and potential water requirements were given in the 1984 "Framework" report: requirements that were not considered by the South Africa/Swaziland study. Mozambique further stated that it had never received any formal proposal by South Africa/Swaziland on the construction of the Driekoppies and Maguga dams. It noted that, whereas South Africa alleged that Mozambique had agreed to proposals in the consultant's interim report, no such agreement was recorded in the minutes of the TPTC meetings. South Africa responded by maintaining that the dams would not substantially reduce the availability of utilizable water in Mozambique. Mozambique emphasized that the dry season flow coming to Mozambique at Ressano Garcia had decreased substantially over the last twenty years. With the proposed plans, upstream water use in South Africa and Swaziland would further increase from about 700 to 900 Mm³/a after implementing Phase One.

South Africa stated that it could not wait for the implementation of Phase One, and it reiterated that it wanted to know Mozambique's needs between the border and the confluence with the Sabie, as the immediate water requirements on the Lower Incomati could be met from Corumana dam. Mozambique replied that Corumana should not be used to correct a situation caused by increased water use by upstream countries, but to expand its own irrigated area.

Mozambique finally stated that it wished to reach agreement on a division of the Sabie water first, and that it then would like to reach a general agreement on the entire Incomati basin. Mozambique had suggested this earlier during the fifth TPTC meeting. With Corumana dam on the Sabie River in place, it was in Mozambique's immediate interest to secure an uninterrupted supply. Mozambique further agreed to prepare a paper detailing its water requirements in order to allow the other countries to accommodate its needs.

After the meeting, South Africa formally requested Mozambique's "no objection" for the construction of Driekoppies dam. Mozambique responded in an official note signed by the Minister of Cooperation, stating some conditions, the most important being a water sharing agreement on the Sabie, and a guaranteed minimum flow in the Incomati at Ressano Garcia.

After the tough experience of the seventh and eighth TPTC meetings, Mozambique requested the World Bank to provide technical advice. Dutch experts from Euroconsult reviewed the existing data on water availability and water use in three rivers in Maputo Province, with emphasis on the Incomati (DNA, 1989). The study was commissioned in September 1989, and proved that water flows at Ressano Garcia had indeed diminished significantly due to upstream abstractions over the period 1952–86. The report contained a secret annex with advice to the Mozambican government with respect to the upcoming negotiations that would lead to the Piggs Peak agreement.

The ninth TPTC was held on November 16 1989 in the Kruger National Park in South Africa but little is known of what transpired. Developments during 1990 indicate that Swaziland and South Africa would not proceed with constructing Driekoppies and Maguga dams without the consent of Mozambique, and that both countries were willing to establish a water sharing arrangement with Mozambique. This willingness came at the time when Swaziland negotiated with the World Bank about financing its contribution towards the construction of Maguga dam. The World Bank, adhering to a long-established practice, demanded a declaration of "no objection" from Mozambique. This forced South Africa and Swaziland to reach agreement with Mozambique.

A water use arrangement was the central issue of the tenth TPTC meeting, held at Piggs Peak in Swaziland on February 14 1991. A day later, the ministers responsible for water met in the Tripartite Ministerial Meeting. The ministers agreed to approve the first phase of the Komati Basin Development Plan (that is, the construction of Driekoppies and Maguga dams), but also, pending agreements resulting from the Joint Inkomati Basin Study, that as interim measures the base flow at Ressano Garcia should be maintained at no less than 2 m³/s, and that South Africa would consult the TPTC prior to constructing any water work larger than 250,000 m³, or any water abstraction larger than 110 l/s on the Sabie.

Also part of the agreement was the decision to conduct a joint study of the water resources, demands, and development potential of the entire Incomati basin. The idea for such a study came from the positive experience of both Swaziland and South Africa when they formulated their joint development plan on the Komati. Conducting this joint study proved a powerful tool towards cooperation, as it broke down suspicions and created alliances at the technical level that influenced the process all the way up to the political level (see also Van Niekerk, 1989). It was with this philosophy in mind that the Joint Inkomati Basin Study (JIBS) was proposed.²⁹

During the same TPTC meeting, South Africa made available to Mozambique and Swaziland a report on water resources planning of the Sabie river catchment, which contained a recommendation to construct Injaka dam. This dam was meant to ensure sufficient domestic water for towns and communities in this area.

6.3. The Situation in the 1990s: Peace, Protocols, and Bilateral Projects

6.3.1. The Period 1991–7

From 1991 to 1997 no major new dam was commissioned on the Incomati basin, but water use continued to increase. This, combined with the great drought of 1992, resulted in the Incomati drying up again at the border, violating the agreed minimum

flow at Ressano Garcia of 2 m³/s. Mozambique complained, but South Africa argued that it was caused by the extreme drought. In the meantime, South Africa did not prevent sugarcane farmers building a weir immediately upstream of the border at Komatipoort, further affecting river flow.³⁰ In the South African part of the Sabie, communities suffered from severe water scarcity, which underscored the need for Injaka dam.³¹

Two major political developments with a positive impact on the Incomati basin were that South Africa attained majority rule in 1994, and that Mozambique held multi-party elections for the first time. Both developments consolidated the new era of peace and stability that emerged around 1991.

After the important Piggs Peak meeting of February 1991, the TPTC met six more times during the period 1991–7. The most important issue on the agenda during these meetings was progress on the Joint Incomati Basin Study (JIBS), which commenced in 1992. During these meetings, South Africa also regularly informed Mozambique about developments concerning the Injaka dam. The fourteenth TPTC meeting held in July 1995 also had the Umbeluzi basin on the agenda. The Maputo basin only started featuring during the seventeenth TPTC meeting held in May 1998. In 1995, the Joint Incomati Basin Study was completed in curtailed form, because of difficulties with gathering relevant data in Mozambique and the apparent reluctance of Mozambique to actively cooperate.

6.3.2. *The Bilateral Komati Development Project*

During this period, arguably the most important development on the Incomati basin was the establishment of the Komati Basin Water Authority (KOBWA) between Swaziland and South Africa, based on two treaties signed by both countries on March 13 1992. One treaty established the Joint Water Commission JWC, replacing the JPTC, which would “act as technical adviser to the Parties on all matters relating to the development and utilization of water resources of common interest to the Parties.” With the other treaty both countries committed themselves to building the Maguga in the Swaziland part of the Komati River, and the Driekoppies in the South African part of the Lomati River. This treaty specified how the costs would be shared (South Africa would fund Driekoppies dam and 60 percent of Maguga), as well as how the water would be shared in the Komati/Lomati (32.5 percent for Swaziland, 67.5 percent for South Africa). The treaty also established the Komati Basin Water Authority, which would be the bilateral agency operating the dams on the Komati/Lomati.

Driekoppies Dam (251 Mm³) on the Lomati River was completed by South Africa in 1998. The official commissioning ceremony was held on September 17 1998 by the then Minister of Water Affairs and Forestry of South Africa, Dr Kader Asmal, in the presence of the then Minister for Natural Resources and Energy of Swaziland, Prince Sobandla. At the occasion, the dam was renamed to Lake Matsamo. Around the same time the sod-turning ceremony for Maguga dam in Swaziland (which would be commissioned in 2002) was performed jointly by King Mswati III of Swaziland and former South African President, Nelson Mandela. Both ceremonies clearly underlined that the dams were a joint venture between the two countries.

6.3.3. *Developments on the Incomati, 1996–8*

In July 1996, South Africa and Mozambique agreed to establish a Joint Water Commission on rivers of mutual interest, in due consideration of the interests of the other riparians of these rivers (that is, Swaziland on the Maputo and Incomati, and Botswana and Zimbabwe on the Limpopo). In the same year, South Africa announced that it would start with the construction of Injaka dam (120 Mm³) on the Sabie River, as it could not wait any longer for an agreement because of domestic and

environmental needs. While South Africa had during earlier meetings tabled its intention at the TPTC, the Mozambican authorities considered it a surprise and a violation of the Piggs Peak agreement of 1991.

In 1997, Mozambique and Swaziland started to hold meetings concerning the establishment of a Joint Water Commission, along similar lines to the JWC between Swaziland and South Africa, and that between Mozambique and South Africa. The most important topic discussed during the two meetings held in 1998 was the intention of Swaziland to increase its irrigated area on the Usutu river (part of the Maputo basin) with 11,500 ha under the Lower Usuthu Smallholder Irrigation Project (LUSIP). In April 1999 both countries reached an agreement at the technical level on LUSIP, and in July 1999 the JWC was formally established.

6.3.4. The SADC–EU Conference: May 1997

In May 1997, the SADC Water Sector organized a conference on international river basins in Maseru, Lesotho. In the run-up to that conference, some tension came to the surface between South Africa and Mozambique. South Africa was unhappy about some formulations in the draft text of a paper that would be presented during that conference. Strongly worded references to alleged violations by South Africa of its earlier agreements on the Incomati basin irked South Africa. Mozambique obliged and rephrased sensitive parts of the paper (Box 5; the final paper was published as Carmo Vaz and Lopes Pereira, 2000).

Possibly facilitated by the willingness of Mozambique to take South Africa's concerns seriously, during the conference the South African water minister committed his country to honor earlier agreements, to right wrongs of the past, and to do everything possible to ensure the agreed minimum flow in the Incomati at its border with Mozambique. This did not materialize in 1998 (see Box 6) but in 1999 South Africa did manage to deliver the agreed flow at the border.³²

Box 5. Text revisions of Carmo Vaz and Lopes Pereira's paper presented during the SADC–EU Conference on Shared River Basins, Maseru, May 20–1 1997

Draft text

"The minimum flow of 2 m³/s also was not complied with by RSA, alleging that, in a situation of serious drought, they had no authority to force their farmers to release water that was stored in their reservoirs."

"In addition, RSA announced the construction of the Injaka dam in the Sabié river, thus violating directly the agreement of 1991."

"The recent construction by South

Final text

"The minimum flow of 2 m³/s was not always complied with by RSA, alleging that, in a situation of serious drought, they had not enough water stored in reservoirs and all consumers had to be rationed."

"In addition, RSA announced the construction of the Injaka dam in the Sabié river, in spite of the agreement of 1991. While RSA says that it tabled it at the TPTC and that it could not wait any longer for an agreement because of domestic and environmental needs, the Mozambican authorities considered it internally as a surprise and a violation of the agreement."

"The recent construction by South

African farmers of a large weir, immediately upstream of the Ressano Garcia border, completely drying the Incomati River in Mozambique, thus violating the 1991 agreement and with no intervention of the RSA authorities in spite of Mozambican protests.”

African farmers of a large weir, immediately upstream of the Ressano Garcia border, significantly decreasing the already low flows in the Incomati River in Mozambique and with no effective intervention of the RSA authorities in spite of Mozambican protests.”

Box 6. News clip: “South Africa accused of keeping water”

Moamba, November 16 1998

Residents of the district of Moamba, in the southern province of Maputo, are accusing the South African authorities of violating the agreement concerning the use of the water from the Incomati River, that flows through both countries, reports the daily paper *Noticias* on November 3.

Moamba administrator Romao Mutisse stated that the South Africans take more than their share of Incomati water, which deprives the Mozambican side of water for irrigation and jeopardizes the expected good harvest in the present agricultural season.

“If it rains, as the forecasts say it will, the 1999 harvest will be good,” said Mutisse. “If it does not rain, but the South Africans release water as they should, we can still have a satisfactory harvest, mainly along the banks of the Incomati. But if it does not rain, and the South Africans continue violating their obligations concerning the use of international waters, then we will have serious problems in the Incomati valley.”

Over the last few months farmers in Moamba have been complaining of shortages of water for irrigation, which they blame on the South African unilateral decision to retain the water on their side.

Source: AIM Mozambique News Agency Report No.147, November 16 1998.

6.4. The Situation since 1999: Towards a New Agreement

6.4.1. The Year 1999: a Turning Point?

Whereas by 1998 relations between Swaziland and South Africa were at their best, relations between Mozambique and South Africa concerning the Incomati were not. Around 1999 a number of new initiatives were started, which would create the conditions for this relationship to improve, and would lead to the three riparian countries signing a new agreement on the Incomati and Maputo basins in 2002. These initiatives included the following:

- The TPTC established in 1998 the “Incomati System Operation Task Group” (ISOTG), which would advise on how all of the major dams on the Incomati, including both KOBWA dams (Driekoppies and Maguga), should be operated in order to achieve equitable water distribution. The major development here was that the operation of both dams was made subservient to the interests of all three riparian countries (and not solely of Swaziland and South Africa).

- The commitment of Mozambique to proceed, in 1999, with the second phase of the Joint Incomati Basin Study (JIBS), with funding from Danida. The original study of 1995 would be complemented with data and information on the Mozambique part of the basin that were missing. Where necessary the earlier study would also be updated with new data.
- The initiative to conduct a Joint Maputo Basin Study. This effectively broadened the agenda of the TPTC, which had so far mainly focused on the Incomati. The study was intended to provide information that would lead to a water sharing agreement between the three riparian countries on the Maputo. The importance of conducting this study increased when Swaziland indicated its intention to undertake a new smallholder irrigation project on the Usuthu River in Swaziland, known as LUSIP. The agencies willing to fund LUSIP demanded a water sharing agreement on the Maputo basin between the three countries. The Joint Maputo Basin Study started in 2000 and was completed in 2001.
- The TPTC subsequently decided that if a water sharing agreement on the Maputo basin was required, then it would be better to reach a similar agreement on the Incomati as well, and to incorporate both into one encompassing interim agreement for both river basins. The Inco-Maputo Task Group was established in May 1999 to prepare drafts for the TPTC, and met many times (twenty meetings between May 1999 and February 2002).

6.4.2. The Floods of February 2000

Nearly 700 people died and 95 more disappeared, many others were dislocated and much infrastructure severely damaged during the floods of the Limpopo and Incomati in February 2000. South Africa assisted Mozambique with rescue operations. For many Mozambicans, this was probably the first time to view the South African military as "brothers," and created a tremendous measure of goodwill. Just as with previous floods, such as Demoina in 1984, this event once more emphasized the need for basin-wide coordination across borders, and called for effective means of "real-time" information exchange in order to mitigate as much as possible potential hazards of future floods.

6.4.3. The Joint Incomati Basin Study (JIBS), 2001

During 2001 and 2002, two major dams were commissioned in the basin: Injaka (120 Mm³) on the Sabie River in South Africa, and Maguga (332 Mm³) on the Komati River in Swaziland. This brought the total storage capacity in the basin to 2,060 Mm³. His Majesty King Mswati III of Swaziland and South Africa's Deputy President Jacob Zuma conducted the official opening ceremony of Maguga dam on April 5 2002. Significantly, Mozambique's Minister of Public Works and Housing, Hon. Roberto White, was present during the ceremony. The dam was renamed as the Maguga Nkomati basin dam.

The second phase of the Joint Incomati Basin Study (JIBS) was finalized and submitted to the TPTC in April 2001. Although the study has not yet been formally approved by the TPTC, some conclusions of the study are worth mentioning:

- There is insufficient water in the Incomati to fulfill all the plans of the three riparian states. Mozambique's ambitious plans for irrigation development should be scaled down significantly and be limited to 36,000 ha over and above its current 22,000 ha.
- In order to cope with the high pressure on the water resources, Mozambique will have to increase storage capacity, first through raising the existing dam wall of Corumana (additional storage: 495 Mm³), and second by building the Moamba

Major dam (700 Mm³). South Africa will have to construct Mountain View dam in the Sand river (245 Mm³). With these dams in place, storage capacity would be just above the average annual water generation in the basin at the confluence of the Sabie and the Incomati (see Figure 7); that is, with an average residence time of one year.

- A sophisticated suite of computer models (Water Resources Yield Model and Water Resources Planning Model) was developed by consulting engineers BKS (Pty) Ltd (South Africa) and Acres International (Canada) for and in collaboration with the South African Department of Water Affairs and Forestry. The Water Resources Yield Model (WRYM) was used to analyze the water availability and water supply to the various water users in the basin. It allowed JIBS to measure the impact of various development scenarios. It appears that all three countries trust the model and the outcomes of the various development scenarios considered.
- JIBS emphasized the importance of experts from all three riparian countries having access to the WRYM computer model, as well as to new models that would assist with operational issues. For a considerable time, it remained unclear to Swaziland and Mozambique whether or not their experts would have access to the WRYM model. This was later clarified by South Africa. In the mean time, however, experts from Swaziland and Mozambique did not use the opportunity to run development scenarios on their own. This might have assisted them in the trilateral negotiations.

6.4.4. Towards an Interim Agreement: 2000–2

The discussions initiated in 1999 on an interim agreement for the Incomati and Maputo basins were tedious. A major breakdown occurred in mid-2000 when the Inco-Maputo Task Group, charged with drafting the agreement, was finalizing the sixth draft. The major issue was whether two annexes that were also being drafted, namely on the exchange of information and on transboundary impact, should be part of the current *interim* agreement or should become part of the final agreement, envisaged to be reached before the year 2010. The task group could not solve this stalemate. Given its limited mandate, the task group had to refer the matter back to the TPTC for resolution. The stalemate was finally resolved at that level, but significantly delayed the drafting process.

By the end of 2001 the negotiations had yielded little, and some observers close to the negotiations were pessimistic whether an interim water sharing agreement was within reach. However, during the first months of 2002 substantial progress was made. The three water ministers, who met on May 7 2002 in Ezulwini, Swaziland, declared in an official press release, that they:

- Had discussed the text of the draft “Tripartite Interim Agreement on the Protection and Sustainable Utilization of the Water Resources of the Incomati and Maputo Watercourses” (TIA).
- Confirmed that the TPTC’s “Resolution on the Exchange of Information and Water Quality Standards” would be passed prior to the formal signing of TIA.
- Confirmed their commitment to signing the TIA during the World Summit on Sustainable Development in Johannesburg, South Africa, in August 2002.

As was indicated in Section 5, the Tripartite Interim Agreement was indeed signed during the World Summit on Sustainable Development in Johannesburg, on August 29 2002. Three weeks earlier, the TPTC had signed the resolution on the exchange of information and water quality.

6.4.5. A Preliminary Analysis of the Interim Agreement of 2002

The Tripartite Interim Agreement is a very comprehensive document, setting out the laudable objectives of protecting the water resources of the Incomati and Maputo basins and utilizing these in a sustainable manner (see Section 5.4, and Annex 3). Moreover, the agreement is bold in that it specifies, in an annex concerning “flow regimes,” the water withdrawals in the three riparian countries that are allowed under this agreement (Table 11; compare with Table 5). The quantitative data in this annex were derived from the JIBS study, although some have been modified (notably environmental water requirements).³³

Table 11. Consumptive water use (Mm³/a) in the Incomati basin, as allowed by TIA, excluding evaporation losses from dams

<i>Country</i>	<i>Water generation</i>	<i>Priority uses*</i>	<i>Exotic tree plantations</i>	<i>Irrigation</i>	<i>Interbasin transfer</i>	<i>Total water use</i>	<i>% of total use</i>	<i>% of water generated</i>
South Africa	2 937	205	475	786	131	1 598	68	54
Swaziland	479	22	46	126	136	329	14	69
Mozambique	171	19	25	280	88	412	18	241
Total	3 587	246	546	1 192	355	2 338	100	65
% of total use		11	23	51	15	100		

* Priority uses include: Domestic and municipal, Industrial, and Livestock and game. Those priority water uses outside the Incomati basin are accounted for under interbasin transfer in the table.

Source: TIA (2002), Annex I; water generation taken from JIBS, 2001.

The most striking feature of the agreement is that it allows a significant increase (nearly 30 percent) in the consumptive water uses of the water resources of the Incomati by all three countries, allowing the commitment level to increase from 51 percent in 2002 to 65 percent in the near future. This includes water reserved for the future needs of the city of Maputo (an interbasin transfer of 88 Mm³/a). The agreement is thus based on the premise that more (secure) water can be created by:

- increasing the capacity of existing dams (Corumana dam in Mozambique and Vygeboom dam in South Africa)
- constructing new dams (Moamba Major dam in Mozambique; Tonga, Mountain View, and New Forest dams in South Africa; Silingane and Ngonini dams in Swaziland).

This premise has been corroborated by the Inco-Maputo Task Group, which carefully analyzed the proposed allocations, and conducted a systems analysis by feeding these allocations into the Water Resources Yield Model (WRYM) developed under JIBS. The outcomes were debated at length by the task group, and eventually all delegations were satisfied that the allocations can be provided at reasonable levels of assurance.³⁴ However, it is clear that such levels of assurance can only be achieved at a high cost, not only in terms of finance but also in terms of increased evaporation losses from dams. Further additional allocations (as specified in a separate annex on “Reference projects” in the agreement) will therefore have to be considered very carefully.

Even with increased storage capacity, the significant increases in water withdrawals will most likely lead to more frequent shortages. These shortages will have to be resolved by relying on Article 1 and Clauses 5 and 6 of Article 4 of the flow regime annex of TIA, which define procedures for managing water use during droughts. Article 1 assigns priority to water for domestic, livestock, and industrial use,

as well as to ecological water requirements. Implicitly, runoff reduction due to afforestation also takes priority, since this type of water use cannot be altered overnight. This means that in case of water shortage, the irrigation sector (with 51 percent of withdrawals by far the largest water user in the basin) will have to decrease its abstractions. Consequently, the irrigation sector will experience more frequent shortages in future. Enforcing this priority rule will be a challenge in terms of water management in all three countries, and more so if the political leverage of some large irrigators is considered (think, for example, of the sugarcane industry in all three countries).

The TIA's premise that more secure water can be made available resulted in the negotiating parties not having to critically evaluate current water uses. The large consumptive water use by exotic tree plantations as well as by some large interbasin transfers was not questioned. Afforested areas in all three countries are allowed to increase significantly, and existing interbasin transfers may continue.

The manner in which TIA defines first priority uses and other uses may not be entirely consistent with the national water laws of the three countries. An example is the National Water Act (1998) of South Africa, which, in Part 3, prioritizes only the Reserve, that is, water to satisfy basic human needs as well as to protect aquatic ecosystems. TIA, however, assigns the status of first priority use to the water transferred out of the Incomati basin from Nooitgedacht and Vygeboom dams for the use of cooling thermal power plants in the adjacent Olifants catchment, part of the Limpopo basin. The same priority is given to the water reserved for the future needs of the city of Maputo. This position may be questioned.³⁵

Concerning water requirements of the ecosystems, the interim agreement defines target in stream flows for the Sabie, Crocodile, Komati, and Incomati rivers. At Ressano Garcia, the minimum flow target is 2.6 m³/s, which is higher than agreed in 1991 at Piggs Peak (2 m³/s). At the estuary (Marracuene) the minimum flow target is set at 3 m³/s, which is less than recommended by JIBS (5 m³/s), but double the minimum flow recommended by Mozambique in 1984. Further detailed research on the water requirements of the Incomati estuary is clearly required, and the costs and benefits of various minimum flows estimated. This is not only relevant because many poor households derive important benefits from this estuary, but also because the integrity of the estuary and the whole of the Incomati River within Mozambique is important for the aquatic ecosystems in South Africa and Swaziland.³⁶

Despite these critical observations, the Tripartite Interim Agreement is an important positive achievement, and a landmark in the sharing of international waters. The three countries have not only accepted the equity principle in utilizing the Incomati and Maputo water resources, but have also been able to translate this into concrete, measurable, and thus enforceable, commitments. They obviously take this agreement very seriously, as they invested three long years in negotiating it. However, negotiations on the mooted Comprehensive Agreement, to be concluded by 2006, will be tough and complex, as the Incomati basin is approaching "closure."

7. FROM COMPETITION TO COOPERATION: A CONCLUSION

The Incomati river basin has a dynamic and checkered history of water sharing between Mozambique, South Africa, and Swaziland. The basin has seen a change from colonial rule to more or less totalitarian regimes and a subsequent transition to democratic rule. These changes were accompanied by violent interventions. At a regional scale, SADC was transformed from a governmental anti-apartheid organization of the frontline states into a regional organization for political and economic integration. During these turbulent times, the region has seen years of severe drought, hunger, and floods. There were thus ample reasons and triggers for serious conflicts over water to emerge. Yet the tensions over water that indeed existed never escalated into open conflict. To phrase it more poignantly, during a large part of the 1980s South Africa and Mozambique were practically at war and literally fighting, except over water. This is remarkable, and the following question begs an answer: Why didn't open conflict emerge between the riparian countries over the water resources of the Incomati, and why did cooperation prevail?

It is impossible to single out one clear-cut answer to this question. The answer must take into account the larger socio-political context that shaped the negotiations, which, as was shown, was fairly complex, multi-faceted, and sometimes contradictory. The answer must also consider the specifics of water availability in the three countries, and the manner in which the geography and hydrology of the Incomati basin tie them together and draw them into specific dependency relations, as well as their water needs and future development ambitions. Finally, the interests of individual water users (the majority of whom have remained voiceless) must be taken into account.

These three aspects will be discussed in Sections 7.1–7.3; Section 7.4 is devoted to some lessons of a more practical nature. Section 7 concludes with an attempt to answer the central question.

7.1. Socio-Politics at the Level of the Nation-States

The inequality of the three riparian countries in terms of geographic position, economy, and technological know-how is striking. In the Incomati the upstream country is the most powerful, whereas the downstream country is comparatively weak. In such a situation, the upstream country may be tempted to ignore the interests of other riparians, and the potential transboundary impact and damage of its development activities on downstream countries. This would provide fertile ground for open conflict to emerge.

The previous sections have shown that up to 1991 South Africa developed its water resources to a large extent without considering the needs of Mozambique, while taking a more careful approach with regard to Swaziland. The more considerate approach towards Swaziland may be explained by several factors. First, South Africa is situated both upstream *and* downstream of Swaziland. Denying water to Swaziland would directly affect water availability in South Africa's most heavily committed part of the basin, namely immediately downstream of Swaziland along the Komati. Second, Swaziland was one of the few independent countries in Africa that maintained good political relations with the apartheid regime, which South Africa did not want to put in jeopardy. Third, South African companies had economic interests in various water-related ventures in Swaziland. Thus, South Africa could not ignore Swaziland's interests in the Incomati. Yet at various crucial moments in the history of water sharing, South Africa also took Mozambique's interests, which it could have ignored, into account.

This was the case with the Piggs Peak Agreement reached in 1991, whereby South Africa and Swaziland acknowledged that Mozambique was an interested party in their bilateral Komati development project. Although the agreement was signed under pressure from the World Bank (it would only finance Swaziland's Maguga dam if Mozambique accepted it), and coincided with the dawn of a new era of peace, it was rooted in the bilateral and tripartite negotiations that preceded it.

The Piggs Peak agreement is an example of a triple-win. Swaziland got what it wanted and could pride itself in having brokered negotiations between two antagonistic states. South Africa could show that it played its new role of responsible neighbor. Mozambique could also show its goodwill (as it allowed the Komati Development Plan to go ahead), and got critical undertakings by South Africa concerning the Sabie River and a guaranteed minimum flow at Ressano Garcia.

Subsequent developments show that South Africa remains committed to considering downstream interests. This is explicitly stated in its National Water Act of 1998, and was also demonstrated by the minister of water affairs in 1997 who personally guaranteed the minimum flow at the border with Mozambique at Ressano Garcia. This commitment has been reconfirmed with the signing of the Tripartite Interim Agreement in 2002. The role of SADC in this development was also significant, as the new South Africa was eager to show its new face to the region. This was most convincingly displayed when South Africa rendered speedy and life-saving support to Mozambique during the floods of February 2000.

The record of the tripartite negotiations contains one stain. The construction of Injaka dam on the Sabie catchment led to frictions between South Africa and Mozambique. South Africa maintained that it met all requirements before constructing the dam. Mozambique disagreed.³⁷

7.2. Can More Water Be Squeezed out of the Incomati?

Whereas the riparian countries are committed to take each other's interests into account and to find negotiated solutions, there is a tendency, and a need, in all three countries to satisfy all users (existing and prospective) as much as possible. South Africa faces the challenge of righting the wrongs of the past by making more water available to emergent black farmers, but without questioning existing water uses by the historically advantaged elite (sugar, paper, thermal power, and so on). In this mode of compromise it cannot consider the Incomati water resources as finite and "closed," but prefers to project further increases of water withdrawals. Similarly, Swaziland wishes to increase access to water by small-scale producers, without affecting the large established sugar companies. Mozambique, for its part, faces an enormous challenge of economic development after more than a decade of civil war and economic stagnation. It therefore plans for a significant irrigation expansion and may require additional water for the city of Maputo from the Incomati.

The Tripartite Interim Agreement (TIA) honors the wishes and development plans of all three countries and thus suggests a "win-win" outcome. As was observed in the previous chapter, water scarcity is likely to occur more frequently. If in such situations the arrangements as spelled out in TIA are not fully complied with, downstream Mozambique will bear the brunt.

With water abstractions on the increase, and hence the frequency of water scarcity, new tensions may build up in the basin, and new negotiated solutions will be required. These negotiations will, of necessity, be more difficult than those of the past. As the Incomati basin is approaching "closure," they will be "zero-sum." In the not too distant future, some consumptive uses will have to decrease if other uses are allowed to increase.

7.3. The Role of Interest Groups and Stakeholder Participation

Among the most surprising aspects of the negotiations on the Incomati are the apparent voids: those interactions that did not occur, or did not come out in the open. The tripartite negotiations seem to have been largely confined to a handful of officials from the three countries. It remains unclear to the authors whether and how water users and user representatives were involved in them. And yet those are the ones with the real stakes.

Within each country large socioeconomic interests are associated with access to Incomati water. In Mozambique the most important interest groups include small-scale farmers, the two large sugar estates, those deriving benefits from the estuary, and the needs of the city of Maputo to secure additional water in the near future. In Swaziland, the two major interest groups include the established sugar estates and the small-scale farmers who also wish to grow sugarcane. In South Africa, the situation is more varied, with established commercial irrigators, newly emergent black farmers, the TSB sugar mills, the Sappi paper company, and the Kruger National Park all having strong interests in accessing Incomati waters.

There is no doubt that many of these interests have been able to articulate their wishes to country negotiators. It will require more detailed research to establish how this was accomplished, revealing the pressures under which the country delegations sat around the negotiation table. But it is known, for instance, that Anton Rupert, the founder of the Rembrandt group that owns the TSB sugar company, has direct access to the highest political circles, not only in South Africa but also in Mozambique. Other companies may have remained sidelined in the negotiation process, but have found other ways of accessing Incomati water. Such is the case with the two biggest sugar companies in South Africa, Illovo and Tongaat-Hulett, who recently acquired significant stakes in the two sugar estates in the Mozambican part of the Incomati basin. In addition, Tongaat-Hulett has interests in sugar production in the Umbeluzi basin irrigated with Incomati water. South African companies are therefore competing for the Incomati water resources in all three riparian countries. If the water cannot go their way, these companies go where the water is!

The fact remains that no formal and transparent procedure for water users to participate in the trilateral negotiations existed. The danger, then, is that water user groups participate through other means, such as "old boy networks." This creates an uneven playing field whereby the majority of water users may remain without voice. In future this will have to change. Stakeholder representatives must get formally involved in the sharing agreements at the basin scale. This will allow the negotiations to "deepen," and the agreements to be more effectively implemented and enforced. Water users have to "buy" into the agreements, and widen their often limited perspective to the entire basin.

The water reforms in all three countries (Swaziland's new Water Act is expected to come into force soon) provide a unique opportunity. The newly established Catchment Management Agencies in South Africa and Regional Water Authorities in Mozambique, and the proposed River Basin Authorities in Swaziland, all have a strong component of stakeholder participation. Such water management bodies, including water user boards, should be stimulated to establish contacts across borders. This will enhance mutual understanding, and will allow them to give practical form to the bilateral and trilateral agreements reached between states.

7.4. Negotiating a Water Sharing Agreement: Some Practical Lessons

7.4.1. Widening the Scope of Negotiations to the Entire Basin

The first negotiations started mainly between Swaziland and South Africa about the river that was most heavily committed at that moment: the Komati. At that time it was not opportune to take a basin-wide perspective. Only gradually did the entire basin emerge as the only appropriate unit on which to base agreements.

The process of negotiating water in the Incomati has therefore been iterative, with an initial focus on the smaller spatial scales. With the steadily increasing pressure on water resources, the interconnectedness between the various parts of the basin became apparent (exemplified by the drying up of the Incomati at the border between Mozambique and South Africa). This led to widening the scope of the water allocation process also to the largest spatial scale, the watercourse as defined by the UN Convention and the revised SADC Protocol.

7.4.2. Broadening the Scope of Negotiations to Include Other Issues

When by 1998 a stalemate was reached on the Incomati, a relatively minor development created new opportunities for an agreement to be reached. The Lower Usutu Smallholder Irrigation Project (LUSIP), on a river basin that was less contested than the Incomati (the Maputo basin), brought to the negotiating table by the least controversial riparian country (Swaziland), caused the negotiation base to be broadened. With the inclusion of the Maputo basin, new combinations of negotiation positions were suddenly possible. One country might want to score "more" on the one basin and be somewhat "flexible" on the other, depending on that particular country's needs. This broadening of the scope of negotiations therefore offered more options, enhancing the chances of a positive outcome.

Another instance of broadening the scope of the negotiations was when the JIBS study added the environment to the list of water using sectors. The recognition by the upstream countries that indeed the environment required water gave a fresh argument in favour of an old issue that had been the subject of negotiations ever since the Incomati river fell dry for the first time in 1982, namely the establishment of minimum flows. When in 1998 South Africa adopted its new Water Act, it had to reserve water for environmental needs within its territory. Since environmental water requirements are largely non-consumptive, this means that more water will flow into the downstream country, satisfying an important issue for Mozambique.

Broadening the scope of the negotiations therefore offered more give and take options, which enhanced the chances of a positive outcome.

7.4.3. Structuring the Negotiations: A Phased Approach

At most times during the Incomati negotiations, the three riparian countries did honor each other's requests for information. The biggest opportunity to go beyond sharing information, and achieve a shared vision on the facts and future of the basin was created with the agreement at Piggs Peak to conduct the Joint Inkomati Basin Study. This opportunity, however, was not exploited to the full. This created a serious drawback, in that a new water sharing agreement took much longer than initially envisaged: three years of tedious negotiations. A similar chance was missed when access to the WRYM computer model developed under JIBS remained unclear. As a tool to analyze the impacts of development scenarios, WRYM can potentially create convergence among the negotiating parties.

It is apparent that it is imperative to conduct the negotiations in a structured and systematic way, from information exchange, via shared understanding of facts, to reaching agreement about a shared vision. Only thereafter will it be feasible to reach

a formalized and comprehensive agreement. The Incomati shows that shortcuts are costly in terms of time and opportunities lost.

7.4.4. The Unique Role of the Downstream Country

The downstream country was the party that had most to lose, and thus had to work hardest to claim its share. At times when contacts were less intense, upstream parties developed without impediment. The only option available to the downstream country was to insist on keeping the lines of communication open, even in times of war, and to show a willingness to reach negotiated solutions. The case of the Incomati shows that most of the time the other riparian countries obliged. This also implies, however, that the downstream country is often put in a position of responding and reacting to upstream *faits accomplis*, and finds it difficult to influence the agenda.

7.4.5. Technical Negotiations may Continue when Politics Fail

Discussions at the technical level can be very efficient, especially when official contacts are not possible at the political level. Mozambique has been able to secure a share of its waters thanks to the technical meetings that continued during the period 1974–91, when the official political relations were almost entirely hostile.

At times it was necessary for the weaker countries to engage external technical support (Swaziland received technical advice from the US Army Corps of Engineers, Mozambique from Euroconsult). In the case of Mozambique, this one-off type of technical support came at the right time, and led to the country becoming a more credible negotiator, taking on a firm and clear position. It is important to acknowledge that this did not weaken the other parties, but led to a credible, equitable, and legitimate sharing arrangement (Piggs Peak in 1991) that was largely upheld by the new Tripartite Interim Agreement (2002).

7.4.6. The Need for Capacity Building

There is a marked difference between the three riparian countries in terms of relevant expertise, despite significant capacity building efforts in Swaziland and Mozambique in the recent past. This may pose a threat to the successful implementation of existing agreements, and the conclusion of future negotiations. In devoting a separate article to capacity building in the Tripartite Interim Agreement, all three countries acknowledge the importance of this issue. To level the playing field there is need to continue investing in human resources.

7.5. From Conflict to Cooperation

So why was there not open conflict between the riparian countries over the water resources of the Incomati, and why did cooperation prevail?

First, because riparian countries are made up of people who share a common space and a common history, and therefore also a common future. There is an inherent pressure for nation-states to behave as good neighbors, even when political ideologies diverge. Furthermore, there are outside pressures on nation-states to act responsibly, and to honor existing regional and international conventions. The strong political ties between states in Southern Africa are an important and positive resource. Moreover, multilateral banks intent on funding large water projects normally demand declarations of no objections by other riparian states.

The second reason is the particular political developments in both Mozambique and South Africa. Just when the need for an agreement was highest, the cold between both countries started to melt, allowing the Piggs Peak agreement to be reached in 1991.

Third, there was a third riparian country whose role as broker was accepted by the other two riparian countries, because of its particular political and hydrological position *vis-à-vis* the other two countries.

Finally, and perhaps most importantly, potential conflicts were evaded by allowing more water to be abstracted and more dams to be built. So far the negotiations can therefore be considered non-zero sum games. However, as the Incomati basin fast approaches closure this situation is bound to change. The comprehensive agreement, to be concluded by 2006, will have to address this fact. Water sharing will increasingly be a delicate balancing act between cooperation and competition.

The hypothesis that water drives peoples and countries towards cooperation is supported by the developments in the Incomati basin. Increased water use has indeed led to rising cooperation. When the next drought comes and Mozambique, South Africa, and Swaziland enforce their recently concluded agreement, and voluntarily decrease those water uses deemed less essential, then the hypothesis has to be accepted.

NOTES

1. The word "Incomati" used to be spelled in South Africa and Swaziland as "Inkomati". Both spellings refer to the entire river basin. We follow the convention and use Incomati when referring to the entire basin, except when quoting official documents that do not follow this convention. Please note that "Nkomati" (Swaziland) or "Komati" (South Africa) refers to the Komati river, which is one of the tributaries in the Incomati basin. In Mozambique "Incomati river" is used to refer to the main stem of the river inside that country. (The JIBS, however, used "Inkomati" to refer to the entire river basin, and in quoting them we follow their convention.)
2. The Umbeluzi river basin covers a total area of 5,460 Mm², of which 41 percent is located in Mozambique, 58 percent in Swaziland, and only 1 percent in South Africa. The Maputo river basin covers a total area of 30,000 Mm², of which approximately 57 percent is located in South Africa, 37 percent in Swaziland, and 6 percent in Mozambique.
3. In 1984, DNA established that a minimum flow of 1.5 m³/s was necessary to keep salt intrusion at acceptable levels (cited in DNA, 1989, p. 21).
4. Another project was financed with South African capital, namely the construction of a dam on the Cunene river, which forms the border between Namibia and Angola. In 1964 Portugal and South Africa signed the so-called "Cunene Agreement," which covered all waters of mutual interest to Portugal and South Africa. This agreement therefore included the waters of the Incomati basin (Bipartite Agreement between South Africa and Portugal in regard to Rivers of Mutual Interest and the Cunene River Scheme).
5. The Southern Africa Development Coordination Conference, which was transformed into SADC (Southern Africa Development Community) in 1992.
6. The paper mill at Ngodwana was expanded during the 1980s. It currently requires some 6,000 tons of wood per day, which is supplied from commercial forests plantations. The mill produces pulp (540,000 tons/a) and paper (400,000 tons/a). Source: <http://www.sappi.com>.
7. South Africa's heartland of sugarcane production is Kwazulu-Natal, which is all rain-fed. Total sugar production in South Africa is c. 2.5 million tons/year, more than half of which is exported (SASA, 2002).
8. Mhlume Swaziland Sugar Company and the Royal Swaziland Sugar Corporation merged in July 2002.
See <http://www.swazi.com/government/newsletter/2002/nl25-2002.html>.
9. Source: <http://www.hulets.co.za/tambankulu.html>.
10. This is well explained in a judgment of the Competition Tribunal of South Africa in 2000 against the merger between TSB and Tongaat-Hulett; see <http://www.comptrib.co.za/html/83lmjul00m.htm>.

11. Personal communication, Dr Theo van Robbroeck, July 25 2002.
12. Personal communication, Mr Niel Van Wyk, October 31 2002.
13. Another minor interbasin transfer occurs at Acornhoek, where 2 Mm³/a is exported from the northern watershed of the Sabie River catchment. This transfer is likely to increase to 9 Mm³/a in 2015.
14. At present the main raw water source for the water supply system for Maputo is the Umbeluzi River, regulated by the Pequenos Libombos reservoir. Abstraction from this reservoir for Maputo can probably not exceed 240,000 m³/d (88 Mm³/a).
15. The 1992 Treaty establishing the Southern African Development Community defines "protocol" as an instrument of implementation of the treaty, having the same legal force as the treaty.
16. Personal communication, Mr Sidney Dhlamini, October 18 2002.
17. The second phase of JIBS did not update the data on water use given in the first JIBS report for South Africa and Swaziland. JIBS (2001) therefore contains data on water use that are difficult to compare. It presented *potential* water consumption in Mozambique with the existing infrastructure *for the year 2000* (a figure higher than Mozambique's actual water use in 2000), and *actual* water consumption for South Africa and Swaziland *for the year 1991* (a figure lower than their actual water use in 2000).
18. Dr Theo van Robbroeck recalls that because of the Cunene hydroelectric project on the border between Angola and the then South West Africa (Namibia), there was a lot of interaction between the South African authorities, then responsible for that project, and the Portuguese. It can be surmised that there was a desire to extend such discussions to other water resources of common interest between these two authorities, but which, of necessity, Swaziland was to be a part. The Portuguese may already have been worried about upstream water use in the Incomati due to the commissioning of the Nooitgedacht Dam. At that time it was also known that Eskom envisaged further power stations in the same area (personal communication, Dr Theo van Robbroeck, July 25 2002).
19. The meeting of the Standing Technical Committee on Parameters (Mbabane, November 21 1972) agreed that works in excess of 10 Mm³ storage and 10 Mm³/a abstraction (or 0.32 m³/s) would be recorded by the TPTC.
20. Personal communication Eng. Gebre Libsekal, April 2002.
21. Around 1976, a conflict emerged between Swaziland and South Africa on the Komati River. In the eyes of Swaziland, South Africa had reneged on the earlier agreement of maintaining a certain minimum flow in the Komati River at the border with Swaziland (personal communication Eng. Gebre Libsekal, April 2002). In September 1979, the drought of that year triggered the request by Swaziland to South Africa to increase its water releases from the Vygeboom Dam (upstream in the Komati) to 68 cusec (1.9 m³/s). The drought of 1982 caused a water shortage in Swaziland and in July 1982, Swaziland requested South Africa to release more water in the Komati River. It is not known whether the 1979 and 1982 requests were granted.
22. As a result, the United States Corps of Engineers were hired at a cost of \$56,000 (personal communications, Mr Peter van Niekerk, January 2002, and Dr Theo van Robbroeck, February 2002).
23. This agreement, one and a half pages long, does not regulate issues related to exchange of information, joint control of measuring stations, and water quality, nor does it impose regular meetings between the two countries for verification of its implementation (Carmo Vaz and Lopes Pereira, 2000). A major weakness of the agreement is that it requires Swaziland to release to Mozambique 40 percent of the combined measured flows (*not naturalized*) past GS3 and 10. Further developments upstream of these gauges can significantly reduce the flow without violating the agreement (personal communication, Mr Sidney Dhlamini, July 2002).
24. Personal communication, Mr Peter Van Niekerk, January 2002.
25. Personal communication, Eng. Gebre Libsekal, April 2002.
26. The third and fourth TPTC meetings were held in 1983, and the fifth and sixth in 1984. The seventh TPTC meeting was initially scheduled to be held in 1985 but did not take place until 1989. Whereas the TPTC met six times during 1982–4, the JPTC (Swaziland and South Africa) met eleven times in the same period.
27. Personal communication, Mr Hubert Savenije, November 2001.

28. Personal communication, Mr Peter Van Niekerk, January 2002.
29. Personal communication, Mr Peter Van Niekerk, October 21 2002.
30. Interestingly, these same farmers would also fight a battle upstream, namely with the South African electricity company Eskom, which diverts large amounts of water out of the Upper Komati River (Waalewijn, 2002).
31. Personal communication, Mr Mike Muller, October 24 2002.
32. The internal arrangement in South Africa was that 1.1 m³/s should come from the Komati River, and 0.9 m³/s from the Crocodile. At the border with Mozambique, both rivers join (Waalewijn, 2002, p. 79).
33. It is important to note that TIA does not explicitly consider evaporation losses from dams, as these have not been included in the allocations presented in the flow regime annex of the agreement.
34. Personal communication, Mr Niel Van Wyk, October 24 2002.
35. Compare this also with the consent by Mozambique to the interbasin transfer from the Pungwe river basin for the primary needs of the city of Mutare in Zimbabwe, and its refusal to allow Zimbabwe to transfer water from the same river out of the basin for irrigation purposes, a position which was accepted by Zimbabwe. Both countries reached this agreement on September 27 1995, after eighteen months of negotiations.
36. Personal communication, Mr Niel Van Wyk, October 31 2002.
37. One observer is of the opinion that had the JIBS study from the start been conducted in the manner originally envisaged, namely all three countries actively taking part in it simultaneously, it would have been less likely that disagreement would have emerged on the Injaka dam. (Personal communication, Mr Peter Van Niekerk, October 21 2002.)

BIBLIOGRAPHY

- Beinart, W. 1994. *Twentieth-century South Africa*. Oxford, Oxford University Press.
- Bienen, H. S. 1985. Economic interests and security issues in Southern Africa. In: R. I. Rotberg, H. S. Bienen, R. Legrold, *South Africa and its Neighbors: Regional Security and Self-Interest*. Lexington, Mass., Toronto.
- Brito, R. 2002. *Brochure on Integrated Water Resources Management*. Harare, Global Water Partnership: Southern Africa.
- Cabaço, J. L. 1991. A Africa Austral e as transformações na Europa. In: A. Zacarias (ed.), *Repensando estratégias sobre Moçambique e Africa Austral*. Maputo
- Carmo Vaz, A. and Lopes Pereira, A. 2000. The Incomati and Limpopo International River Basins, a View from Downstream. *Water Policy*. Vol. 2, Nos 1-2, pp. 99-112.
- Cawthra, G. 1996. *Brutal Force: The Apartheid war Machine*. London.
- Cliffe, L. 1976. Modelo de Colaboração e Conflito com o Subimperialismo Sulafricano. In: *A Africa Austral em perspectiva*. Lisbon, Centro de Estudos de Dependência, Vol. 1, pp. 113-36.
- Coker, C. 1985. South Africa: A new military role in Southern Africa 1969-82. In: R. Jaster, *Southern Africa: Regional Security Problems and Prospects*. Aldershot.
- Coles, J. and Cohen, R. 1977. O Subimperialismo Sul-Africano. In: E. de Sousa Ferreira (ed.), *A Africa do Sul e as Ex-Colônias Portuguesas*. Lisbon.
- Davies, R. and O'Meara, D. 1985. Total Strategy in Southern Africa: An Analysis of South African Regional Policy Since 1978. *Journal of Southern African Studies*. Vol. 11, No. 2, pp 183-211.
- DNA. 1989. *Review of the Water Resources of Maputo Province*. World Bank Study. Arnhem, Euroconsult; Maputo, DNA.
- Gomes, F. and Famba, S. I. 1999. Water Resources for Crop Production: Mozambique Country Report. Paper presented at the workshop on Integrated Analysis and Management of Renewable Natural Resources in Mozambique, Maputo, June 7-11.
- Green, R. and Thompson, C. B. 1986. Political Economies in Conflict: SADCC, South Africa and sanctions. In: P. Johnson and D. Martin (eds.), *Destructive Engagement: Southern Africa at War*. Harare.
- Hanlon, J. 1984. *Mozambique: the Revolution Under Fire*. London, Zed.

- . 1986. *Beggar your neighbors: Apartheid Power in Southern Africa*. London, Bloomington, Ind.
- Jewitt, G. P. W.; Heritage, G. L.; Mackenzie, J. A.; and Weeks, D. C. n.d. *The Sabie River Catchment*. URL: <http://www.ccwr.ac.za/knprrp/blink/chapter2.htm>.
- JIBS. 2001. *Joint Inkomati Basin Study Phase 2*. Consultec in association with BKS Acres. Final Draft, April 2001.
- Katzenellenbogen, S. E. 1982. *South Africa and Southern Mozambique: Labor, Railways, and Trade in the Making of a Relationship*. Manchester.
- Libby, R. T. 1987. *The Politics of Economic Power in Southern Africa*. New Jersey.
- Minter, W. 1977. Origens Externas da Reacção em Angola e Moçambique. In: E. de Sousa Ferreira (ed.), *A Africa do Sul e as Ex-Colónias Portuguesas*. Lisbon.
- . 1998. *Os Contrastes do Apartheid; As Raízes da Guerra em Angola e Moçambique*. Maputo.
- Murteira, M. 2000. Formação e Colapso de uma Economia Colonial. In: F. Bethencourt and K. Chaudhuri (eds), *História da Expansão Portuguesa: Vol. 5: Último Império e Recentramento (1930–98)*. Lisbon.
- Mwendera, E. J.; Manyatsi, A. M.; Magwenzi, O.; and Dhlamini, S. M. 2002. *Swaziland Water Demand Management Country Study Report*. Water Demand Management Program for Southern Africa Phase II. Pretoria, IUCN.
- Newitt, M. 1995. *A History of Mozambique*. Johannesburg, Witwatersrand University Press.
- Nyathi, W. M. 1977. O Imperialismo Sul-Africano na Africa Austral. In: E. de Sousa Ferreira (ed.), *A Africa do Sul e as Ex-Colónias Portuguesas*. Lisbon.
- Ohlsson, L. 1995. *Water and Security in Southern Africa*. Publications on Water Resources No. 1. Stockholm, Sida.
- Packard, R. 2001. "Malaria Blocks Development" Revisited: the Role of Disease in the History of Agricultural Development in the Eastern and Northern Transvaal Lowveld, 1890–1960. *Journal of Southern African Studies*. Vol. 27, No. 3, pp. 591–612.
- Price, R. M. 1990. Pretoria's Southern African strategy. In: S. Chan (ed.), *Exporting Apartheid: Foreign Policies in Southern Africa 1978–88*. London and Basingstoke.
- SADC. 1995. *Protocol on Shared Watercourse Systems in the Southern African Development Community (SADC)*. Signed in Johannesburg on August 28 1995. Gaborone, SADC.
- . 2000. *Protocol on Shared Watercourses in the Southern African Development Community (SADC) Region*. Signed in Windhoek on August 7 2000. Gaborone, SADC.
- SASA. 2002. *South African Sugar Industry Directory*. Mount Edgecombe, South African Sugar Association (URL: <http://www.sugar.org.za>).
- Schouwenaars, J. M. 1988. Rainfall Irregularity and Sowing Strategies in Southern Mozambique. *Agricultural Water Management*, Vol 13, pp. 49–64.
- Smithers, J. C.; Schulze, R. E.; Pike, A.; and Jewitt, G. P. W. 2001. A Hydrological Perspective of the February 2000 Floods: A Case Study in the Sabie River Catchment. *Water SA*, Vol. 27, No. 3, pp. 325–32.
- TIA. 2002. *Tripartite Interim Agreement between Mozambique, South Africa and Swaziland for cooperation on the protection and sustainable utilization of the water resources of the Inkomati and Maputo watercourses*. Johannesburg, August 29 2002.
- UN. 1997. *Convention on the Law of the Non-Navigational Uses of International Watercourses*. Adopted by the United Nations General Assembly in resolution 51/229 of May 21 1997. New York, United Nations.
- Van Niekerk, P. H. 1989. Basin Studies for Participative Water Resource Planning. *The Civil Engineer in South Africa*, October [in Afrikaans].
- Van Der Zaag, P. 1984. *Desenho de 1600 Hectares de Arroz Alagado*. Projecto de recuperação de regadios de Macia. Brigada de Construção de Macia. SRBL, Xai Xai.
- Waalewijn, P. 2002. *Squeezing the Cow: Perceptions and Strategies of Stakeholders Concerning River Basin Management on the Lower Komati River, South Africa*. M.Sc. Thesis, Wageningen, Wageningen University.
- Wuyts, M. 1989. *Money and Planning for Socialist Transition: The Mozambican Experience*. Aldershot, UK, Gower.
- Zacarias, A. 1991. *Repensando Estratégias Sobre Moçambique e Africa Austral*. Maputo.

ANNEX 1.

Agreement between the Government of the Republic of South Africa, the Government of the Kingdom of Swaziland and the Government of the People's Republic of Mozambique Relative to the Establishment of a Tripartite Permanent Technical Committee. Signed at Pretoria, February 17 1983 ¹

The Governments of the Republic of South Africa, the Kingdom of Swaziland and the People's Republic of Mozambique have agreed as follows:

Article 1

The Contracting Parties shall establish a Tripartite Permanent Technical Committee.

Article 2

The Tripartite Permanent Technical Committee (hereinafter referred to as "the TPTC") shall consist of three representatives from each Government one of whom shall be nominated chairman, and each Government will have power to co-opt additional suitable persons to take part in the discussions as advisors. The chairmanship and the venue of meetings shall rotate among the Republic of South Africa and the Kingdom of Swaziland and the People's Republic of Mozambique.

Article 3

The three Chairmen shall convene the TPTC as and when circumstances require. Six members of the Committee shall form a quorum for any meeting, provided at least two representatives of each Government are present at such meetings. All conclusions and recommendations by the TPTC shall be by consensus.

Article 4

Each Government shall bear its own representative's cost as well as the cost of any persons it wishes to appoint as advisors.

Article 5

The functions and duties of the TPTC shall, *inter alia*, be to recommend to the three Governments:

- (a) Any measures to be undertaken to alleviate short term problems regarding water shortages on rivers of common interest during drought periods, taking into account the existing amount of stored water and water requirements in the three countries.
- (b) On the division of flows in rivers of common interest.
- (c) On procedures, programming, operations, maintenance, measurement of water, abstraction of water, curtailing of abstraction, and supervision with regard to the implementation of any agreements that are entered into between the three Governments.
- (d) Arrangements for the investigation of, and access to, common watersheds and joint water schemes on rivers of common interest.
- (e) The required mechanism to coordinate and integrate the findings and plans of each country including the appointments of consultants as required.
- (f) The estimated costs of investigations and appointments which shall be apportioned on an equitable basis.

Article 6

On the basis of preliminary studies, to be carried out either individually or jointly by the three Governments, and to the extent feasible, the TPTC shall prepare a report or reports with recommendations in respect of the optimum joint scheme or schemes that cater for the needs of the three countries. Such report or reports may include proposals for financing of proposed schemes.

Article 7

These terms of reference may be amended or added to as circumstances require.

Article 8

- (1) This Agreement shall enter into force on the date of signature thereof and may be terminated by any Contracting Party by giving six months' written notice to the other Parties.
- (2) Any amendment to this Agreement mutually agreed upon by the Contracting Parties shall be effected in writing.

IN WITNESS WHEREOF, the undersigned, being duly authorized by their respective Governments, have signed and sealed the present Agreement.

THUS DONE AND SIGNED at Pretoria in the English language, on this the Seventeenth day of February 1983.

For the Government of the Republic of South Africa

For the Government of the Kingdom of Swaziland.

For the Government of the People's Republic of Mozambique

ANNEX 2

Tripartite Interim Agreement between the Republic of Mozambique and the Republic of South Africa and the Kingdom of Swaziland for Cooperation on the Protection and Sustainable Utilization of the Water Resources of the Incomati and Maputo Watercourses²

Preamble

The Republic of Mozambique, the Republic of South Africa and the Kingdom of Swaziland (hereinafter jointly referred to as the "Parties");

BEARING IN MIND the principles advocated in the Declaration by the Heads of State or Government of Southern African States "Towards the Southern African Development Community" and the Treaty of the Southern African Development Community signed on 17 August 1992 and the Revised Protocol on Shared Watercourses in the Southern African Development Community signed on 7 August 2000;

HAVING RESOLVED to pursue the guidelines established by the Agreement between the Government of the Republic of South Africa and the Government of the Republic of Portugal in regard to Rivers of Mutual Interest and the Cunene River Scheme signed on 13 October 1964, to which the Republic of Mozambique succeeded in 1975 and the Kingdom of Swaziland acceded to in 1967;

MINDFUL of the spirit of cooperation and good understanding reached by the implementation of the Piggs Peak Agreement of 15 February 1991;

TAKING INTO ACCOUNT the modern principles and norms of International Law as reflected in the Convention on the Law of the Non-Navigational Uses of International Watercourses adopted by the General Assembly of the United Nations on 21 May 1997;

CONSCIOUS of the mutual advantages of concluding agreements on cooperation on shared watercourses;

DETERMINED to cooperate and seek mutually satisfactory solutions for the needs of the Parties towards water protection and to the sustainable utilization and development of the water resources with a view to improving the standard of living of their populations;

EXPRESSING the common desire to proceed with sustainable development on the basis of Chapter 18 of Agenda 21, adopted by the United Nations Conference on Environment and Development on 14 June 1992;

RECOGNIZING that the Parties need to agree on water use in the shared watercourses to enable sustainable development;

MINDFUL of the fact that good relationships between the people and the governments of the Parties, good neighborliness and mutual respect, will contribute to the improvement of cooperation on the protection and utilization of waters for the benefit and the welfare of their populations;

TAKING into consideration the interim nature of this Agreement;

HEREBY AGREE as follows:

Article1: Definitions

For the purposes of this Agreement the following terms shall have the meanings ascribed to them hereunder:

“Catchment” means an area through which any rainfall will drain into the watercourse through surface flow to a common point;

“Emergency situation” means a situation that causes or poses an imminent threat of causing serious harm to the Parties and which results suddenly from natural causes, such as torrential rains, floods, landslides, or earthquakes, or from human conduct;

“Environmental impact assessment” means a national procedure for evaluating the likely impact of a planned measure on the environment;

“Impact” means any effect on the environment caused by an activity; such effects on the environment include effects on human health and safety, flora, fauna, soil, air, water, climate, landscape, socioeconomic environment, or the interaction among these factors and cultural heritage or socioeconomic conditions resulting from alterations to these factors;

“Incomati watercourse” means the system of the Incomati River, which includes the tributaries Mazimechopes, Uanetze, Massintonto, Sabie, Crocodile, Komati Rivers, and the estuary;

“Maputo watercourse” means the system of the Maputo River, which includes the tributaries Pongola and Usuthu Rivers and the estuary;

“Ministers” means Ministers responsible for the water affairs of the Parties;

“Ongoing activity” means any activity that would have been subjected to a decision of a competent authority in accordance with an applicable national procedure if it had been a planned measure;

“Piggs Peak Agreement” means the agreement reached at the Tripartite Ministerial Meeting of Ministers Responsible for Water Affairs, signed in Piggs Peak on 15 February 1991;

“Planned measure” means any activity or a major change to an ongoing activity subject to a decision of a competent authority in accordance with applicable national procedures;

“Pollution” means any detrimental alteration in the composition or quality of the waters of a shared watercourse, which results directly or indirectly from human conduct;

“Protocol” means the Revised Protocol on Shared Watercourses in the Southern African Development Community signed on 7 August 2000 in Windhoek;

“Sustainable development” is development that meets the needs of present generations without compromising future generations to meet their own needs;

“TPTC” means the Tripartite Permanent Technical Committee established by the Agreement between the Government of the Republic of South Africa, the Government of the Kingdom of Swaziland and the Government of the People’s Republic of Mozambique relative to the establishment of the Tripartite Permanent Technical Committee, signed in Pretoria on 17 February 1983;

“Transboundary impact” means any adverse effect, caused by human conduct, within an area under the jurisdiction of a Party caused by a proposed activity, the physical

origin of which is situated wholly or in part within the area under the jurisdiction of another Party;

“Watercourse” means a system of surface and groundwaters constituting by virtue of their physical relationship a unitary whole normally flowing into a common terminus such as the sea, lake or aquifer.

Article 2: General Objective

This Agreement aims to promote cooperation among the Parties to ensure the protection and sustainable utilization of the water resources of the Incomati and Maputo watercourses.

Article 3: General Principles

For purposes of this Agreement, the general principles of the Protocol shall apply, especially -

- (a) sustainable utilization principle;
- (b) equitable and reasonable utilization and participation principle;
- (c) prevention principle; and
- (d) cooperation principle.

Article 4: Responsibilities of the Parties

The Parties shall, individually and, where appropriate, jointly, develop and adopt technical, legal, administrative and other reasonable measures in order to:

- (a) prevent, reduce, and control pollution of surface and groundwaters, and protect and enhance the quality status of the waters and associated ecosystems for the benefit of present and future generations;
- (b) prevent, eliminate, mitigate, and control transboundary impacts;
- (c) coordinate management plans and planned measures;
- (d) promote partnership in effective and efficient water use;
- (e) promote the security of relevant water related infrastructures and prevent accidents;
- (f) monitor and mitigate the effects of floods and droughts;
- (g) provide warning of possible floods and implement agreed upon urgent measures during flood situations;
- (h) establish comparable monitoring systems, methods, and procedures;
- (i) exchange information on the water resources quality and quantity, and the uses of water;
- (j) promote the implementation of this Agreement according to its objectives and defined principles;
- (k) implement capacity building programs in accordance with Article 14;
- (l) cooperate with the SADC organs and other shared watercourse institutions.

Article 5: Shared Watercourses Institution

- (1) The joint body for cooperation between the Parties shall be the TPTC.
- (2) The TPTC shall exercise the powers established in this Agreement, as well as those conferred by the Parties, in order to pursue the objectives and provisions established herein.
- (3) For the purpose of implementation of this Agreement the TPTC shall meet at least twice a year.
- (4) The official working languages for the purpose of implementation of this Agreement shall be English and Portuguese.

- (5) After the entry into force of this Agreement, the TPTC shall adopt, by consensus, rules of procedure which will govern its meetings. Until such rules of procedure are adopted by the TPTC, those contained in the TPTC Agreement shall govern such sessions of the TPTC, taking into account the provisions of sub Articles (3) and (4).

Article 6: Protection of the Environment

- (1) The Parties shall, individually and, where appropriate, jointly, protect and preserve the aquatic environment of the Incomati and Maputo watercourses, taking into account generally accepted international rules and standards.
- (2) The Parties shall, individually and, where appropriate, jointly, take all measures to protect and preserve the ecosystems of the Incomati and Maputo watercourses.
- (3) The Parties shall take all measures necessary to prevent the introduction of species, alien or new, into the Incomati and Maputo watercourses, which may have effects detrimental to the ecosystems of the watercourses resulting in significant harm to other Parties.

Article 7: Sustainable Utilization

- (1) The Parties shall be entitled, in their respective territories, to optimal and sustainable utilization of and benefits from the water resources of the Incomati and Maputo watercourses, taking into account the interests of the other Parties concerned, consistent with adequate protection of the watercourses for the benefit of present and future generations.
- (2) The Parties shall coordinate their management activities by the exchange of information on their respective experiences and perspectives; and the coordination of management plans, programs, and measures.
- (3) In pursuing the objective of this Article, the Parties shall follow the flow regimes stipulated in Annex I as determined according to Article 9.
- (4) In further pursuance of the objective of this Article the Parties disclose in Annex II their intentions of developing new projects that fall outside the scope of Annex I during the period of validity of this Agreement.
- (5) The Parties are committed to develop measures towards improvement of efficiency and rational use of water and its conservation and to promote more efficient water use through adopting better available technology.

Article 8: Water Quality and Prevention of Pollution

- (1) In order to protect and conserve the water resources of the Incomati and Maputo watercourses, the Parties shall, through resolutions adopted by the TPTC, and, when appropriate, through the coordination of management plans, programs and measures, proceed to:
 - (a) endeavor to develop an evolving classification system for the water resources of the Incomati and Maputo watercourses;
 - (b) classify and state the objectives and criteria in respect of water quality variables to be achieved through the agreed classification system for the water resources;
 - (c) adopt a list of substances the introduction of which, into the water resources of the Incomati and Maputo watercourses, is to be prohibited or limited, investigated or monitored;
 - (d) adopt techniques and practices to prevent, reduce and control the pollution and environmental degradation of the Incomati and Maputo watercourses that may cause significant harm to the other Parties or to their environment,

- including human health and safety, or to the use of the waters for any beneficial purpose, or to the living resources of the watercourses; and
- (e) implement a regular monitoring program, including biological and chemical aspects for the Incomati and Maputo watercourses and report, at the intervals established by the TPTC, on the status and trends of the associated aquatic, marine and riparian ecosystems in relation to the water quality of the said watercourses.
- (2) Until such time that water quality objectives and criteria are determined, the Parties shall comply with the provisions of the Resolution of the TPTC on Exchange of Information and Water Quality. The Resolution may be reviewed by the TPTC from time to time.

Article 9: Flow Regimes

- (1) The agreed flow regime of the Incomati watercourse is contained in Annex I, which complements the flow regime as determined in the Piggs Peak Agreement, and the agreed flow regime of the Maputo watercourse is contained in the same Annex.
- (2) Any abstraction of waters from the Incomati or Maputo watercourses, regardless of the use or geographic destination of such waters, shall be in conformity with the flow regimes of Annex I and relevant provisions of this Agreement and its Annexes.
- (3) The Parties have considered the following criteria in establishing the flow regimes contained in Annex I:
 - (a) The geographic, hydrological, climatic and other natural characteristics of each watercourse;
 - (b) the need to ensure water of sufficient quantity with acceptable quality to sustain the watercourses and their associated ecosystems;
 - (c) any present and reasonably foreseeable water requirements, including afforestation;
 - (d) existing infrastructure which has the capacity to regulate streamflow of the watercourses; and
 - (e) agreements in force among the Parties.
- (4) The following short to medium-term water requirements of each of the Parties are recognized in particular:
 - (a) The strategic importance to Mozambique of augmenting the water supplies to the city of Maputo and its metropolitan area from one or both of the Incomati and Maputo watercourses;
 - (b) the importance to Swaziland of developing the Lower Usuthu Smallholder Irrigation Project in the Usuthu River catchment; and
 - (c) the importance to South Africa of establishing and developing emerging irrigation farmers in the Incomati River catchment.
- (5) The additional water requirements of the city of Maputo, for which additional water must be secured, have been reserved in Annex I.

Article 10: Droughts and Floods

- (1) The Parties undertake to coordinate their actions within six months to one year and to develop measures to mitigate the effects of droughts and floods.
- (2) The flow regimes of the Incomati and Maputo watercourses during flood and drought periods shall be adjusted in accordance with the measures referred to in sub Article (1).
- (3) The Parties shall notify each other without delay and by the most expeditious means of any flood danger.

- (4) During flood alarm situations, the affected Party may require the other Parties to adopt the measures referred to in sub Article (1) and any other urgent measures agreed upon, which may be deemed necessary.
- (5) During a drought period, the Parties shall be obliged to manage, in a co-ordinated manner, water storage infrastructure in accordance with the measures referred to in Sub-Articles (1) and (2).

Article 11: Incidents of Accidental Pollution and Other Emergency Situations

- (1) The Parties shall, without delay and by the most expeditious means available, notify other potentially affected Parties, the SADC organs or any other authorized institutions and competent international organizations of any incidents of accidental pollution and other emergency situations originating within their respective territories and shall promptly supply the necessary information to such affected Parties and competent organizations with a view to cooperate in the prevention, mitigation and elimination of the harmful effects of the emergency.
- (2) The Parties shall, individually and, where appropriate, jointly, develop contingency plans for responding to any incidents of accidental pollution and other emergency situations in cooperation, where appropriate, with other potentially affected Parties and competent international organizations, to take immediately all practicable measures necessitated by the circumstances to prevent, mitigate and eliminate the harmful effects of the emergency.

Article 12: Exchange of and Access to Information

- (1) The Parties shall, within the TPTC, exchange available information and data regarding the hydrological, geohydrological, water quality, meteorological and environmental condition of the Incomati and Maputo watercourses to enable planning, development and management of these shared watercourses.
- (2) The Parties shall exchange data, information and study reports on the activities that are likely to cause significant transboundary impacts.
- (3) To enable compliance with sub Article (2), the polluting substances subject to special attention shall be as agreed in the Resolution and regularly reviewed by the TPTC.
- (4) The Parties shall exchange information and consult each other and if necessary, negotiate the possible effects of planned measures on the condition of the Incomati and Maputo watercourses. The Parties shall employ their best efforts to collect and where appropriate, to process data and information in a manner, which facilitates its utilization by the other Party to which it is communicated.
- (5) If a Party is requested by another Party to provide data or any information in sub Articles (1) and (2), and that information is not readily available, it shall employ its best efforts to comply with the request but may condition its compliance upon payment by the requesting Party of the reasonable costs of collecting and where appropriate processing such data or information.
- (6) The Parties shall provide one another, at intervals agreed to by the TPTC, information on the use, quantity and quality of the water resources and the ecological state of the Incomati and Maputo watercourses necessary for the implementation of this Agreement.
- (7) The Parties shall develop the appropriate measures to ensure that the information is homogeneous, compatible and comparable, as agreed by the TPTC.
- (8) The Parties shall create the necessary conditions to ensure that, in conformity with applicable domestic law or International Law, information on matters covered by this Agreement is available to whoever makes a reasonable request.

Article 13: Transboundary Impacts

- (1) Planned measures listed in Annex II, regardless of their location, that by themselves or by accumulation with the existing ones, have the potential of a significant transboundary impact on the watercourse, shall not commence before the provisions of Article 4(1) of the Protocol are complied with.
- (2) Whenever, a planned measure, not listed in Annex II, is likely to cause a significant transboundary impact or any of the Parties expresses concern that such may occur, it shall not commence before the provisions of Article 4(1) of the Protocol are complied with.
- (3) In case of a planned measure involving significant transboundary impact of substantial magnitude the Parties shall conduct an environmental impact assessment, which takes transboundary impact into account in accordance with procedures determined by the TPTC.
- (4) Whenever an ongoing activity causes or is likely to cause a significant transboundary impact, which will lead the Party to fail to comply with an obligation under Articles 4, 8 or 9, the national procedures on the subject shall apply and the Parties concerned shall endeavor to address the matter through the coordination of management plans, programs or measures.

Article 14: Capacity Building

- (1) The TPTC shall:
 - (a) identify capacity building programs necessary for the implementation and monitoring of this Agreement; and
 - (b) prioritize the capacity building programs for implementation.
- (2) The Parties shall, individually and, where appropriate, jointly, be responsible for ensuring that capacity is developed in their respective States and in the shared basins to effectively implement this Agreement.

Article 15: Settlement of Disputes

- (1) Any dispute between the Parties concerning the interpretation or implementation of this Agreement shall be settled amicably through consultation and negotiations between the Parties.
- (2) Where the dispute has not been settled within one year from the date upon which such negotiations were requested, it may be submitted to arbitration by either Party. If the disputing parties do not agree on the subject matter of the dispute, the arbitral tribunal shall determine the subject matter.
- (3) The arbitration shall operate according to the following rules:
 - (a) The number of arbitrators shall amount to a total of three.
 - (b) The Parties initiating the arbitration shall appoint one arbitrator and the other Party or Parties shall appoint one other arbitrator. The aforesaid two arbitrators shall jointly designate a third arbitrator who shall chair the arbitral tribunal.
 - (c) The arbitrators shall be appointed within a three-month period. Should the time limit elapse and any one of the disputing parties have not appointed any arbitrator, the arbitrator shall be appointed by the President of the SADC Tribunal at the request of a Party. Pending the establishment and entering into operation of the SADC Tribunal the aforementioned appointment shall be made by the President of the International Court of Justice.
 - (d) In case of a dispute between the arbitrators designated by the disputing parties as to the designation, within two months, of the final arbitrator, the latter shall be designated by the President of the SADC Tribunal at the request of a Party. Pending the establishment and entering into operation of

the SADC Tribunal the aforementioned designation shall be made by the President of the International Court of Justice.

- (e) Based on International Law and in particular on the basis of this Agreement, the rules of procedure to be followed by the arbitral tribunal shall be decided by the tribunal, who shall also determine the distribution between the disputing parties of the costs of the arbitration.
- (f) The arbitral tribunal shall render its decisions in accordance with the provisions of this Agreement and International Law.
- (g) The arbitral tribunal may, at the request of one of the disputing parties, recommend interim measures of protection.
- (h) Decisions of the arbitral tribunal, both on procedure and substance, shall be taken by a majority vote of its members.
- (i) The arbitral award shall be submitted in writing and shall be signed by all arbitrators.
- (j) The arbitral award shall be final and binding.

Article 16: Annexes

The Annexes are an integral part of this Agreement. Annexes I, II, III, IV and V can be modified by a decision of the Ministers upon recommendation by the TPTC.

Article 17: Existing Watercourse Agreements

The stipulations of existing bilateral and trilateral agreements among the Parties concerning the present subject (Annex IV) will remain in force as far as they are not in conflict with this Agreement.

Article 18: Entry into Force, Termination, and Amendments

- (1) This Agreement shall enter into force on the date of the last notification to the Depositary of this Agreement of the fulfillment of the internal procedure for the conclusion of international agreements.
- (2) This Agreement shall remain in force until 2010 or until superseded for the relevant watercourse by comprehensive water agreements on the Incomati and Maputo watercourses supported by joint studies, whichever is the earlier. The Parties shall adhere to the time frames set out in Annex V.
- (3) This Agreement may be amended at any time by mutual consent of the Parties, by an exchange of notes between the Parties through the diplomatic channels. The date of entry into force shall be the date of the last notification.

Article 19: Depositary of the Agreement

- (1) The Republic of Mozambique shall be the Depositary of this Agreement.
- (2) The Depositary of this Agreement shall perform the following functions:
 - (a) Inform the Parties of instruments of ratification, withdrawal or termination or of any other information or declarations relevant to this Agreement;
 - (b) inform the Parties of the date of the entry into force of this Agreement;
 - (c) register this Agreement with the Secretariat of the United Nations and with the SADC Secretariat; and
 - (d) send certified copies of the authentic texts of this Agreement and other relevant documents to the Parties.

IN WITNESS WHEREOF the undersigned, being duly authorized by their respective Governments, have signed and sealed this Agreement in triplicate, in the English and Portuguese languages, all texts being equally authentic.

Signed at Johannesburg on this 29th day of the month of August 2002

Minister Roberto Costley-C. White
For the Republic of Mozambique

Hon Magwagwa BE Mdluli
For the Kingdom of Swaziland

Minister Ronnie Kasrils
For the Republic of South Africa

ANNEX I FLOW REGIME

Article 1: Determining Criteria

- (1) Determination of the flow regime is based on the criteria in Article 9(3) of the Agreement.
- (2) The Parties accord a first priority to supply water for domestic, livestock and industrial use, as well as ecological water requirements as recognized by the TPTC.
- (3) If, upon review of the hydrology of the system, more water is found to be available in the Incomati or Maputo watercourses than that contemplated in this Annex, the Parties shall give priority to the water uses referred to in sub Article (2), when considering the allocation of the water.
- (4) Monitoring of the flow regime will be carried out at appropriate hydrometrical stations. The TPTC will determine their location and the conditions of installation and operation.

Article 2: Incomati Watercourse

- (1) The Incomati River Basin, covering 46 740 km², is made up of the following catchments:

Komati	11 200 km ²
Crocodile	10 470 km ²
Sabie	7 050 km ²
Massintonto	3 430 km ²
Uanetze	3 930 km ²
Mazimchope	3 970 km ²
Incomati	6 690 km ²
- (2) The net contributions to the total net natural mean annual runoff (mean annual runoff in the natural condition without any land and water use effects and allowing for river channel losses) (MAR) of 3 590 million m³ of the Incomati watercourse at the estuary by the various catchments are estimated as follows:

Catchment	Contributions to MAR (million m ³)			
	Mozambique	South Africa	Swaziland	Total
Komati	0	955	475	1 430
Crocodile	–	1 225	–	1 225
Sabie	0	750	–	750
Massintonto	10	10	–	20
Uanetze	10	5	–	15
Mazimechopes	20	–	–	20
Incomati	130	0	–	130
Total	170	2 945	475	3 590

- (3) The irrigation areas developed and utilized within the Incomati River Basin are estimated as follows:

Catchment	Irrigation Development and Utilization (ha)					
	Mozambique Developed (1991)	Utilized (2000)	South Africa Developed (1991)	Utilized (1991)	Swaziland Developed (1991)	Utilized (1991)
Komati	–	–	29 100	24 060	14 210	14 060
Crocodile	–	–	42 320	37 780	–	–
Sabie	1 200	500	11 590	9 990	–	–
Massintonto	0	0	0	–	–	–
Uanetze	0	0	0	–	–	–
Mazimechopes	100	0	–	–	–	–
Incomati	22 020	7 410	–	–	–	–
Total	23 320	7 910	83 010	71 830	14 210	14 060

- (4) The mean annual irrigation water requirements for actual developed areas and utilized areas within the Incomati River Basin are estimated as follows:

Catchment	Irrigation Water Requirements (million m ³ /a)					
	Mozambique Developed areas (1991)	Utilized areas (2000)	South Africa Developed areas (1991)	Utilized areas (1991)	Swaziland Developed areas (1991)	Utilized areas (1991)
Komati	–	–	271.0	232.1	176.0	174.9
Crocodile	–	–	307.3	281.1	–	–
Sabie	12.0	4.1	91.3	80.4	–	–
Massintonto	0	0	0	0	–	–
Uanetze	0	0	0	0	–	–
Mazimechopes	1.0	0	–	–	–	–
Incomati	267.3	94.5	–	–	–	–
Total	280.3	98.6	669.6	593.6	176.0	174.9

- (5) The stations for monitoring the flow regime, apart from others to be specified by the TPTC, shall be as follows:

Diepgezet (at border between RSA and Swaziland)
 Mananga (GS-30)
 Matsamo (GS-34)
 Driekoppies Dam Outflow (X1H049)
 Komatipoort (X2H036)
 Machatuíne (E-30)
 Corumana Dam Outflow
 Manhica (E-28)

Article 3: Maputo Watercourse

OMITTED

Article 4: Utilization of the Incomati Watercourse

- (1) Based on the estimates of the present availability of water in the Incomati watercourse the Parties agree to the following water uses, excluding those shown

as provisional, and areas of afforestation that will result in a reduction in streamflow of the Incomati watercourse:

(a) *The Republic of Mozambique:*

First priority supplies:	19 million m ³ /a (up to 87.6 million m ³ /a - reserved)
Irrigation supplies:	80 million m ³ /a
Afforestation: Area	25 000 ha
Runoff reduction	25 million m ³ /a

The additional reserved water use of up to 87.6 million m³/a is intended for the city of Maputo and will be drawn from the total water available from the further development of the Incomati watercourse. A similar quantity of water is reserved from the Maputo watercourse to provide for wider options of choice. The final details and options to meet the growing water requirements of the city of Maputo and the greater Maputo Metropolitan Area will follow from further studies. These will be recorded by the Parties as an amendment of this Annex in terms of Article 16 of the Agreement after the provisions of sub Article (7) have been complied with.

(b) *The Republic of South Africa:*

First priority supplies:	336.6 million m ³ /a
Irrigation supplies:	786 million m ³ /a
Afforestation: Area	364 975 ha
Runoff reduction	475 million m ³ /a

(c) *The Kingdom of Swaziland:*

First priority supplies:	22 million m ³ /a
Irrigation supplies:	261 million m ³ /a
Afforestation: Area	32 442 ha
Runoff reduction	46 million m ³ /a

The first priority supplies include the water required by the Parties for domestic, livestock and industrial use and will be available to the Parties in the rivers subject to the conditions in sub Article (5).

The Parties will be allowed to convert some of their agreed irrigation use to first priority use at a conversion factor approved by the TPTC at the time that the need arises.

(2) The water use by Mozambique shall not exceed the following in the Incomati, Sabie, Massintonto, Uanetse, and Mazimechopes River catchments:

(a) *The Incomati River catchment upstream of the Sabie River confluence:*

First priority supplies:	1.1 million m ³ /a (up to 87.6 million m ³ /a - reserved)
Irrigation supplies:	29 million m ³ /a
Afforestation:	
Area	Nil.
Runoff reduction	Nil.

The additional reserved water use of up to 87. 6 million m³/a is intended for the city of Maputo and will be drawn from the total water available from the further development of the Incomati watercourse. A similar quantity of water is reserved from the Maputo watercourse to provide for wider options of choice. The final details and options to meet the growing water requirements of the city of Maputo and the greater Maputo Metropolitan Area will follow from further studies. These will be recorded by

the Parties as an amendment of this Annex in terms of Article 16 of the Agreement after the provisions of sub Article (7) have been complied with.

(b) *The Incomati River catchment downstream of the Sabie River confluence:*

First priority supplies:	15.6 million m ³ /a
Irrigation supplies:	239 million m ³ /a
Afforestation: Area	25 000 ha
Runoff reduction	25 million m ³ /a

(c) *The Sabie River catchment:*

First priority supplies:	0.5 million m ³ /a
Irrigation supplies:	12.0 million m ³ /a
Afforestation: Area	Nil.
Runoff reduction	Nil.

(d) *The Massintonto River catchment:*

First priority supplies:	0.7 million m ³ /a
Irrigation supplies:	Nil.
Afforestation: Area	Nil.
Runoff reduction	Nil.

(e) *The Uanetse River catchment:*

First priority supplies:	0.6 million m ³ /a
Irrigation supplies:	Nil.
Afforestation: Area	Nil.
Runoff reduction	Nil.

(f) *The Mazimchope River catchment:*

First priority supplies:	0.5 million m ³ /a
Irrigation supplies:	Nil.
Afforestation: Area	Nil.
Runoff reduction	Nil.

(3) The water use by South Africa shall not exceed the following in the Komati, Crocodile, Sabie, Massintonto, and Uanetse River catchments:

(a) *The Komati River catchment:*

First priority supplies:	183 million m ³ /a
Irrigation supplies:	381 million m ³ /a
Afforestation: Area	90 233 ha
Runoff reduction	99 million m ³ /a

(b) *The Crocodile River catchment:*

First priority supplies:	73 million m ³ /a
Irrigation supplies:	307 million m ³ /a
Afforestation: Area	199 715 ha
Runoff reduction	247 million m ³ /a

(c) *The Sabie River catchment:*

First priority supplies:	80 million m ³ /a
Irrigation supplies:	98 million m ³ /a
Afforestation: Area	75 027 ha
Runoff reduction	129 million m ³ /a

(d) <i>The Massintonto River catchment:</i>		
First priority supplies:		0.3 million m ³ /a
Irrigation supplies:		Nil.
Afforestation:	Area	Nil.
	Runoff reduction	Nil.

(e) <i>The Uanetse River catchment:</i>		
First priority supplies:		0.3 million m ³ /a
Irrigation supplies:		Nil.
Afforestation:	Area	Nil.
	Runoff reduction	Nil.

- (4) The water use by Swaziland shall not exceed the following in the Komati River catchment:

(a) <i>The Komati River catchment:</i>		
First priority supplies:		22 million m ³ /a
Irrigation supplies:		261 million m ³ /a
Afforestation:	Area	32 442 ha
	Runoff reduction	46 million m ³ /a

- (5) When the TPTC determines that a drought condition exists and that the water use by the Parties as given in sub Articles (1), (2), (3) and (4) must be reduced the irrigation use shall be the first to be reduced. This will be followed by reductions in the first priority use and the water for the riverine and estuarine ecosystems only under extreme drought conditions, as determined by the TPTC.
- (6) The operating rules of the existing dams shall be reviewed by the TPTC from time to time. The operating rules developed by the Parties for those dams in their territory shall ensure that the river losses and the agreed water allocations of the various sectors in the Incomati River Basin, corresponding to the actual land use, can be supplied. The TPTC shall approve the criteria for reducing water use that are included as part of the operating rules. These shall take account of the availability of water and the water requirements in sub Articles (1), (2), (3) and (4) the determining criteria defined in Article 1 and the acceptability of restrictions for the first priority and irrigation users and the tolerance of the riverine and estuarine ecosystems to reductions in water supply. Adequate account shall be taken of transmission losses and other return flows.
- (7) Mozambique shall perform further studies, including environmental impact assessments that also take account of any future transboundary impacts, approved by the TPTC to establish the water requirements of the city of Maputo, the supply capability of its existing sources of water. Mozambique shall notify the Parties through the TPTC of the findings of these studies in accordance with the procedures set out in Article 4(1) of the Protocol and Article 13 of the Agreement to enable the Parties to evaluate the same in own territories and for the TPTC to then recommend to the Parties the portion of the reserved quantity of water shown in sub Articles (1) and (2) that is to be admitted in the respective sub Articles.

Article 5: Water Requirements of the Ecosystems of the Incomati Watercourse

- (1) The Parties acknowledge the need to maintain interim instream flows at various key points in the Incomati watercourse to sustain the ecology of the watercourse including the estuary of the Incomati River.

- (2) The actual minimum river flows consistent with the operating rules referred to in Articles 4(5) and (6) shall be determined by the TPTC for the key points given in sub Article (3) after having reviewed the target flows given in sub Article (3). These river flows shall be maintained by the relevant Party or Parties, unless the actual weather and river flow conditions are worse than previously recorded in the Incomati River Basin, in which case revised short-term flows shall be agreed by the TPTC.
- (3) The key points and target flows to be maintained to sustain the ecology of the watercourse including the estuary of the Incomati River are as follows:

<i>River</i>	<i>Key Point</i>	<i>Interim Target Instream Flow</i>	
		<i>Mean (million m³/a)</i>	<i>Minimum (m³/s)</i>
Sabie	Lower Sabie	200	0.6
	Incomati River	200	0.6
Crocodile	Tenbosch	245	1.2
Komati	Diepgezet	190	0.6
	Mananga	200	0.9
	Lebombo	42	1.0
Incomati	Ressano Garcia	290	2.6
	Sabie	290	2.6
	Marracuene	450	3.0

Article 6: Utilization of the Maputo Watercourse

OMITTED

Article 7: Water Requirements of the Ecosystems of the Maputo Watercourse

OMITTED

Article 8: Water Conservation

Any Party may use a reduction in the agreed water use by a particular sector, as a result of better management practices or other water conservation measures, including pricing policies, for any other purpose within its own territory, provided that the TPTC shall be notified accordingly.

Article 9: Generation of Hydropower

A Party may utilize water within its own territory for the generation of hydropower at existing hydropower installations, hydropower installations under construction at the time of this Agreement coming into force, and future hydropower installations after the TPTC has agreed to the operating rules.

Article 10: Concluding Provisions

The TPTC shall assess any problems regarding the flow regime, any problems that will affect the normal utilization of dams and any problems arising from the minimum flows specified to maintain the ecosystems, taking into consideration the provisions of Article 10 of the Agreement. Any affected Party shall inform the TPTC about the problems so that measures may be considered and adopted to establish a temporary or revised interim flow regime conforming to the general criteria set out in Article 9(3) of the Agreement.

ANNEX II: REFERENCE PROJECTS

Article 1: Determining Criteria

- (1) The Parties accord a high priority to supply water for domestic, livestock and industrial use, as well as ecological water requirements as recognized by the TPTC.
- (2) In particular, the Parties recognize the strategic importance to Mozambique of augmenting the water supplies to the city of Maputo.
- (3) The Parties recognize the projects in this Annex as projects that:
 - (a) are contemplated by the Parties to commence before 2010, but of which the implementation had not commenced at the time of coming into force of this Agreement; and
 - (b) have previously been identified and studied by one or more of the Parties for future implementation.
- (4) The projects are classified into:
 - (a) water utilization projects; and
 - (b) water resources development projects.

The Parties recognize the usefulness of studying the creation of structural and non-structural measures in order to make more water available than admitted in Annex I.
- (5) For the mere reason that a project is listed in this Annex the Party is not exempted from complying with the provisions of the Agreement.
- (6) If more water is made available through structural and non-structural measures in the Incomati or Maputo watercourses, the Parties shall give priority to the water uses referred to in sub Article (1), when considering the allocation of the water, taking into account the equitable and reasonable utilization by the Parties of the water resources of the Incomati and Maputo Watercourses.
- (7) A Party may develop any other project not listed in this Annex, in accordance with the provisions of the Agreement.

Article 2: Reference Projects in Mozambique

- (1) The following land and water use projects are contemplated in the Incomati River Basin:
 - (a) Increased irrigation development along the Sabie and Incomati Rivers supplied by the additional water secured by completing and increasing the storage capacity of the Corumana Dam.
 - (b) Increased irrigation development along the Sabie and Incomati Rivers supplied by the additional water secured by the Moamba Major Dam.
 - (c) Augmentation of the water supplies to the city of Maputo with additional water secured by the Moamba Major Dam.
- (2) (*Omitted*)
- (3) The following water resources development projects are contemplated in the Incomati River Basin:
 - (a) Completing and increasing the storage capacity of the Corumana Dam on the Sabie River by the installation of spillway crest gates.
 - (b) Construction of the Moamba Major Dam on the Incomati River.
- (4) (*Omitted*)

Article 3: Reference Projects in South Africa

- (1) The following land and water use projects are contemplated in the Incomati River Basin:
 - (a) Increased irrigation development in the Komati River catchment supplied by the additional water secured by the Tonga Dam.

- (b) Increased irrigation development in the Komati River catchment supplied with water made available by the Silingane Dam in Swaziland.
 - (c) Increased irrigation development in the Komati River catchment supplied with water made available by the Ngonini Dam in Swaziland.
 - (d) Increased irrigation development in the Crocodile River catchment supplied by the additional water secured by the Mountain View Dam.
 - (e) Expansion of the domestic water supply networks in the Sabie River catchment supplied with the water secured by the Inyaka Dam.
- (2) The following water resources development projects are contemplated in the Incomati River Basin:
- (a) Raising of the Vygeboom Dam on the Komati River, diverting additional water into the Vygeboom Dam or the construction of a new dam such as the Boekenhoutrand Dam.
 - (b) Construction of the Tonga Dam on the Komati River as a joint project with Swaziland.
 - (c) Construction of the Mountain View Dam on the Kaap River.
 - (d) Construction of the New Forest Dam on the Mutlumuvi River.
 - (e) Construction of the Maroela Weir in the Crocodile River.

Article 4: Reference Projects in Swaziland

- (1) The following land and water use projects are contemplated in the Incomati River Basin:
- (a) Increased irrigation development in the Komati River catchment supplied with water from the Maguga Dam made available by the Tonga Dam in South Africa.
 - (b) Increased irrigation development in the Komati River catchment supplied with water made available by the Silingane Dam.
 - (c) Increased irrigation development in the Komati River catchment supplied with water made available by the Ngonini Dam.
- (2) *(Omitted)*
- (3) The following water resources development projects are contemplated in the Incomati River Basin:
- (a) Construction of the Silingane Dam on the Komati River as a joint project with South Africa.
 - (b) Construction of the Ngonini Dam on the Lomati River as a joint project with South Africa.
- (4) *(Omitted)*

ANNEX III: TRANSBOUNDARY IMPACT

The projects and activities referred to in Article 13(1) of the Agreement are the following:

- (a) Industrial installation for energy production or mining activities which can impact significantly on water quality and quantity;
- (b) pipelines carrying oil or chemical products;
- (c) installations (facilities) for storage of dangerous products;
- (d) reservoirs for river water regulation and storage with a capacity above 250 000 m³;
- (e) river training and canalization of river beds with a length exceeding 500 m, provided they are situated in the bordering rivers or in their tributaries;
- (f) surface water abstraction facilities, regardless of their use or destination, when the minimum effective consumption exceeds 110 l/s, and in any case of water transfers to other river basins in volume exceeding 3.5 million m³ per year;
- (g) groundwater abstraction facilities, regardless of the use or destination of the water, above 3.5 million m³ per year;
- (h) artificial recharging of aquifers with volumes above 3.5 million m³ per year;
- (i) wastewater treatment plants with capacity above 1,000 equivalent inhabitants;
- (j) wastewater discharges, of urban, industrial, cattle raising, or other origin, in which the polluting charge is above 1,000 equivalent inhabitants;
- (k) use of water causing the cross border water temperature to change by more than 3 °C in the aquatic environment;
- (l) deforestation and reforestation works, affecting an area above 500 hectares and that have the potential to increase the sediment production or to increase flood peaks or to decrease the river flow.

ANNEX IV: BILATERAL AND TRILATERAL AGREEMENTS

The Parties took into consideration the existing bilateral and trilateral agreements listed hereunder, not excluding other agreements, which apply, but are not listed. If any of the Parties becomes aware of the existence of any agreement not listed, the Party shall immediately notify the other Parties.

- (1) Agreement between the Government of the Republic of South Africa and the Government of the Republic of Portugal in regard to rivers of mutual interest and the Cunene River Scheme, signed at Lisbon on 13 October 1964.
- (2) Agreement between the Government of the Republic of South Africa, the Government of the Kingdom of Swaziland and the Government of the People's Republic of Mozambique relative to the Establishment of a Tripartite Permanent Technical Committee, signed at Pretoria on 17 February 1983.
- (3) Agreement reached at the Tripartite Ministerial Meeting of Ministers Responsible for Water Affairs, signed at Piggs Peak on 15 February 1991.
- (4) Treaty on the Development and Utilization of the Water Resources of the Komati River Basin between the Government of the Republic of South Africa and the government of the Kingdom of Swaziland, signed at Mbabane on 13 March 1992.
- (5) Treaty on the Establishment and Functioning of the Joint Water Commission between the Government of the Republic of South Africa and the Government of the Kingdom of Swaziland, signed at Mbabane on 13 March 1992.
- (6) Agreement between the Government of the Republic of South Africa and the Government of the Republic of Mozambique on Establishment and Functioning of the Joint Water Commission, signed at Maputo on 26 July 1996.
- (7) Agreement between the Government of the Republic of Mozambique and the Government of the Kingdom of Swaziland on the Establishment and Functioning of the Joint Water Commission, signed at Piggs Peak on 30 July 1999.

ANNEX V: TIME FRAME FOR THE ESTABLISHMENT OF COMPREHENSIVE WATER RESOURCE DEVELOPMENT AND WATER USE AGREEMENTS

- (1) Comprehensive Agreements shall be based on water use and water resource development and conservation studies of the Incomati and Maputo River Watercourses and the current and expected future utilization and development of the resources.
- (2) The finalization of Comprehensive Agreements depends on the finalization of these studies and the political willingness of the Parties.
- (3) Phase 2 of the Joint Incomati Basin Study (JIBS) has been completed and can provide valuable information to contribute to the drafting of a comprehensive water resource development and water use agreement. However, additional work to JIBS is required in order to bring the study up to present day situation, to achieve a common holistic approach and to provide an updated knowledge base.
- (4) A Scoping Study for the Maputo Basin will commence soon, but it will take some time to complete and will be followed by a detailed water resources and water use study.
- (5) The programs for completing Comprehensive Agreements for the Incomati and Maputo River Watercourses are different.
- (6) The program for concluding a Comprehensive Agreement for the Incomati River Watercourse is as follows:

July 2001:	Complete the draft JIBS report.
October 2001:	Technical review of the draft JIBS report by the Parties.
May 2002:	Finalization and adoption by TPTC of JIBS report.
January 2003:	TPTC to prepare and sign report outlining the technical and institutional requirements to be incorporated into the Comprehensive Agreement for the Incomati River Watercourse.
January 2005:	Completion and adoption of studies to determine the ecological water requirements of the river system and its estuary and feasibility studies to reconcile the water requirements and water supply.
January 2005:	Legal teams with technical support to finalize the text of the Comprehensive Agreement for the Incomati River Watercourse.
July 2005:	Signature of the Comprehensive Agreement for the Incomati River Watercourse by the Parties.
January 2006:	Ratification of the Comprehensive Agreement for the Incomati River Watercourse by the Parties.

- (7) The program for concluding the Comprehensive Agreement for the Maputo River Watercourse is as follows:

Omitted

ANNEX 3

Revised Protocol on Shared Watercourses in the Southern African Development Community (SADC)

Preamble

We, the Heads of State or Government of:

The Republic of Angola
The Republic of Botswana
The Democratic Republic of the Congo
The Kingdom of Lesotho
The Republic of Malawi
The Republic of Mauritius
The Republic of Mozambique
The Republic of Namibia
The Republic of Seychelles
The Republic of South Africa
The Kingdom of Swaziland
The United Republic of Tanzania
The Republic of Zambia
The Republic of Zimbabwe

BEARING in mind the progress with the development and codification of international water law initiated by the Helsinki Rules and that the United Nations subsequently adopted the United Nations Convention on the Law of the Non-Navigational Uses of International Watercourses;

RECOGNIZING the relevant provisions of Agenda 21 of the United Nations Conference on Environment and Development, the concepts of environmentally sound management, sustainable development and equitable utilization of shared watercourses in the SADC Region;

CONSIDERING the existing and emerging socioeconomic development programs in the SADC Region and their impact on the environment;

DESIROUS of developing close cooperation for judicious, sustainable and co-ordinated utilization of the resources of the shared watercourses in the SADC Region;

CONVINCED of the need for co-ordinated and environmentally sound development of the resources of shared watercourses in the SADC Region in order to support sustainable socioeconomic development;

RECOGNIZING that there are as yet no regional conventions regulating common utilization and management of the resources of shared watercourses in the SADC Region;

MINDFUL of the existence of other Agreements in the SADC Region regarding the common utilization of certain watercourses; and

IN ACCORDANCE with Article 22 of the Treaty, have agreed as follows:

Article 1: Definitions

- (1) For the purposes of this Protocol the following terms shall have the meanings ascribed to them hereunder:

"Agricultural use" means use of water for irrigation purposes;

"Domestic use" means use of water for drinking, washing, cooking, bathing, sanitation, and stock watering purposes;

"Emergency situation" means a situation that causes or poses an imminent threat of causing serious harm to Watercourse States and which results suddenly from natural causes, such as torrential rains, floods, landslides or earthquakes, or from human conduct;

"Environmental use" means the use of water for the preservation and maintenance of ecosystems;

"Industrial use" means use of water for commercial, electrical power generation, industrial, manufacturing, and mining purposes;

"Management of a shared watercourse" means (i) planning the sustainable development of a shared watercourse and providing for the implementation of any plans adopted; and (ii) otherwise promoting the rational, equitable and optimal utilization, protection, and control of the watercourse;

"Navigational use" means use of water for sailing whether it is for transport, fishing, recreation or tourism;

"Pollution of a shared water course" means any detrimental alteration in the composition or quality of the waters of a shared watercourse resulting directly or indirectly from human conduct;

"Regulation of the flow of the waters of a shared watercourse" means the use of hydraulic works or any other continuing measure to alter, vary or otherwise control the flow of waters of a shared watercourse;

"Shared watercourse," means a watercourse passing through or forming the border between two or more Watercourse States;

"Significant Harm" means non-trivial harm capable of being established by objective evidence without necessarily rising to the level of being substantial;

"State Party" means a member of SADC that ratifies or accedes to this Protocol;

"Watercourse" means a system of surface and groundwaters consisting by virtue of their physical relationship a unitary whole normally flowing into a common terminus such as the sea, lake or aquifer;

"Watercourse State" means a State Party in whose territory part of a Watercourse is situated.

- (2) Any other term defined in the Treaty and used in this Protocol shall have the same meaning as ascribed to it in the Treaty.

Article 2: Objective

The overall objective of this Protocol is to foster closer cooperation for judicious, sustainable and co-coordinated management; protection and utilization of shared

watercourses and advance the SADC agenda of regional integration and poverty alleviation. In order to achieve this objective, this Protocol seeks to:

- (a) promote and facilitate the establishment of shared watercourse agreements and Shared Watercourse Institutions for the management of shared watercourses;
- (b) advance the sustainable, equitable and reasonable utilization of the shared watercourses;
- (c) promote a co-coordinated and integrated environmentally sound development and management of shared watercourses;
- (d) promote the harmonization and monitoring of legislation and policies for planning, development, conservation, protection of shared watercourses, and allocation of the resources thereof; and
- (e) promote research and technology development, information exchange, capacity building, and the application of appropriate technologies in shared watercourses management.

Article 3: General Principles

For the purposes of this Protocol the following general principles shall apply:

- (1) The State Parties recognize the principle of the unity and coherence of each shared watercourse and in accordance with this principle, undertake to harmonize the water uses in the shared watercourses and to ensure that all necessary interventions are consistent with the sustainable development of all Watercourse States and observe the objectives of regional integration and harmonization of their socioeconomic policies and plans.
- (2) The utilization of shared watercourses within the SADC Region shall be open to each Watercourse State, in respect of the watercourses within its territory and without prejudice to its sovereign rights, in accordance with the principles contained in this Protocol. The utilization of the resources of the watercourses shall include agricultural, domestic, industrial, navigational and environmental uses.
- (3) State Parties undertake to respect the existing rules of customary or general international law relating to the utilization and management of the resources of shared watercourses.
- (4) State Parties shall maintain a proper balance between resource development for a higher standard of living for their people and conservation and enhancement of the environment to promote sustainable development.
- (5) State Parties undertake to pursue and establish close cooperation with regard to the study and execution of all projects likely to have an effect on the regime of the shared watercourse.
- (6) State Parties shall exchange available information and data regarding the hydrological, hydro geological, water quality, meteorological and environmental condition of shared watercourses.
- (7)
 - (a) Watercourse states shall in their respective territories utilize a shared watercourse in an equitable and reasonable manner. In particular, a shared watercourse shall be used and developed by Watercourse States with a view to attain optimal and sustainable utilization thereof and benefits therefrom, taking into account the interests of the Watercourse States concerned, consistent with adequate protection of the watercourse for the benefit of current and future generations.
 - (b) Watercourse states shall participate in the use, development and protection of a shared watercourse in an equitable and reasonable manner. Such participation, includes both the right to utilize the watercourse and the duty

to cooperate in the protection and development thereof, as provided in this Protocol.

- (8) (a) Utilization of a shared watercourse in an equitable and reasonable manner within the meaning of Article 7(a) and (b) requires taking into account all relevant factors and circumstances including:
 - i. geographical, hydrographical, hydrological, climatical, ecological, and other factors of a natural character;
 - ii the social, economic, and environmental needs of the Watercourse States concerned;
 - iii the population dependent on the shared watercourse in each Watercourse State;
 - iv the effects of the use or uses of a shared watercourse in one Watercourse State on other Watercourse States;
 - v existing and potential uses of the watercourse;
 - vi conservation, protection, development, and economy of use of the water resources of the shared watercourse and the costs of measures taken to that effect; and
 - vii the availability of alternatives, of comparable value, to a particular planned or existing use.
- (b) The weight to be given to each factor is to be determined by its importance in comparison with that of other relevant factors. In determining what is an equitable and reasonable use, all relevant factors are to be considered together and a conclusion reached on the basis of the whole.
- (9) State Parties shall deal with planned measures in conformity with the procedure set out in Article 4(1).
- (10) (a) State Parties shall, in utilizing a shared watercourse in their territories, take all appropriate measures to prevent the causing of significant harm to other Watercourse States.
- (b) Where significant harm is nevertheless caused to another Watercourse State, the State whose use causes such harm shall, in the absence of agreement to such use, take all appropriate measures, having due regard for the provisions of paragraph (a) above in consultation with the affected States, to eliminate or mitigate such harm and, where appropriate, to discuss the question of compensation.
- (c) Unless the Watercourse States concerned have agreed otherwise for the protection of the interests of persons, natural or juridical, who have suffered or are under a serious threat of suffering significant transboundary harm as a result of activities related to a shared watercourse, a Watercourse State shall not discriminate on the basis of nationality or residence or place where the injury occurred, in granting to such persons, in accordance with its legal system, access to judicial or other procedures, or a right to claim compensation or other relief in respect of significant harm caused by such activities carried on in its territory.

Article 4: Specific Provisions

- (1) Planned Measures
 - (a) Information concerning planned measures

State Parties shall exchange information and consult each other and, if necessary, negotiate the possible effects of planned measures on the condition of a shared watercourse.
 - (b) Notification concerning planned measures with possible adverse effects

Before a State Party implements or permits the implementation of planned measures, which may have a significant adverse effect upon other Watercourse States, it shall provide those States with timely notification

thereof. Such notification shall be accompanied by available technical data and information, including the results of any environmental impact assessment, in order to enable the notified States to evaluate the possible effects of the planned measures.

(c) Period for reply to notification

- i. Unless otherwise agreed, a State Party providing a notification under paragraph (b) shall allow the notified States a period of six months within which to study and evaluate the possible effects of the planned measures and to communicate the findings to it;
- ii. This period shall, at the request of a notified State for which the evaluation of the planned measures poses difficulty, be extended for a period of six months.

(d) Obligations of the notifying State during the period for reply

During the period referred to in paragraph (c), the notifying State:

- i. shall cooperate with the notified States by providing them, on request, with any additional data and information that is available and necessary for an accurate evaluation; and
- ii. shall not implement or permit the implementation of the planned measures without the consent of the notified States.

(e) Reply to Notification

The notified States shall communicate their findings to the notifying State as early as possible within the period applicable pursuant to paragraph (c). If a notified State finds that implementation of the planned measures would be inconsistent with the provisions of Article 3(7) or (10), it shall attach to its finding a documented explanation setting the reasons for the findings.

(f) Absence of reply to notification

- i. If, within the period applicable pursuant to paragraph (c), the notifying State receives no communication under (e), it may, subject to its obligations under Article 3(7) and (10), proceed with the implementation of the planned measures, in accordance with the notification and any other data and information provided to the notified States.
- ii. Any claim to compensation by a notified State which has failed to reply within the period applicable pursuant to paragraph (c) may be offset by the costs incurred by the notifying State for action undertaken after the expiration of the time for a reply, which would not have been undertaken if the notified State had objected within that period.

(g) Consultations and negotiations concerning planned measures

- i. If a communication is made under paragraph (e) that implementation of the planned measures would be inconsistent with the provisions of Article 3(7) or (10), the notifying State and the State making the communication shall enter into consultations and, if necessary, negotiations with a view to arriving at an equitable resolution of the situation.
- ii. The consultations and negotiations shall be conducted on the basis that each State must in good faith pay reasonable regard to the rights and legitimate interests of the other States.
- iii. During the course of the consultations and negotiations, the notifying State shall, if so requested by the notified State at the time it makes the communication, refrain from implementing or permitting the implementation of the planned measures for a period of six months unless otherwise agreed.

(h) Procedures in the absence of notification

- i. If a State Party has reasonable grounds to believe that another Watercourse State is planning measures that may have a significant

adverse effect upon it, the former State may request the latter to apply the provisions of paragraph (b). The request shall be accompanied by a documented explanation setting forth its grounds.

- ii. If the State planning the measures finds that it is not under an obligation to provide a notification under paragraph (b), it shall so inform the other State, providing a documented explanation setting forth the reasons for such finding. If this finding does not satisfy the other State, the two States shall, at the request of that other State, promptly enter into consultations and negotiations in the manner provided in sub-paragraphs (i) and (ii) of paragraph (g).
 - iii. During the course of the consultations and negotiations, the State planning the measures shall, if so requested by the other State at the time it requests the initiation of consultations and negotiations, refrain from implementing or permitting the implementation of those measures for a period of six months unless otherwise agreed.
- (i) Urgent implementation of planned measures
- i. In the event that the implementation of planned measures is of the utmost urgency in order to protect public health, public safety or other equally important interests, the State planning the measures may, subject to paragraphs 7 and 10 of Article 3, immediately proceed to implementation, notwithstanding the provisions of paragraph (d) and sub-paragraph (iii) of paragraph (g).
 - ii. In such case, a formal declaration of the urgency of the measures shall be communicated without delay to the other Watercourse States referred to in paragraph (b) together with the relevant data and information.
 - iii. The State planning the measures shall, at the request of any of the States referred to in paragraph (ii), promptly enter into consultations and negotiations with it in the manner indicated in sub-paragraphs (i) and (ii) of paragraph (g).

(2) Environmental Protection and Preservation

(a) Protection and preservation of ecosystems

State Parties shall, individually and, where appropriate, jointly, protect and preserve the ecosystems of a shared watercourse.

(b) Prevention, reduction, and control of pollution

- i. State Parties shall, individually and, where appropriate, jointly, prevent, reduce and control the pollution and environmental degradation of a shared watercourse that may cause significant harm to other Watercourse States or to their environment, including harm to human health or safety, to the use of the waters for any beneficial purpose or to the living resources of the watercourse.
- ii. Watercourse states shall take steps to harmonize their policies and legislation in this connection.
- iii. State Parties shall, at the request of any one or more of them, consult with a view to arriving at mutually agreeable measures and methods to prevent, reduce and control pollution of a shared watercourse, such as:
 - setting joint water quality objectives and criteria
 - establishing techniques and practices to address pollution from point and non-point sources
 - establishing lists of substances the introduction of which, into the waters of a shared watercourse, is to be prohibited, limited, investigated, or monitored.

(c) Introduction of alien or new species

State Parties shall take all measures necessary to prevent the introduction of species, alien or new, into a shared watercourse, which may have effects detrimental to the ecosystems of the watercourse resulting in significant harm to other Watercourse States.

(d) Protection and preservation of the aquatic environment

State Parties shall individually and, where appropriate, in cooperation with other States, take all measures with respect to a shared watercourse that are necessary to protect and preserve the aquatic environment, including estuaries, taking into account generally accepted international rules and standards.

(3) Management of Shared Watercourses

(a) Management

Watercourse states shall, at the request of any of them, enter into consultations concerning the management of a shared watercourse, which may include the establishment of a joint management mechanism.

(b) Regulation

- i. Watercourse states shall cooperate, where appropriate, to respond to needs or opportunities for regulation of the flow of the waters of a shared watercourse.
- ii. Unless otherwise agreed, Watercourse States shall participate on an equitable and reasonable basis in the construction and maintenance or defrayal of the costs of such regulation works as they may have agreed to undertake.

(c) Installations

- i. Watercourse states shall, within their respective territories, employ their best efforts to maintain and protect installations, facilities and other works related to a shared watercourse.
- ii. Watercourse states shall, at the request of any of them which has reasonable grounds to believe that it may suffer significant adverse effects, enter into consultations with regards to:
 - the safe operation and maintenance of installations, facilities, or other works related to a shared watercourse; and
 - the protection of installations, facilities or other works from willful or negligent acts or the forces of nature.
- iii. Shared watercourses and related installations, facilities and other works shall enjoy the protection accorded by the principles and rules of international law applicable in international and non-international armed conflict and shall not be used in violation of those principles and rules.

(4) Prevention and Mitigation of Harmful Conditions

- (a) State Parties shall individually and, where appropriate, jointly take all appropriate measures to prevent or mitigate conditions related to a shared watercourse that may be harmful to other Watercourse States, whether resulting from natural causes or human conduct, such as floods, water-borne diseases, siltation, erosion, salt-water intrusion, drought or desertification.
- (b) State Parties shall require any person intending to use the waters of a shared watercourse within their respective territories for purposes other than domestic or environmental use or who intends to discharge any type of waste into such waters, to first obtain a permit, license or other similar authorization from the relevant authority within the State concerned. The permit or other similar authorization shall be granted only after such State has determined that the intended use or discharge will not cause significant harm on the regime of the watercourse.

- (5) **Emergency Situations**
State Parties shall, without delay, notify other potentially affected States, the SADC Water Sector Co-coordinating Unit and competent international organizations of any emergency situation originating within their respective territories and promptly supply the necessary information to such affected States and competent organizations with a view to cooperate in the prevention, mitigation, and elimination, of harmful effects of the emergency.

Article 5: Institutional Framework For Implementation

- (1) The following institutional mechanisms responsible for the implementation of this Protocol are hereby established:
- (a) SADC Water Sector Organs
 - the Committee of Water Ministers;
 - the Committee of Water Senior Officials;
 - the Water Sector Co-coordinating Unit; and
 - the Water Resources Technical Committee and sub-Committees.
 - (b) Shared Watercourse Institutions
 - (c) The Committee of Water Ministers shall consist of Ministers responsible for water.
 - (d) The Committee of Water Senior Officials shall consist of the Permanent Secretaries or officials of equivalent rank responsible for water.
 - (e) The Water Sector Coordinating Unit which shall be the executing agency of the Water Sector shall be headed by a Co-coordinator appointed by the State Party responsible for coordinating the Water Sector, and he or she shall be assisted by such supporting staff of professional, administrative and secretarial personnel as the Coordinator may deem necessary.
- (2) The SADC Water Sector Organs shall have the following functions:
- (a) The Committee of Water Ministers
 - i. Oversee and monitor the implementation of the Protocol and assist in resolving potential conflicts on shared watercourses.
 - ii. Guide and coordinate cooperation and harmonization of legislation, policies, strategies, programs and projects.
 - iii. Advise the Council on policies to be pursued.
 - iv. Recommend to Council the creation of such other organs as may be necessary for the implementation of this Protocol.
 - v. Provide regular updates to the Council on the status of the implementation of this Protocol.
 - (b) The Committee of Water Senior Officials
 - i. Examine all reports and documents put before them by the Water Resources Technical Committee and the Water Sector Co-coordinating Unit.
 - ii. Initiate and advise the Committee of Water Ministers on policies, strategies, programs and projects to be presented to the Council for approval.
 - iii. Recommend to the Committee of Water Ministers the creation of such other organs as may be necessary for the implementation of this Protocol.
 - iv. Provide regular updates to the Committee of Water Ministers on the status of the implementation of this Protocol.
 - (c) The Water Sector Co-coordinating Unit
 - i. Monitor the implementation of this Protocol.
 - ii. Liaise with other SADC organs and Shared Watercourse Institutions on matters pertaining to the implementation of this Protocol.

- iii. Provide guidance on the interpretation of this Protocol.
 - iv. Advise State Parties on matters pertaining to this Protocol.
 - v. Organize and manage all technical and policy meetings.
 - vi. Draft terms of reference for consultancies and manage the execution of those assignments.
 - vii. Mobilize or facilitate the mobilization of financial and technical resources for the implementation of this Protocol.
 - viii. Annually submit a status report on the implementation of the Protocol to the Council through the Committee of Water Ministers.
 - ix. Keep an inventory of all shared watercourse management institutions and their agreements on shared watercourses within the SADC Region.
- (d) The Water Resources Technical Committee
- i. Provide technical support and advice to the Committee of Water Senior Officials through the Water Sector Co-coordinating Unit with respect to the implementation of this Protocol.
 - ii. Discuss issues tabled by the Water Sector Co-coordinating Unit and prepare for the Committee of Water Senior Officials.
 - iii. Consider and approve terms of reference for consultancies, including the appointment of consultants.
 - iv. Recommend to the Committee of Water Senior Officials any matter of interest to it on which agreement has not been reached.
 - v. Appoint working groups for short-term tasks and standing sub-committees for longer-term tasks.
 - vi. Address any other issues that may have implications on the implementation of this Protocol.
- (3) Shared Watercourse Institutions
- (a) Watercourse States undertake to establish appropriate institutions such as watercourse commissions, water authorities or boards as may be determined.
 - (b) The responsibilities of such institutions shall be determined by the nature of their objectives, which must be in conformity with the principles set out in this Protocol.
 - (c) Shared Watercourse Institutions shall provide on a regular basis or as required by the Water Sector Co-coordinating Unit, all the information necessary to assess progress on the implementation of the provisions of this Protocol, including the development of their respective agreements.
- (4) State Parties undertake to adopt appropriate measures to give effect to the institutional framework referred to in this Article for the implementation of this Protocol.

Article 6: Shared Watercourse Agreements

- (1) In the absence of any agreement to the contrary, nothing in this Protocol shall affect the rights or obligations of a Watercourse State arising from agreements in force for it on the date on which it became a party to the Protocol.
- (2) Notwithstanding the provisions of paragraph 1, parties to agreements referred to in paragraph 1 may harmonize such agreements with this Protocol.
- (3) Watercourse states may enter into agreements, which apply the provision of this Protocol to the characteristics and uses of a particular shared watercourse or part thereof.
- (4) Where a watercourse agreement is concluded between two or more Watercourse States, it shall define the waters to which it applies. Such an agreement may be entered into with respect to an entire shared watercourse or any part thereof or a particular project, program or use except insofar as the agreement adversely

affects, to a significant extent, the use by one or more other Watercourse States of the waters of the watercourse, without their express consent.

- (5) Where some but not all Watercourse States to a particular shared watercourse are parties to an agreement, nothing contained in such agreement shall affect the rights or obligations under this Protocol of Watercourse States that are not parties to such an agreement.
- (6) Every Watercourse State is entitled to participate in the negotiation of and to become a party to any watercourse agreement that applies to the entire shared watercourse, as well as to participate in any relevant consultations.
- (7) A Watercourse State whose use of a shared watercourse may be affected to a significant extent by the implementation of a proposed watercourse agreement that applies only to a part of the watercourse or to a particular project, program or use is entitled to participate in consultations on such an agreement and, where appropriate, in the negotiation thereof in good faith with a view to becoming a party thereto, to the extent that its use is thereby affected.

Article 7: Settlement Of Disputes

- (1) State Parties shall strive to resolve all disputes regarding the implementation, interpretation or application of the provisions of this Protocol amicably in accordance with the principles enshrined in Article 4 of the Treaty.
- (2) Disputes between State Parties regarding the interpretation or application of the provisions of this Protocol which are not settled amicably, shall be referred to the Tribunal.
- (3) If a dispute arises between SADC on the one hand and a State Party on the other, a request shall be made for an advisory opinion in accordance with article 16(4) of the Treaty.

Article 8: Signature

This Protocol shall be signed by the duly authorized representatives of the Member States.

Article 9: Ratification

This Protocol shall be ratified by the signatory States in accordance with their constitutional procedures.

Article 10: Entry Into Force

This Protocol and any subsequent amendments thereof shall enter into force thirty (30) days after the deposit of the instruments of ratification by two-thirds of the Member States listed in the Preamble.

Article 11: Accession

This Protocol and any subsequent amendments thereof shall remain open for accession by any Member State.

Article 12: Amendment

- (1) An amendment to this Protocol shall be adopted by a decision of three quarters of the Summit members who are a party to this Protocol.
- (2) A proposal for any amendment to this Protocol may be made to the Executive Secretary by any State Party for preliminary consideration by the Council, provided however, that the proposed amendment shall not be submitted to the Council for preliminary consideration until all Member States have been duly notified of it and a period of three (3) months has elapsed after such notification.

Article 13: Withdrawal

- (1) Any State Party may withdraw from this Protocol upon the expiration of twelve (12) months from the date of giving to the Executive Secretary, a written notice to that effect.
- (2) Any State Party that has withdrawn pursuant to paragraph 1 shall cease to enjoy all rights and benefits under this Protocol upon the withdrawal becoming effective, but shall remain bound by the obligations herein for a period of twelve (12) months from the date of giving notice to the date the withdrawal becomes effective.

Article 14: Termination

This Protocol may be terminated by a decision of three quarters of members of the Summit.

Article 15: Depositary

- (1) The original of this Protocol and all instruments of ratification and accession shall be deposited with the Executive Secretary, who shall transmit certified copies to all Member States.
- (2) The Executive Secretary shall register this Protocol with the Secretariats of the United Nations and the Organization of African Unity.

Article 16: Protocol on Shared Watercourse Systems in the SADC Region

- (1) Upon entry into force of this Protocol, the Protocol on Shared Watercourse Systems in the Southern African Development Community (SADC) Region, which entered into force on 29th September 1998, shall be repealed and replaced by this Protocol.

The rights and obligations of any State Party to the Protocol on Shared Watercourse Systems in the SADC Region, which does not become a party to this Protocol, shall remain in force for twelve (12) months after this Protocol has entered into force.

In witness whereof, we, the Heads of State or government, or duly authorized representatives, of SADC Member States have signed this Protocol.

Done at Windhoek, this 7th day of August 2000 in three original texts in the English, French and Portuguese languages, all texts being equally authentic.

(Signed by Angola, Botswana, Lesotho, Malawi, Mauritius, Mozambique, Namibia, Seychelles, South Africa, Swaziland, Tanzania, Zambia and Zimbabwe; not signed by DR Congo.)

ANNEX 4

Timetable of Developments in the Incomati River Basin; 1962–2002

Abbreviations: SA = Republic of South Africa
 SZ = Kingdom of Swaziland
 MZ = Republic of Mozambique

Year	Context	Physical conditions	Infrastructure dev.	Formal meetings	Agreements/actions
1962			SA: Nooitgedacht dam (81 Mm ³) on the Komati		
1964		Drought in Cunene			Cunene Agreement (Bipartite Agreement between SA and Portugal in regard to Rivers of mutual Interest and the Cunene River Scheme); October 13 1964.
1965 1966	Helsinki rules		SZ: Sand River Dam (50 Mm ³) on Komati		
1967	SZ: Water Act 25 enacted			First Tripartite Technical Conference on Rivers of Common Interest, Mbabane, April 24–5 1967	Principle of “best joint utilization” adopted by the three countries SZ accedes to Part I (Rivers of Mutual Interest) of the 1964 Cunene Agreement. Full and free exchange of hydrological data. Studies to be done leading to an integrated plan for each of the shared river basins. Technical studies to be done for an international flood warning system.
1968	Independence of SZ				
1969				Second Tripartite Technical Conference on rivers of Common Interest, Lourenço Marques, October 13–15 1969	Hardly any progress on studies concerning the Incomati in all 3 countries; progress to be reported at next meeting. Agreed general principles: (a) “No country should use water in a manner which is uneconomic for itself if such use would be to the detriment of another country”; (b) reasonable requirement for domestic use and for stock watering should be accorded priority over other uses of water; (c) projections for the year 2000 should be made for water requirements; (d) the three countries should base their estimates of water resources and requirements on agreed parameters. Standing Technical Committee on Parameters appointed.

1970				Meeting of Standing Technical Committee on Parameters, Mbabane, March 24 1970	Several parameters agreed on mainly concerned with irrigation (soil classification; economic criteria for irrigation; water duties; percentage of gross area to receive assured supply); and on definitions of certain hydrological data.
1971			SA: Vygeboom Dam (84Mm ³); on Komati		
1972				Third Tripartite Technical Conference on Rivers of Common Interest, Pretoria, Feb 21–2 1972	All countries to submit by March 1973 data on actual and projected water use. Agreement over parameters; calculation of “normal flow” amended. SA, Portugal and Swaziland to update their General Plans. SA commits itself to no further development on Incomati without prior consultation. Interim measure: all proposed works > 10 Mm ³ /a to be submitted. Minor works with cumulative effect also to be submitted. Agreement to take steps to prevent future pollution and eliminate existing pollution.
				Meeting of Standing Technical Committee on Parameters, Mbabane, November 21 1972	
1975	Independence MZ				
1976		Floods?			Umbeluzi agreement between MZ and SZ (40 percent of flow in White and Black Umbeluzi is for MZ).
1978				SA–SZ Govts. Meeting, 18/1 Meeting South African Railways–Mozambique, 8/5 First meeting DWAF–SA to DNA, –MZ, Maputo, 15/6	First contact between SA and Mozambique on water and other issues held under auspices of the CEO of the South African Railways.
1979	May 1979: lowest flow Umbeluzi; water shortage Maputo	Lowest annual flow measured since recording started (1953) at Komati Poort/Ressano Garcia (121 Mm ³ /a)	SA: new dams on the Crocodile: Witklip, Klipkopje, Primkop (total 27 Mm ³) SA: Da Gama dam (14 Mm ³) on the Sabie	Visit to DWAF from Mozambique, 6–7/6 Ministerial level meeting SA/SZ, 8/6 Official level meeting SZ-SA (28/6) JPTC SA/SZ, Mbabane, 20/8	14/9 Request from Swaziland to SA to increase releases from Vygeboom Dam to 68 cusec, so as to have 135 cusec at the border.
JPTC SA/SZ; Pretoria, 16/10					

				Talks MZ-SZ on Umbeluzi	Negotiations between MZ and SZ on respecting Umbeluzi agreement; significant increase in flow after talks (Present: Robert Thabede, Tom Brook, Gebre Libsekal).
1980	Oct 1980: low flow Umbeluzi; water shortage Maputo	Drought	SZ: Mnjoli dam on Umbeluzi (153 Mm ³)	JPTC SA/SZ, Mbabane, 5/3 JPTC SA/SZ, Pretoria, 20/5 SA-SZ Govts Meeting JPTC SA/SZ Mbabane 28/7	
1981		Floods		Ministerial level SA/SZ Cape Town, 15/1 JPTC SA/SZ Mbabane, 23/7 JPTC SA/SZ, Pretoria, 28/7	Exchange of information between SA and MZ. Request from SZ to SA to pay half of \$56 000 fee for services of US Army Corps of Engineers.
1982		Drought; Sep 1982: Incomati dry first time since observation started	SA: Kweni Dam (167 Mm ³) on Crocodile	JPTC SA/SZ, Mbabane, 24/2 JPTC SA/SZ, Pretoria, 9/6 Preliminary discussions on the establishment of a committee to hold talks on river basins of common interest to Mozambique, South Africa and Swaziland (First TPTC meeting); Mbabane, July 6 1982 JPTC SA/SZ, 6/7 Second TPTC meeting; Maputo, August 30-1 1982	Mozambique recognizes the 1964/1967 Rivers Agreement. Establishment of a Tripartite Permanent Technical Committee (TPTC) proposed; ToR drafted and submitted for approval. Agreement to prepare in the near future a report on 1972-82 water developments in each country. In view of present developments, talks should start on the Incomati. MZ expresses concern about insufficient water in the Incomati during the dry season. SA states that due to upstream developments it is no longer possible to release water during the dry season. Need for coordination of plans for water development stated by MZ and SA. SA and MZ agree to exchange information on studies already undertaken by SA jointly with SZ, and by MZ. Request from SZ to SA to release a further 2.4 million cubic meters in the Komati River.
1983	June-Oct: water shortage in		MZ starts constructing Corumana dam on the	JPTC SA/SZ, Mbabane, 31/1-1/2	

	Maputo; emergency structure built at intake in Umbeluzi	Sabie	Third TPTC meeting, Pretoria, February 17 1983	Formal establishment of TPTC. SA provides short abstracts of interim report on the Incomati; upon request by MZ, SA agrees to make the full reports available, expected to be ready by June/July 1983 Note that these reports are not SA reports, but reports from the Joint Permanent Technical Committee between the SA and Swaziland! Dates and particulars of meetings of this JPTC are extremely relevant to this study! SA Dept of WA has full minutes of these JPTC meetings on file. MZ informs that construction of Corumana dam has started. SA and SZ will shortly produce a joint report on the Komati; but SA wishes to expand it to include the Sabie and Crocodile. After completion MZ will be informed about "the full potential."
			JPTC SA/SZ, Mbabane, 4-5/7 JPTC SA/SZ Including American consultants, Pretoria, 15/7 Fourth TPTC meeting, Mbabane, August 2 1983	SA forwards all interim reports on Komati to MZ. The draft final development plan envisages Driekoppies and Maguga dams "to stabilize existing water use and allow for modest irrigation expansion." The final PTC report would be sent to MZ for information. MZ expresses satisfaction of the interim Reconnaissance report. SA states that extreme care must be exercised in the use of the Pitman Model Analysis. Information is exchanged between SA and MZ on the Sabie and Komati MZ asks SA to provide discharge data on Komati and Sabie river near the border; SA agrees.
1984	"Komati" agreement between SA and MZ on security (16/03)	Demoina floods	Fifth TPTC meeting, Maputo, Feb 27-8 1984 Exploratory meeting SA/Zim/MZ/Botswana re: possible Limpopo Basin Commission, Maputo, March 22-3 JPTC SA/SZ, Mbabane, 28/5 JPTC SA/SZ, Pretoria, 11/7 Sixth TPTC meeting, Berg en Dal, 30 August 1984	MZ presents "Framework" report on Incomati, inspired by point 5 of the Helsinki Rules. SA agrees with suggestion by MZ to formulate a single "Framework"; both SZ and MZ will analyze the report and present comments in the next meeting. Discussions and info exchange of 1984 floods, noting the difficulty in communicating flood warnings speedily because conventional communication systems fail. SZ and SA accept to explore satellite communication options. MZ presents report on 1984 floods. SA states that SABC will transmit messages via TV and radio in case telephone links are destroyed. SZ and SA state they accept MZ Incomati report. SZ and SA submit joint report on Komati; MZ observes that format differs from its "Framework" document, and requests similar information on the Sabie and Crocodile. SA promises to avail a preliminary report on the Sabie to MZ.

		JPTC SA/SZ, Berg en Dal, 31/8 JPTC SA/SZ, Mbabane, 8/10 JPTC SA/SZ, Pretoria, 29/11	
1985		JPTC SA/SZ, Mbabane, 14/3 SA/MZ Ministerial level meeting, Komatipoort, 17/4 SA/MZ Ministerial level meeting, Maputo, 9/5 JPTC SA/SZ, Pretoria, 29/5 JPTC SA/SZ, Mbabane, 5/8 JPTC SA/SZ, Mbabane, 3/10 JPTC SA/SZ, Pretoria, 7/11 JPTC SA/SZ, Pretoria, 14/11 JPTC SA/SZ, Mbabane, 28/11 JPTC SA/SZ, Pretoria, 3/3 SA/SZ Ministerial level meeting re Komati, Cape Town, 25/3 Limpopo Basin Technical Committee meeting, Harare; Signing of agreement, 5/6 SA/SZ Ministerial level meeting re: Komati, Jan Smuts airport, June 13 SA/SZ Ministerial level meeting, Pretoria, 15/9	TPTC meeting initially scheduled for February 20 1985; then re-scheduled to March 14 1985, but MZ could not participate.
1986			
1987	Contacts between the authorities of the three countries are very much reduced, because of the worsening security situation in Mozambique	JPTC SA/SZ; DBSA also present, Pretoria; 26/1 JPTC SA/SZ, Pretoria, 5/2 JPTC SA/SZ, Pretoria, 22/4 SA/SZ Inter-Govt. meeting, October 28	Political difficulty: Swaziland does not want money from DBSA (Development Bank of Southern Africa, an apartheid era South African government bank).
1988		MZ: Corumana (850 Mm ³) on the Sabie MZ: Pequenos Libombos	JPTC SA/SZ, Pretoria, 2/2 JPTC SA/SZ, March 7 JPTC SA/SZ, July 13

		(357 Mm ³) on the Umbeluzi	Meeting: Swazi King–Botha (Foreign Affairs), October 23	Minister Botha requests Van Robbroeck to give him a copy of the Komati report to hand to Mozambique.
1989	Zero flow in Incomati at Ressano Garcia		Seventh TPTC meeting, Mbabane, February 21 1989	MZ received final SA 1984 flood report, and the First Phase Komati Basin Development Plan (February 1987). MZ states that the Plan does not take into account its "Framework" report, or its needs. MZ denies it ever agreed with Phase One of the Komati Plan. SA announces it wishes to construct Driekoppies Dam as soon as possible. SZ will decide on Maguga dam end 1989, when consultant's report is ready. SA states that Driekoppies and Maguga dams will utilize floodwaters not used by MZ. MZ, quoting the First Phase Komati Development Plan, states that it experiences shortages. SA and SZ use much water outside Komati Basin. SA suggests MZ defines its immediate needs but only in the section above the confluence with the Sabie, as the Corumana dam can meet the remaining needs. MZ replies that the Komati cannot be separated from the rest of the basin; and that it required sufficient flow for present and future needs. It is agreed that SA draft a position paper answering MZ questions concerning Driekoppies dam, and that MZ makes its water needs known.
			JPTC SA/SZ, Mbabane, 21/2 Eighth TPTC meeting, Maputo, March 21 1989	SA submits its position paper, as a JPTC paper by SA/SZ. MZ states that its actual, short, medium-term and potential water requirements were given in the 1984 "Framework" report; requirements not considered by the SA/SZ studies. MZ states that no formal proposals by SA/SZ were received on Driekoppies and Maguga dams. According to SA, MZ agreed to proposals in the consultant's interim report. MZ says no such agreement was recorded in the TPTC minutes. SA states that both dams will not substantially reduce the availability of water in MZ. MZ states that the dry season flow coming to MZ at Ressano Garcia has decreased substantially over the last twenty years, and that water use in SA and SZ will further increase from about 700 to 900 Mm³/a after implementing Phase One. SA states it cannot wait with the implementation of Phase One; and that it wants to consider MZ's needs between the border and the confluence with the Sabie. MZ replies that Corumana was not intended to correct a situation caused by increased water use by upstream countries, but to expand its own irrigated area. MZ states it wishes to first reach agreement on a division of the Sabie water, and then to come to a general agreement on the entire Incomati basin. MZ agrees to prepare a paper with detailed water requirements in order to allow the other countries to accommodate needs of MZ. SA wishes to commence constructing Driekoppies in October 1989, and will send a letter to MZ stating its intention, and asking whether MZ objects.
			WB mission in MZ (Sept)	WB report contains proposals for negotiations for MZ.

				SA formally requests MZ's approval for Driekoppies dam. MZ responds in an official note signed by the Minister of Cooperation stating some conditions, the most important being a water sharing agreement on the Sabie.
			Ninth TPTC meeting, Kruger Park, November 16 1989	
1990	Nelson Mandela released (Feb 1990) MZ: DNA establishes Gabinete dos Rios Internacionais	Start construction Driekoppies?	Ministerial level meeting SA/SZ, 18/9	3/1 Gebre Libsekal, Swaziland to fill in details of understandings reached at previous TPTC meetings that were not recorded.
1991	MZ: Water Law enacted		Tripartite SA/SZ/MZ Ministerial Meeting, and Tenth TPTC meeting, Piggs Peak, February 14 1991	Agreement: (a) Conduct Joint Incomati Basin Study (JIBS) (b) Approval first phase of Komati Development plan (i.e. construct Driekoppies and Maguga dams) (c) Pending result of JIBS: -base flow at Ressano Garcia: 2 m ³ /s -SA to consult TPTC prior to construct water works > 250,000 m ³ , or any water abstraction >110 l/s in the Sabie. RSA handed copies of the report "Water Resources Planning of the Sabie River Catchment: Study of Development potential and Water Resources," containing the recommendation to construct Injaka Dam as first stage of Phase One, to Mozambique and Swaziland. Discussion on the Joint Inkomati Basin Study (JIBS) and appointment of Steering Committee (SC). RSA repeats its proposal for the construction of the Injaka Dam. Approval of TPTC membership. Approval of JIBS Terms of Reference, Project leaders and Consultants. Mozambique states that they cannot approve of the Injaka Dam prior to a water sharing agreement, which will be concluded on completion of the JIBS. RSA states that they had to proceed with the Injaka Dam to meet basic human requirements in the catchment and regard this as their eventual allocation from the Sabie River.
			Eleventh TPTC meeting, Maputo; May 24 1991	
			Twelfth TPTC meeting, Pretoria; September 23 1991	
1992	SADC Treaty; Windhoek, August 17 1992 Start Zapro Peace accord in Mozambique (October 1992)	Drought	JWC SA/SZ, Mbabane, March 13 1992 (JPTC SA/SZ renamed into JWC)	Treaty on the Development and Utilization of the Water Resources of the Komati River Basin, between SA and SZ (Mbabane, March 13 1992) (with mention of Driekoppies and Maguga dams). Treaty on the Establishment and Functioning of the Joint Water Commission between SA and SZ (Mbabane, March 13 1992). JWC and Komati Basin Water Authority KOBWA established between SA and SZ. Further discussion on JIBS. Approval of amended membership of JIBS-SC. Launch of JIBS.
			Thirteenth TPTC meeting, Mbabane, March 13 1992	

		Informal JWC meeting, RS/MZ, March 29 1992 TPTC meeting, March 30 1992 ?? TPTC meeting, May 11 1992	RSA provides Mozambique with a copy of the Injaka Dam White Paper. RSA report that the Injaka Dam is scheduled to commence construction in April/June 1993. RSA state the impoundment of 8.5 percent of the Sabie River seemed to be well within the limits of the eventual RSA water allocation. RSA table notes indicating the impact of the Injaka Dam on the Corumana Dam. Mozambique stated that they need to submit the JIBS project proposal to their Minister for approval. Agreed to appoint the consultants Chunnet Fourie and Consultec for the JIBS. As South Africa and Swaziland had funds ready it was agreed that the consultant may commence with data collection. Minimum flow at Ressano Garcia (2 m³/s) not complied with, which SA argues is caused by the extreme drought. SA does not prevent farmers from building a large weir immediately upstream of the border, further reducing the flows.
1993	MZ: ARA South starts operating		
1994	SA majority rule Multi-party elections in MZ		
1995	SA joins SADC SADC Protocol 1, Johannesburg, August 28 1995 SADC water ministers conference, Pretoria, Nov 23-4 1995 MZ Water Policy adopted	Fourteenth TPTC meeting, Pequenos Libombos, July 17 1995	RSA reports that since no approval was forthcoming from Mozambique [meeting 13], RSA and Swaziland had proceeded with the JIBS study on their own and it was now practically complete (environmental study still incomplete). The study has not yielded the results expected due to the non-participation of Mozambique. Mozambique requests that the study be extended to cover the Mozambican side of the catchment. RSA submits a revised TOR to extend the study into Mozambique but states that the funds for the JIBS study have been depleted and it would be difficult to mobilize additional funds. Mozambique to analyze the RSA proposal and submit TOR to the World Bank for possible financing. RSA reports that the reason construction of the Injaka Dam did not commence in 1993, as previously stated, was to allow for the completion of the JIBS study. A tender for the construction of the dam has now been awarded. Discussion on Usutu, Usutu Environmental Study, and other areas of cooperation.
1996	Establishment SADC Water Sector	JWC MZ/SA, Maputo, July 26 1996	Formal agreement between MZ and SA to establish a Joint Water Commission on rivers of mutual interest, in due consideration of the interests of SZ, ZW, and BW (Maputo, July 26 1996).

			Fifteenth TPTC meeting (venue??), November 21 1996	SA and SZ sign the Resettlement and Compensation Policy document for the Maguga Dam. Further discussions on JIBS. RSA provides Mozambique with a copy of the environmental impact assessment report of the Injaka Dam.
1997	Maseru conference (May 20–1 1997) UN Convention (May 21 1997)	Incomati dry at Ressano Garcia	JWC MZ/SZ, Mbabane, 4/8	Diplomatic tension at Ministerial level about the draft paper by Carmo Vaz and Lopes Pereira for the Maseru conference, which is revised as a result. SA commits itself to Incomati agreement. Bilateral discussions between MZ and SZ on draft Treaty/Agreement establishing JWC, along similar lines as the JWC between MZ and SA established in 1996.
			Sixteenth TPTC meeting, Piggs Peak, August 20 1997	Discussion on Komati projects. Resolution: The TOR for the extended JIBS study is accepted by the TPTC. Mozambique mandated to administer the project and take up the funding offered by Danida.
			Thirty-Fifth JWC SA/SZ, Nelspruit, 23/10	Discussion on Komati Project and Komati Basin Water Authority (KOBWA) matters.
1998	SA: new Water Act enacted	SA: Driekoppies Dam / Lake Matsamo (251 Mm ³), on Lomati	Seventeenth TPTC meeting, Maputo, May 26 1998	Discussion on Maputo and Komati projects. A proposal received from BKS Acres in consortium with Consultec to carry out the second phase of the JIBS study is accepted in principle by the TPTC.
			JWC MZ/SZ, Maputo, 27/5	Further discussion on draft Treaty/ Agreement. Discussion on intention by Swaziland to develop the Lower Usutu Smallholder Irrigation Project (LUSIP), on the Maputo Basin. Discussion on the rehabilitation of telemetry system serving the two countries on the Mbuluzi basin.
			First meeting ISOTG, Nelspruit 11/8	First meeting of the Incomati System Operating Task Group (ISOTG) of the TPTC. The ISOTG would meet fourteen times between 11/8/98–23/1/01, including two “mini” meetings.
			JWC SA/SZ	Govt. of Swaziland through JWC tasks KOBWA to implement the Maguga Dam resettlement program.
			September 17 1998	The previous Minister of DWAF, SA, Dr Kader Asmal, and the then Minister for Natural Resources and Energy, SZ, Prince Sobandla, officially open Driekoppies Dam. DWAF minister renames Driekoppies to: Lake Matsamo.
			Eighteenth TPTC meeting, Nelspruit, September 18 1998	Further discussion on Maputo basin Study. Mozambique reports that there has not been any progress with the second phase of the JIBS study. RSA expresses concern that the \$200 000 allocated to the study may not be sufficient.
			JWC MZ/SZ, Mbabane, 23/11	Discussion on Socioeconomic and the Environmental studies of the Komati and Inkomati basins, respectively. Discussion on the establishment of River Basin Commissions.

1999		Nineteenth TPTC meeting, Piggs Peak, February 18 1999	LUSIP (Lower Usutu Smallholder Irrigation Project) study introduced. Memorandum of Understanding (MoU) with Danida discussed. Further discussion on Maputo Basin study and Task Team for study nominated. RSA reports/discusses establishment of Catchment Management Agency. Report that JIBS received funding from Danida. Mozambique reports that they received funding to conduct the JIBS Phase 2 study and that approval of the project had been received from Danida. Mozambique to give periodical reports on development. Commencement of the studies awaits approval of the MoU. Further discussion on the establishment of River Basin Commissions.
		JWC MZ/SZ, Maputo, 27-28/4	Consensus reached at technical level on Agreement and LUSIP.
		First meeting Task Group IIWSA, May 24	First meeting of the Task Group for the Interim IncoMaputo Water Sharing Agreement IIIWSA; this Task Group would meet twenty times between May 24 1999 and February 2002.
		Twentieth TPTC meeting, Maputo, June 3 1999	Working Group on River Basin Commission named (Mr. R. Sangweni, Mr. I Chutumia, and Dr P. Roberts). Further discussion on LUSIP, Maputo Basin study, MoU, Environmental and Socioeconomic studies, and Operating Rules for Inkomati System. Mozambique reports that the funds for JIBS 2 are available and the study is to start in a month's time. The sub-committee for joint studies to follow the implementation of the studies.. RSA informs of new approach to protection of water resources. JIBS Phase 2 initiated.
		Ministerial meeting MZ, SA, SZ; Piggs Peak, July 30 1999	Signing of Agreement (MoU) between Danida and TPTC countries on " The Execution of the Integrated Inkomati Development Initiative Studies." Signing of Bilateral agreement Between SA and Danida. Bilateral Agreement between Swaziland and Mozambique.
		Fifty-Fourth JWC SA/SZ, Nelspruit, August 26	Discussion on Komati Project matters.
		Fifty-fifth JWC SA/SZ, Nelspruit, October 28	Discussion on Komati Project matters.
2000		Fifty-sixth JWC SA/SZ, Nelspruit, November 25	Discussion on Lavumisa Project matters.
		Twenty-First TPTC meeting, Pretoria, December 13 1999	Discussion on Maputo River basin development.
			Meeting includes thirty-eighth meeting of KOBWA Finance Committee.
			Mozambique reports to have secured US\$ 300 000 from Nordic Development Fund for the Maputo Basin Study.
			Mozambique reports appointment of Consultec and BKS to execute JIBS, and that the work commenced in November 1999.
			Task group for Environmental study named (Mr S. Dhlamini, Mr C. Vicente, Mr L. van den Berg).
			Task group for Socioeconomic study named (Mr S. Dhlamini, Ms O. Sousa, Mr L. van den Berg).
			Further discussion on the Komati and Incomati studies.
	SADC Protocol 2, February: Windhoek, severe floods August 7 2000 on Limpopo and	First TPTC Steering Committee meeting for the Joint Maputo Basin study	First meeting of the Steering Committee on the Maputo Basin Study, Funding and Terms of Reference; the SC would further meet on in 2000 on 22/2, 6/4, 26/5 and 23/11, and in 2001 on 15/3.

Incomati			SA assists with floods in MZ. TPTC initiated discussions on the formation of an Inkomati Joint Water Commission (IJWC).
		JWC MZ/SZ, Piggs Peak, 18/5	Discussion to conduct Mbuluzi Basin study and further discussion on the LUSIP and the Interim Water Sharing Agreement on the Maputo Basin.
		Twenty-Second TPTC meeting, Piggs Peak, May 19 2000	Further discussions on Maputo Basin Study, LUSIP, Komati and Incomati Basins studies. Report that Tripartite Agreement with Denmark signed in October, 1999. Mozambique proposes Joint Flood Study. Discussion on the Interim IncoMaputo Water Sharing Agreement (TIA).
		JWC MZ/SZ, Maputo, 29/8 Twenty-Third TPTC meeting, Maputo, August 30 2000	Further discussion on Maputo Basin, LUSIP. Swaziland reports to be under pressure from European Union for delaying with Letter of Comfort for the LUSIP. Breakdown on IIWSA/TIA negotiations, TPTC encourages and advises Task Group to continue. Further discussion on Incomati studies. Swaziland appoints Mr. D. Mndzebele to serve in the Floods study Task Team.
		Twenty-Fourth TPTC meeting, Pretoria, December 13 2000	Mozambique appoints Mr. Chivambo and Ms. Olinda Sousa. Swaziland reports Project Coordinator for Maputo basin Study is identified Further discussion on LUSIP. Mozambique reports second Phase of JIBS completed. Mozambique reports on the Netherlands initiative on the Management of the Incomati Basin and Adjacent Coastal Zones. Swaziland nominates Mr S. Dhlamini for the Floods study. Further discussion on IIWSA/TIA.
		Fifty-Seventh–Sixty-Fifth JWC SA/SZ	JWC SA/SZ met in 2000 in total nine times; including two KOBWA finance comm. Meetings.
2001	SA: Komati Catchment Management Agency being established SZ ratifies SADC Protocol (revised) on August 3 2001	SA: Injaka Dam (120 Mm ³) on Sabie	Twenty-Fifth TPTC meeting, Piggs Peak, April 24 2001 Further discussion on Maputo Basin study, IIWSA/TIA, Floods study. LUSIP – Swaziland reports recent interaction with donors. Swaziland reports that Environmental assessment study for LUSIP completed.
		“Management of Incomati basin and adjacent Coastal Zone” meeting, Maputo, June 28–30 2001	
		Twenty-Sixth TPTC meeting, Maputo, August 22 2001	Further discussion on Maputo Basin study, LUSIP, Komati and Incomati studies, IIWSA/TIA. Incomati System Operation Task Group (ISOTG) – advised that operation of system to comply with 1991 Agreement.
		Seventy-Fourth JWC SA/SZ, Nelspruit, September 25	JWC met in 2001 at least seven times; the seventy-fourth meeting included a hearing of people affected by Maguga Dam.

		Twenty-Seventh TPTC meeting, Nelspruit, November 22 2001 (or December 13 2001??)	Further discussion on IIWSA/TIA. BKS Acres and Consultec give a presentation to the TPTC on the completed JIBS. The task team to review for acceptance.
2002	SZ: Maguga Nkomati Basin Dam (332 Mm ³) on Komati	Seventy-Seventh JWC SA/SZ, Nelspruit, January 23 April 5 2002	Included a discussion on Pongolapoort Dam Sustainable Utilization Plan.
		Ministerial meeting MZ, SA, SZ; Ezulwini, May 7 2002	His Majesty King Mswati III of Swaziland and South Africa's Deputy President Jacob Zuma officially open the Maguga Dam in the presence of Mozambique's Minister of Public Works and Housing, Hon. Robert White. His Majesty King Mswati III renames Maguga Dam to: Maguga Nkomati Basin Dam. Ministers discussed text of the draft "Tripartite Interim Agreement on the Protection and Sustainable Utilization of the Water Resources of the Incomati and Maputo Watercourses" (TIA). Confirmed that the TPTC's "Resolution on the Exchange of Information and Water quality Standards" will be passed prior to the formal signing of TIA. Committed that signing of TIA will take place during WSSD in Johannesburg, South Africa, August 2002.
		Twenty-Eighth TPTC meeting; Maputo August 13 2002	"Resolution of the TPTC on exchange of information and water quality" signed by Mr Americo Muianga (Director DNA, MZ), Mr Sandile Ceko (Principal Secretary Min. of Natural Resources and Energy, SZ) and Mr Mike Muller (Director-General DWAF, SA). RSA tables its final comments on the JIBS. Other Parties to review and also furnish their own final comments.
		Ministerial meeting MZ, SA, SZ; Johannesburg, August 29 2002	"Tripartite Interim Agreement" signed by Minister Roberto Costley-C. White (MZ); Hon. Magwagwa BE Mdluli (SZ) and Minister Ronnie Kasrils (SA).

Compiled on the basis of the following information sources:

Documents

Carmo Vaz, A.; and Lopes Pereira, A. 1997. The Incomati and Limpopo International River Basins, a View From Downstream. Paper presented at the Maseru Conference on "The Management of Shared River Basins" Maseru, 20–21 May (published in *Water Policy* Vol. 2, No. 1–2 pp. 99–112)

DNA. 1989. *Review of the water resources of Maputo Province* ("World Bank Study"). September 1989. Arnhem, Euroconsult / Maputo, DNA

DNA. 1998. *Country Situation Report (Mozambique); Water Resources Final Draft*, Volume 2 (of 3). February, Consultec for DNA. Maputo, DNA

JIBS. 2001. *Joint Inkomati Basin Study Phase 2 Main Report*. April 2001. Maputo, Consultec in association with BKS ACRES

Resource persons

Detailed additions by Dr Theo van Robbroeck, dd. 30 January 2002, on the first draft (of 20 December 2001);

Detailed additions by Mr Sidney Dhlamini, dd. 12 May 2002, on the second draft (of 29 March 2002);

Detailed additions by Mr Peter van Niekerk, dd. October 21 2002, on the final draft (of October 7 2002).

ANNEX NOTES

1. Text as downloaded on December 20 2001 from:
<http://faolex.fao.org/docs/texts/saf15880.doc>
2. Text as downloaded on September 7 2002 from:
[http://www.dwaf.gov.za/docs/internet/other/incomaputo/incomaputo agreement 29 august 2002.doc](http://www.dwaf.gov.za/docs/internet/other/incomaputo/incomaputo%20agreement%2029%20august%202002.doc)

Index entries: conflict; cooperation; Incomati; Inkomati; international river; Komati; Maputo; Mozambique; negotiation; Nkomati; South Africa; Swaziland; transboundary river basin

Contacts:

UNESCO

Division of Water Sciences

1, rue Miollis
F-75015 Paris, France

Tel: (+33) 1 45 68 41 80

Fax: (+33) 1 45 68 58 11

E-mail: pccp@unesco.org

Website: www.unesco.org/water/wwap/pccp

Cover: Mario Haas - Le Pré St. Gervais - France

Credits Photos:

1. UNESCO / Sébastien Le Hécho, & UNESCO / Dominique Roger
2. UNESCO / Dominique Roger
3. UNESCO / Dominique Roger
4. UNESCO / France Boquet
5. UNESCO / Béatrice Petit
6. Andrea Scialla-Nagy
7. UNESCO / Dominique Roger
8. UNESCO / Georges Malengré
9. UNESCO / Dominique Roger
10. UNESCO / Dominique Roger
11. Dr. Grigorios Konstantin V.
12. UNESCO / B. van Droste
13. János Bogárdi
14. UNESCO / J. W. Thurnell
15. Uri Shamir
16. UNESCO / Dominique Roger
17. UNESCO / A. Vorontsov
18. UNESCO / Ingrid Serrano
19. UNESCO / Dominique Roger
20. UNESCO / Georges Malengré
21. UNESCO / Dominique Roger
22. UNESCO / Dominique Roger
23. & 24. UNESCO / David Riffe & UNESCO / Dominique Roger
25. UNESCO / Andee / CCAP / AEA
26. UNESCO / Andee Vorontsov
27. UNESCO / Andee Andee

Printed by: UNESCO - Paris - France

Constitution of UNESCO (excerpt)

London, 16 November 1945

The Governments of the States Parties to this Constitution on behalf of their peoples declare:

That since wars begin in the minds of men, it is in the minds of men that the defences of peace must be constructed;

That ignorance of each other's ways and lives has been a common cause, throughout the history of mankind, of that suspicion and mistrust between the peoples of the world through which their differences have all too often broken into war;

That the great and terrible war which has now ended was a war made possible by the denial of the democratic principles of the dignity, equality and mutual respect of men, and by the propagation, in their place, through ignorance and prejudice, of the doctrine of the inequality of men and races;

That the wide diffusion of culture, and the education of humanity for justice and liberty and peace are indispensable to the dignity of man and constitute a sacred duty which all the nations must fulfil in a spirit of mutual assistance and concern;

That a peace based exclusively upon the political and economic arrangements of governments would not be a peace which could secure the unanimous, lasting and sincere support of the peoples of the world, and that the peace must therefore be founded, if it is not to fail, upon the intellectual and moral solidarity of mankind...

