LIMCOM
LIMPOPO WATERCOURSE COMMISSION

LIMPOPO RIVER BASIN IWRM PLAN

INTEGRATED WATER RESOURCES MANAGEMENT

2011-2015

VISION

Sustainable water security for improved livelihoods in the Limpopo River Basin.

MISSION

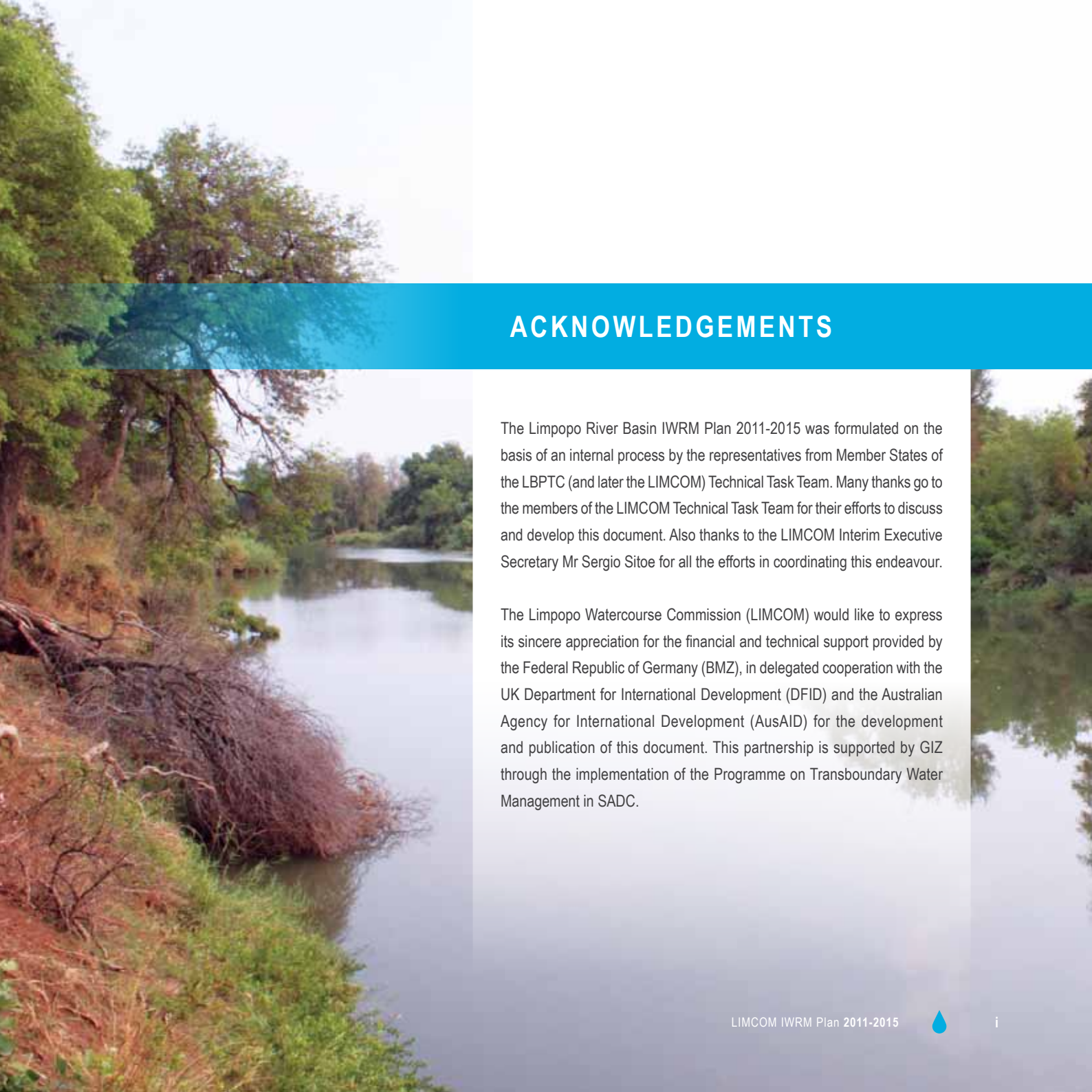
To advise the riparian states on the governance, management and development of water resources in the Limpopo River Basin through integrated water resources management in order to improve social equity, promote economic efficiency and ensure sustainable development.

IWRM PLAN GOAL 2011-2015

To develop the capacities (individual, organisational and institutional) in the riparian states for the sustainable management and development of the Limpopo River Basin.

LIMCOM
LIMPOPO WATERCOURSE COMMISSION

	STRATEGIC AREAS		
STRATEGIC OBJECTIVES	**WATER GOVERNANCE**	**WATER MANAGEMENT**	**WATER RESOURCES DEVELOPMENT**
DISASTER MANAGEMENT	**OBJECTIVE 1.1: DISASTER PREPAREDNESS** **LIMCOM to strengthen coordination among the member states to reduce the adverse effects of droughts and floods**	**OBJECTIVE 1.2: EARLY WARNING** **LIMCOM to facilitate the establishment of an early-warning system for floods and droughts in the Limpopo River Basin**	**OBJECTIVE 1.3: WATER INFRASTRUCTURE** **LIMCOM to coordinate the management and development of water infrastructure in the Limpopo River Basin in order to reduce the impact of floods and droughts**
Phase 1 2011-2015	• Disaster-preparedness plan for Limpopo • Information- and data-sharing protocol between member states on disaster management • Stakeholder participation/public- awareness campaigns on disaster-risk management • Climate change adaptation and mitigation strategies for the Limpopo River Basin	• Water-related hazard-monitoring system • Communication and dissemination system for early-warning information	• Infrastructure inventory • Operating rules and flooding study • Identification of strategic water infrastructure for disaster management in the Basin • Climate-proofing of water infrastructures • Potential for micro hydro-power generation
WATER QUALITY	**OBJECTIVE 2.1: STANDARDS** **LIMCOM to promote the adoption of common standards of water quality in order to reduce transboundary water pollution**	**OBJECTIVE 2.2: MONITORING AND REPORTING SYSTEM** **LIMCOM to facilitate the development of a Transboundary Water-Quality Monitoring and Reporting System in the Limpopo River Basin**	**OBJECTIVE 2.3: BEST PRACTICES** **LIMCOM to facilitate the implementation of pilot projects and the assessment and dissemination of best practices for reducing the transboundary water pollution caused by different sectors**
Phase 1 2011-2015	• Harmonised water-quality standards in the member states • Protocol on monitoring procedures as well as information- and data-sharing procedures relating to water quality • Raising of awareness about water quality	• Joint Basin Water-Quality Survey • LIMCOM Water-Quality Database	• Guidelines on formulating and implementing pilot projects • Pilot project on water sanitation (e.g. in relation to diseases such as cholera) • Pilot project on nonpoint source (NPS) pollution in the agricultural sector • Pilot project on mining pollution (e.g. acid mine drainage) • Pilot project on water quality in the industrial sector • Pilot project on municipal pollution
WATER ALLOCATION	**OBJECTIVE 3.1: BENEFIT SHARING** **LIMCOM to promote the equitable and reasonable utilisation of water resources in the Limpopo River Basin**	**OBJECTIVE 3.2: MONITORING** **LIMCOM to facilitate the dissemination of data and information on water resources and water usage in the Limpopo River Basin**	**OBJECTIVE 3.3: WATER USE EFFICIENCY** **LIMCOM to promote methods of increasing water availability and the efficient use of water resources in the Limpopo River Basin**
Phase 1 2011-2015	• Common understanding and practical examples of joint basin-wide development opportunities • Limpopo Information System (LIMIS)	• Hydrological monitoring • Development of Economic Accounts for Water (EAW) for the Limpopo River Basin	• Feasibility studies of potential interventions • Cost benefit analysis of the recommended interventions



ACKNOWLEDGEMENTS

The Limpopo River Basin IWRM Plan 2011-2015 was formulated on the basis of an internal process by the representatives from Member States of the LBPTC (and later the LIMCOM) Technical Task Team. Many thanks go to the members of the LIMCOM Technical Task Team for their efforts to discuss and develop this document. Also thanks to the LIMCOM Interim Executive Secretary Mr Sergio Sitoe for all the efforts in coordinating this endeavour.

The Limpopo Watercourse Commission (LIMCOM) would like to express its sincere appreciation for the financial and technical support provided by the Federal Republic of Germany (BMZ), in delegated cooperation with the UK Department for International Development (DFID) and the Australian Agency for International Development (AusAID) for the development and publication of this document. This partnership is supported by GIZ through the implementation of the Programme on Transboundary Water Management in SADC.

FOREWORD

Bogadi Mathangwane

LIMCOM Chair

The collaboration on the Limpopo River Basin between the four Member States was initiated in 1986 with the establishment of the Limpopo Basin Permanent Technical Committee (LBPTC). This was a response to the considerable variable climatic conditions that the Limpopo River is exposed to; either flood or drought. Subsequently after the revised SADC Protocol on Shared Watercourses was ratified in 2003 by SADC Member States, the Limpopo Riparian States (Botswana, Mozambique, South Africa and Zimbabwe) signed an Agreement for the establishment of the Limpopo Watercourse Commission (LIMCOM), which was ratified in November 2011.

The ratification of the Limpopo Watercourse Commission Agreement is a clear sign on the commitment between the Limpopo riparian states cooperating on the management of the Limpopo River, its tributaries and its waters for the purposes and measures of protection, preservation and sustainable development of water resources with ultimate aim of improving peoples' livelihoods in the Limpopo River Basin.

LIMCOM developed its Integrated Water Resources Management (IWRM) Plan through an internal process of the LBPTC (and later the LIMCOM), which provides a common vision to guide the further management and development of the Limpopo River Basin in a sustainable manner as well as serving as the implementation framework of the LIMCOM Agreement. The IWRM Plan has adopted a comprehensive approach to integrated water resources management and defines three strategic areas, namely: i) water governance, ii) water management and iii) water resources development.

Implementation of the IWRM Plan has commenced with the development of the Limpopo River Basin Monograph, which in essence is a comprehensive baseline survey consolidating data and information on water availability, demands and balance that will inform the future development of basin scenarios for longer-term management and development of the Limpopo River Basin.

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LIST OF ACRONYMS

CP	climate-proofing
DNA	National Directorate of Water Affairs in Mozambique
e.g.	for example
E-flow	environment flow
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH
ICP	International Cooperating Partner
ICPDR	International Commission for the Protection of the Danube River
IWRM	Integrated Water Resources Management
km2	square kilometres
LBPTC	Limpopo Basin Permanent Technical Committee
LIMCOM	Limpopo Watercourse Commission
LIMIS	Limpopo Information System
m.a.s.l.	metres above sea level
mm	millimetre
SADC	Southern African Development Community
UN-Habitat	United Nations Human Settlements Programme

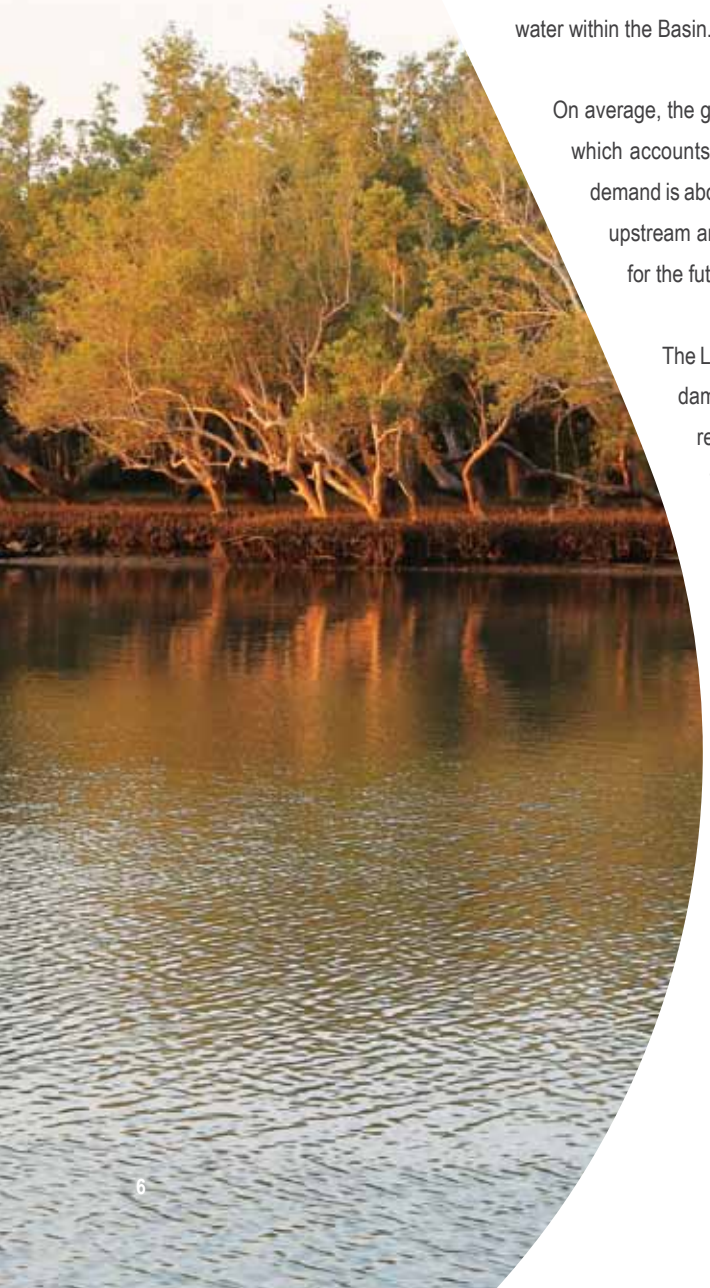
1 BACKGROUND

This document presents the first Limpopo River Basin IWRM Plan covering the period 2011-2015, which provides the implementation framework of the LIMCOM Agreement.

1.1 Key Issues

The Limpopo River Basin is shared by four SADC Member States, namely Botswana, South Africa, Zimbabwe and Mozambique, and has a total catchment area of approximately 408000 km^2. The catchment characteristics are extremely diverse, covering different climatic and topographical zones, as well as different land-use types which include protected areas. The social and economic development features are also highly diverse, ranging from subsistence farming to advanced industrial operations.

The water resources in the Limpopo River Basin differ greatly between the different sub-catchments and between the riparian countries. Topography varies from over 2000 m.a.s.l. in the mountainous regions of South Africa, to the vast low-lying floodplains in the Mozambican part of the catchment. The climate in the Limpopo River Basin ranges from tropical dry savannah and hot dry steppe in its lower parts, to cool temperatures in its mountainous regions. The average rainfall of the Basin is 530 mm per annum, ranging from 200 to 1200 mm/year, whereas the average evaporation is 1970 mm/year, falling within the range of 800 to 2400 mm/year. Rainfall is distinctly seasonal and occurs mainly in the summer months (October to March). The seasonal variations of rainfall in the Limpopo River Basin have always been highly variable, resulting in frequent drought sand floods in parts of, or throughout, the Basin. Extreme rainfall occurs during tropical cyclones which arise in the Indian Ocean.



The Limpopo River Basin is home to around 14 million people in the four riparian states. Essentially, access to water is of critical strategic importance to social and economic development in all parts of the Basin. Large urban centres such as Gaborone, Pretoria, Johannesburg and Bulawayo are the major users of domestic water within the Basin.

On average, the greatest water user by sector in the four Limpopo River riparian states is irrigation, which accounts for approximately 50% of the total water demand. The total estimated present demand is about 65%of the total natural run-off generated from rainfall. Water allocation between upstream and downstream areas and among urban and rural users is an essential challenge for the future water management of the Limpopo River Basin.

The Limpopo River Basin has already developed a considerable number of water storage dams, from which the majority of water abstractions is made. The Limpopo River flow records in Mozambique show, however, that a considerable volume of water still flows into the sea. Although the river regime shows large variability – with floods that cannot be captured and flows that must be reserved for the conservation of the delicate ecological system in the estuary – there are nevertheless still opportunities for the further development of water resources in order to increase the efficiency of water utilisation, livelihood support and management of the adverse impacts of droughts and flooding.

Protected areas comprise a very large portion of the Limpopo River Basin. For example, the Great Limpopo Transfrontier Park, consisting of the Kruger National Park in South Africa, the Limpopo National Park in Mozambique, and the Gonarezhou National Park in Zimbabwe, covers an area of approximately 35000 km^2. The large national parks contain unique biota with several threatened species, and contribute significantly to the economy of the river basin through tourism. It is therefore essential that any development of infrastructure and agricultural or industrial schemes takes place without causing harmful effects to the environment, and to the protected areas in particular.

The Scoping Study assessed that the water quality of the Limpopo River is already negatively affected, in particular the Olifants River (the main tributary of the Limpopo River), given that a substantial number of agricultural and industrial activities take place there. The environmental status of the rivers in the Limpopo River Basin varies from natural (in the national parks) to highly modified (e.g. in the upper Olifants River). Further potential deterioration of the water quality in the river, and of the aquatic and terrestrial habitats caused by unsustainable practices along the river by agricultural and mining activities, must be prevented.

1.2 Institutional Development Issues

The commitment of the four riparian states to managing their water resources together dates back to 1986 when the 'Limpopo Basin Permanent Technical Committee' (LBPTC) was jointly established. The mandate of LBPTC was to advise the Member States on different aspects associated with droughts and floods, pollution, as well as water-resources planning and development across the Basin.

In 2003, the cooperation on the Limpopo River was further strengthened through the multilateral agreement to establish the Limpopo Watercourse Commission (LIMCOM), hereafter referred to as the LIMCOM Agreement. This agreement emanated from the SADC Revised Protocol on Shared Watercourses and was ratified by all the Limpopo River Basin riparian states in 2011.

1.3 Activities Undertaken by LBPTC

LBPTC has, until now, held 22 official meetings on a rotational basis in the four Member States. The main achievements of this committee are summarised below. LBPTC:

- established the Flood Task Team in the late 1990s and has since coordinated communication between the Member States and the exchange of data between them in connection with flooding events (the Flood Task Team was very active with respect to the major flood in February2000);
- established the Interim LIMCOM Secretariat in 2008, which is located in Maputo under the auspices of the National Directorate of Water Affairs in Mozambique (DNA);
- established the legal task team that advised the committee on legal issues, such as the provisional entry into effect of the LIMCOM Agreement, the development of the Host Agreement for the LIMCOM Secretariat, as well as other legal issues related to the day-to-day tasks of LBPTC;
- facilitated the ratification process relating to the establishment of the Limpopo Watercourse Commission Agreement for all the Member States;
- undertook the Scoping Phase of the Joint Limpopo River Basin Study from 2009-2010;
- developed Phase 1 of the Stakeholder Participation Roadmap in 2010;
- established the River-Awareness Kit for the Limpopo River Basin from 2009-2011, which is serving as the information- and knowledge-management hub for LIMCOM;
- established the official www.LIMCOM.org website in2010;
- developed the Strategic Framework and IWRM Plan 2011-2015 internally, according to which LIMCOM will implement the LIMCOM Agreement;
- undertook thematic training on water-related subjects such as benefit-sharing, and on legal issues relating to the management of transboundary water resources; and
- notifies the Member States of on-going and future development projects within the Basin and other aspects of common interest relating to water resources.

2 VISION, MISSION AND GOAL

The LIMCOM vision and mission statements and the goal for the IWRM Plan are presented as follows:

VISION

Sustainable water security for improved livelihoods in the Limpopo River Basin.

MISSION

To advise the riparian states on the governance, management and development of water resources in the Limpopo River Basin through integrated water resources management in order to improve social equity, promote economic efficiency and ensure sustainable development.

IWRM PLAN GOAL 2011-2015

To develop the capacities (individual, organisational and institutional) in the riparian states for the sustainable management and development of the Limpopo River Basin.

3 LIMCOM STRATEGIC FRAMEWORK

The LIMCOM Strategic Framework is anchored in the LIMCOM Vision and Mission, and is designed to provide an effective framework for assisting with the sustainable management of the Limpopo River Basin.

3.1 Strategic Areas

LIMCOM has adopted a comprehensive approach to integrated water resources management (IWRM) in order to improve social equity, promote economic efficiency and ensure sustainable development. The Limpopo IWRM Plan defines three strategic areas, namely: i) Water Governance, ii) Water Management and iii) Water Resources Development, which are presented on the next page.

3.1.1 Water Governance

The political, social, economic and administrative systems in place to develop and manage water resources at different levels of society. Key aspects of water governance include ensuring that:

- coordination mechanisms are in place for the timely involvement of all the relevant stakeholders;
- the participation of the relevant stakeholders is guaranteed; and that
- communication procedures are in place to inform the key stakeholders

3.1.2 Water Management

The activity of planning, developing, distributing, managing and optimising the use of water resources under adherence to defined water policies and regulations. Key aspects of water management include:

- assessment;
- planning; and
- monitoring.

3.1.3 Water Resources Development

The process of developing, financing, implementing and operating structures for irrigation, drainage, water supply and sanitation, hydro-power generation and flood management. Key aspects of water resources development include:

- project preparation;
- resource mobilisation; and
- pilot projects.

3.2 Strategic Objectives

Three core challenges have been identified for the Limpopo River, which were already expressed in the LBPTC Agreement of 1986 and later in the LIMCOM Agreement of 2003, and reaffirmed by the Scoping Study on the Limpopo River Basin in 2010:

- Frequently occurring **disasters**, i.e. droughts and flooding, as a result of the uneven and seasonal variation of rainfall, has been a natural climatic feature of the ecosystem for a very long time. The emerging and observed trends of climate changes taking place in southern Africa further underscore the need for urgent and comprehensive measures to address disaster management in the Limpopo River Basin.
- Increased **pollution** of the aquatic ecosystems has been identified as an increasing challenge in the Limpopo River Basin and is particularly relevant in the case of the Olifants River. The improved environmental consciousness in general among members of the public, together with the high pollution levels in some places in the Basin with direct tangible impacts, have contributed to the realisation that water quality is a serious concern that can potentially hamper socio-economic development as well as the health of the people and the environment.
- Limited **availability** of water has a direct impact on growth and socio-economic development in the four countries. Given that the future water demand will keep increasing from all sectors to support economic growth, it will be important that the available surface and groundwater is used and allocated in an effective, efficient and equitable manner.

The Limpopo IWRM Plan is structured around these three strategic objectives, which have been defined to address the three core challenges as presented above, namely: i) Disaster Management, ii) Water Quality and iii) Water Allocation. The three strategic objectives are presented on the next page.

3.2.1 Disaster Management

LIMCOM will advise the Member States on measures for responding to harmful conditions, whether these result from natural causes such as droughts, or from human conduct. The Commission will also advise the Member State son measures for responding to emergency situations that result suddenly from disaster events such as floods, or from human conduct (e.g. industrial accidents). LIMCOM will establish mechanisms and procedures to ensure that crucial information is made available to the respective national-disaster-management teams in the Member States.

3.2.2 Water Quality

LIMCOM will advise the Member States on adopting a joint approach to water-quality management, on establishing monitoring systems for water quality and the prevention of pollution, as well as on treatment initiatives for wastewater.

3.2.3 Water Allocation

LIMCOM will investigate the availability of water resources and advise the Member States on interim and long-term strategies and mechanisms for the planning, development, management and utilisation of the water resources of the Limpopo that ensure the sustainable and equitable sharing of the available water resources in the Basin.

3.3 Operational Objectives

LIMCOM has adopted a programmatic approach, namely the Limpopo IWRM Plan, to fulfil the articles specified in the LIMCOM Agreement through the achievement of a series of overall operational objectives. These objectives are derived from cross-linking the strategic objectives and strategic areas, as illustrated in the figure alongside.

The overall operational objectives are formulated in a general way and, as such, have longer time frames. Within the IWRM Plan, Phase 1 (2011-2015), specific indicators will be defined for the anticipated outcome of the IWRM Phase 1 Plan.

The strategic objectives were identified by LIMCOM as core areas that need special attention on addressing and find solutions to overcome them. The **Disaster Management Component** is facilitating LIMCOM's efforts to address aspects of both floods and droughts. The annual climatic variations on the Limpopo River are quite significant; often the Limpopo experience either a flood or droughts, or both within the same year. The objectives of this component are on the disaster preparedness, early warning and the strategic development of infrastructure that mitigate adverse impacts of floods and droughts.

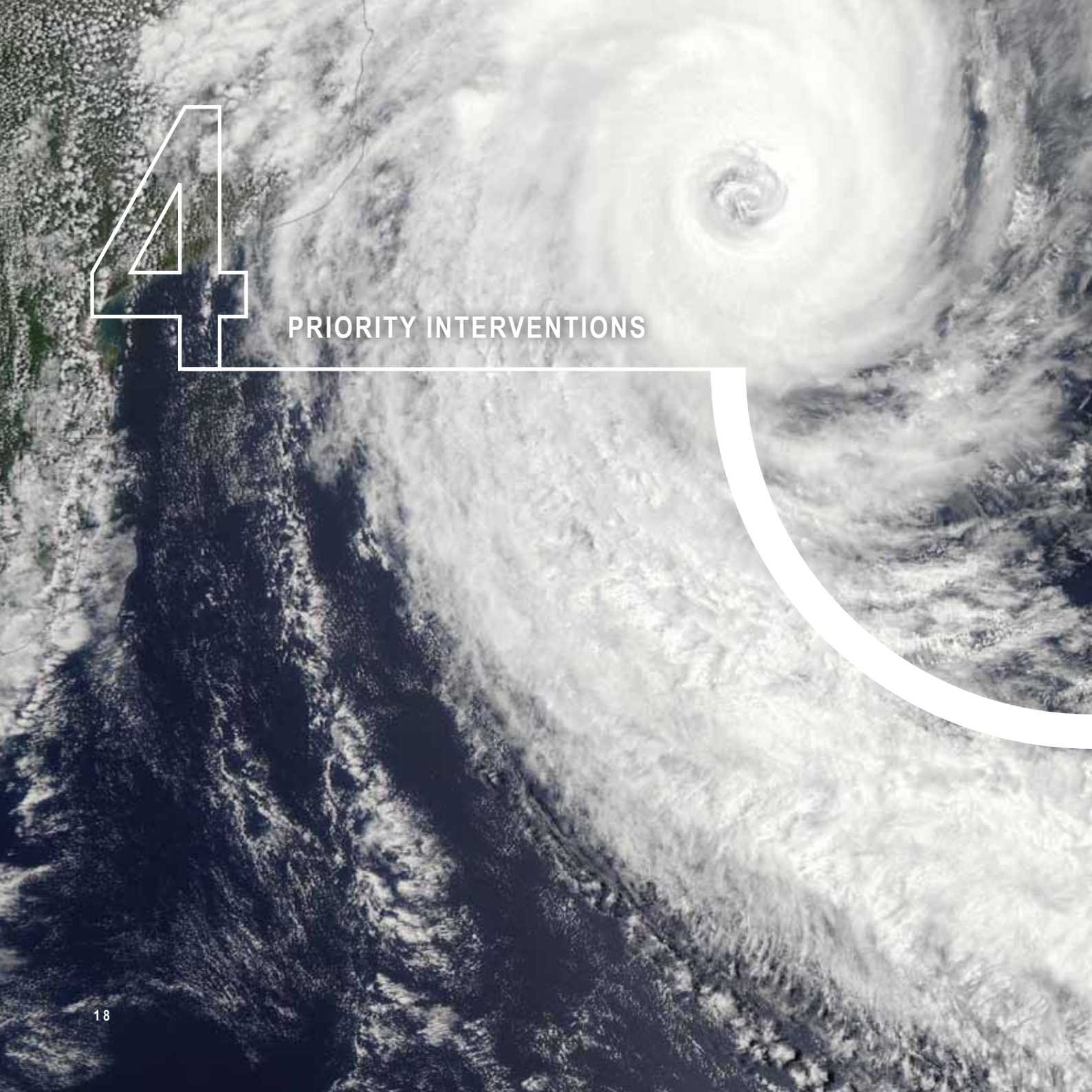
The **Water Quality Component** is facilitating LIMCOM's efforts in aspects of defining and harmonising standards among the four Member States, establishing joint monitoring and reporting system and synthetize best practices from pilot interventions. The water pollution present in the Limpopo potentially creates significant effects on the human, ecological and biodiversity conditions in the Basin.

The **Water Allocation Component** is facilitating LIMCOM's efforts in aspects of allocating water to satisfy the basic needs of the population as well as meet the demands taking into account the water development projects that a projected in the basin. Limpopo is known as water scarce river basin, therefore, principle of benefit sharing, monitoring of the water resources and promote water use efficiency has to be considered when addressing water allocation aspects.

The overall operational objectives are formulated in a general way and, as such, have longer time frames. Within the IWRM Plan, Phase 1 (2011-2015), specific indicators will be defined for the anticipated outcome of the IWRM Phase 1 Plan.

LIMCOM IWRM Strategic Framework

		STRATEGIC AREAS		
		WATER GOVERNANCE	WATER MANAGEMENT	WATER RESOURCES DEVELOPMENT
STRATEGIC OBJECTIVES	DISASTER MANAGEMENT	**OBJECTIVE 1.1** **DISASTER PREPAREDNESS** LIMCOM to strengthen coordination among the Member States to reduce the adverse effects of droughts and floods	**OBJECTIVE 1.2** **EARLY WARNING** LIMCOM to facilitate the establishment of an early-warning system for floods and droughts in the Limpopo River Basin	**OBJECTIVE 1.3** **WATER INFRASTRUCTURE** LIMCOM to coordinate the management and development of water infrastructure in the Limpopo River Basin in order to reduce the impact of floods and droughts
	WATER QUALITY	**OBJECTIVE 2.1** **STANDARDS** LIMCOM to promote the adoption of common standards of water quality in order to reduce transboundary water pollution	**OBJECTIVE 2.2** **MONITORING AND REPORTING SYSTEM** LIMCOM to facilitate the development of a Transboundary Water-Quality Monitoring and Reporting System in the Limpopo River Basin	**OBJECTIVE 2.3** **BEST PRACTICES** LIMCOM to facilitate the implementation of pilot projects and the assessment and dissemination of best practices for reducing the transboundary water pollution caused by different sectors
	WATER ALLOCATION	**OBJECTIVE 3.1** **BENEFIT SHARING** LIMCOM to promote the equitable and reasonable utilisation of water resources in the Limpopo River Basin	**OBJECTIVE 3.2** **MONITORING** LIMCOM to facilitate the dissemination of data and information on water resources and water usage in the Limpopo River Basin	**OBJECTIVE 3.3** **WATER USE EFFICIENCY** LIMCOM to promote methods of increasing water availability and the efficient use of water resources in the Limpopo River Basin



4 PRIORITY INTERVENTIONS

		STRATEGIC AREAS		
		WATER GOVERNANCE	WATER MANAGEMENT	WATER RESOURCES DEVELOPMENT
STRATEGIC OBJECTIVE	DISASTER MANAGEMENT	Disaster Preparedness	Early Warning	Water Infrastructure
	WATER QUALITY	Standards	Monitoring & Reporting System	Best Practices
	WATER ALLOCATION	Benefit Sharing	Monitoring	Water Use Efficiency

Operational Objective 1.1

Disaster Preparedness

LIMCOM to strengthen coordination among the Member States to reduce the adverse effects of droughts and floods.

PRIORITY INTERVENTIONS

1.1.1 Disaster-preparedness plan for Limpopo

LIMCOM is to review and update the UN-Habitat study dated July 2007 in close collaboration with the relevant stakeholders and on the basis of existing national disaster-management contingency plans. The plan will assess risks, adaptation capacities and exposure, and include a vulnerability assessment of potentially affected areas. The plan will include a national database of 'Disaster Contact Points'.

1.1.2 *Information- and data-sharing protocol between Member States on disaster management*

LIMCOM is to facilitate a process between the Member States to develop an information- and data-sharing agreement in order to ensure smooth and prompt access to available data and information in disaster situations. This will mainly be an internal process. The current mechanisms applied by the Flood Forecasting Team will be formalised and expanded to include coverage of drought issues. The Team will become the 'LIMCOM Working Group on Disaster Management'.

1.1.3 *Stakeholder participation/public-awareness campaigns on disaster-risk management*

LIMCOM is to undertake an initial participatory assessment of indigenous knowledge relating to disaster preparedness. This will include recommendations on public-relations activities as regards preparedness and responses before and during disaster events.

1.1.4 *Climate change adaptation and mitigation strategies for the Limpopo River Basin*

Two climate change strategies will be developed for the Limpopo:

- The Climate Change Adaptation Strategy will be based on the SADC-wide Climate Change Adaption Strategy, but scaled down to the level of the Limpopo River Basin; and
- The Climate Change Mitigation Strategy for the Limpopo River Basin will largely be derived from other regionally developed strategies and extrapolated to the Limpopo River Basin.

		STRATEGIC AREAS		
		WATER GOVERNANCE	**WATER MANAGEMENT**	WATER RESOURCES DEVELOPMENT
STRATEGIC OBJECTIVE	**DISASTER MANAGEMENT**	Disaster Preparedness	**Early Warning**	Water Infrastructure
	WATER QUALITY	Standards	Monitoring & Reporting System	Best Practices
	WATER ALLOCATION	Benefit Sharing	Monitoring	Water Use Efficiency

Operational Objective 1.2

Early Warning

LIMCOM to facilitate the establishment of an early warning system for floods and droughts in the Limpopo River Basin.

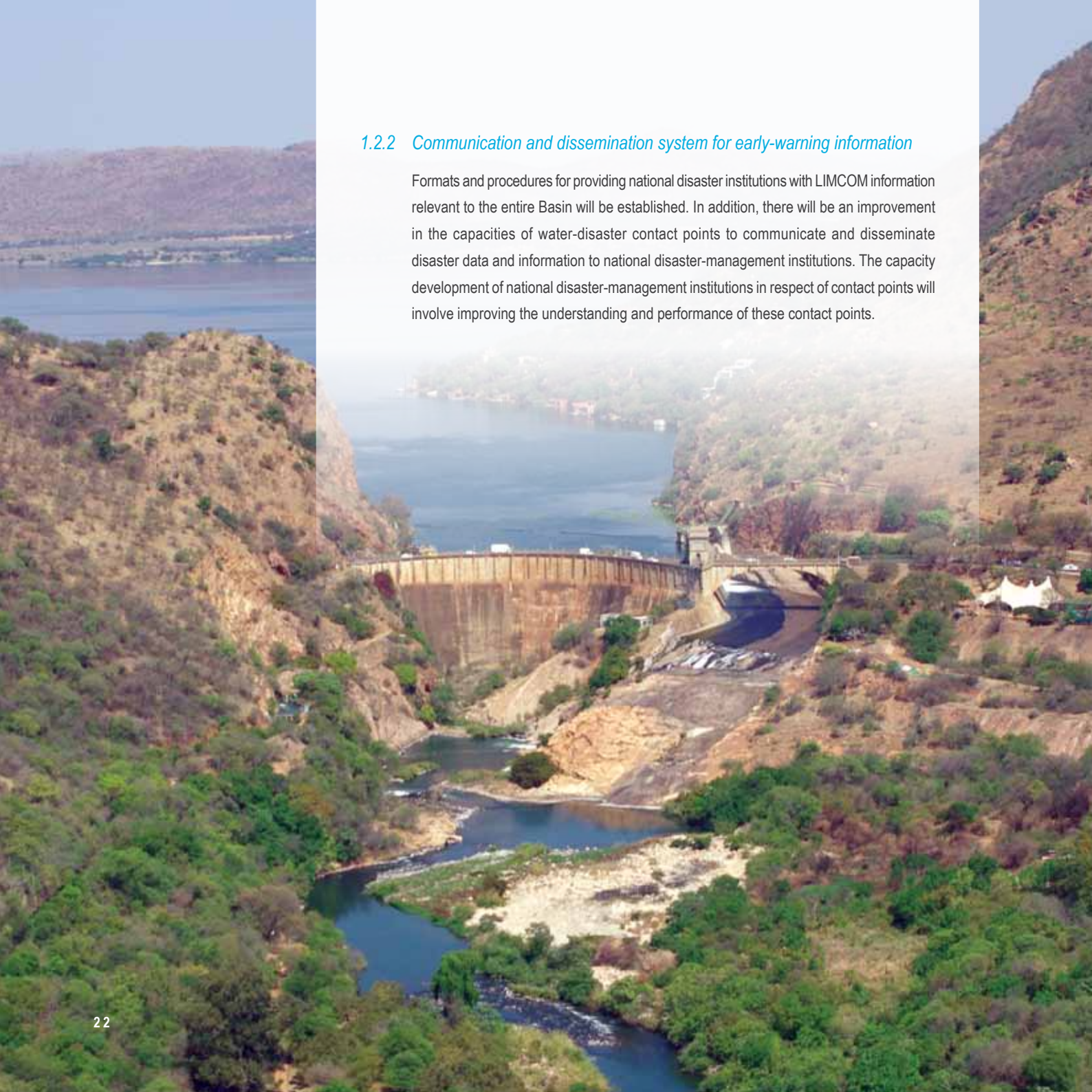
PRIORITY INTERVENTIONS

1.2.1 Water-related hazard-monitoring system

A water-related hazard-monitoring system will be established on the basis of relevant early-warning parameters, e.g. flood- and drought- forecasting for monitoring events, and automated flood- and drought-disaster maps for communications on preparedness and on responses during a disaster event. Links with the existing SADC HYCOS network will complement the early-warning system in the Limpopo River Basin. An inventory of the existing equipment in the four Member States relevant to the early-warning system will be drawn up, and recommendations for equipment to be purchased and installed, provided.

1.2.2 *Communication and dissemination system for early-warning information*

Formats and procedures for providing national disaster institutions with LIMCOM information relevant to the entire Basin will be established. In addition, there will be an improvement in the capacities of water-disaster contact points to communicate and disseminate disaster data and information to national disaster-management institutions. The capacity development of national disaster-management institutions in respect of contact points will involve improving the understanding and performance of these contact points.



		STRATEGIC AREAS		
		WATER GOVERNANCE	WATER MANAGEMENT	WATER RESOURCES DEVELOPMENT
STRATEGIC OBJECTIVE	DISASTER MANAGEMENT	Disaster Preparedness	Early Warning	Water Infrastructure
	WATER QUALITY	Standards	Monitoring & Reporting System	Best Practices
	WATER ALLOCATION	Benefit Sharing	Monitoring	Water Use Efficiency

Operational Objective 1.3

Water Infrastructure

LIMCOM to coordinate the management and development of water infrastructure in the Limpopo River Basin in order to reduce the impact of floods and droughts.

PRIORITY INTERVENTIONS

1.3.1 Infrastructure inventory

An inventory of existing water infrastructure will be drawn up. A common template with key parameters will be adopted, and the information included in an online database e.g. with links to Google Earth.

1.3.2 *Operating rules and flooding study*

An assessment of operating rules will be undertaken to understand the scope of managing floods in the Limpopo River Basin with the existing infrastructure for storing water. The study will also include any measures to be adopted in managing water infrastructure in connection with mitigating the impact of droughts. A financial and social assessment of the recommended interventions will be undertaken to provide guidance for decision-makers.

1.3.3 *Identification of strategic water infrastructure for disaster management in the Basin*

Strategic water infrastructure for disaster management in the Limpopo River Basin will be identified in line with the intervention measure of implementing rules for operating dams. The result of this intervention measure will be an overview of existing strategic infrastructures with recommendations for eventual upgrading of the facilities, together with an assessment of key strategic water infrastructures or measures for mitigating the adverse impact of disasters.

1.3.4 *Climate-proofing of water infrastructure*

LIMCOM's objective is to establish common practices and experiences on the climate-proofing of infrastructure projects. The purpose of climate-proofing (CP) is to minimise and prepare for the potential adverse impacts of climate change, thereby increasing the resilience of water infrastructures. It is important to incorporate adaptations to climate change at the planning stage of infrastructure activities, and to make LIMCOM and the public aware of the impacts of climate change and adaptation measures. The first step to initiate the adoption of CP in the Limpopo is to identify methodologies appropriate in the Member States by initiating two pilot CP projects. As an output of this process, a guideline on CP will be developed specifically for LIMCOM.

1.3.5 *Potential for micro hydro-power generation*

The production of green energy could potentially contribute to the national economies of the Limpopo Basin states. An assessment of the existing level and future potential of micro hydro-power in the Limpopo River Basin will be carried out.

		STRATEGIC AREAS		
		WATER GOVERNANCE	WATER MANAGEMENT	WATER RESOURCES DEVELOPMENT
STRATEGIC OBJECTIVE	DISASTER MANAGEMENT	Disaster Preparedness	Early Warning	Water Infrastructure
	WATER QUALITY	**Standards**	Monitoring & Reporting System	Best Practices
	WATER ALLOCATION	Benefit Sharing	Monitoring	Water Use Efficiency

Operational Objective 2.1

Standards

LIMCOM to promote the adoption of common standards of water quality in order to reduce transboundary water pollution.

PRIORITY INTERVENTIONS

2.1.1 Harmonised water-quality standards in the Member States

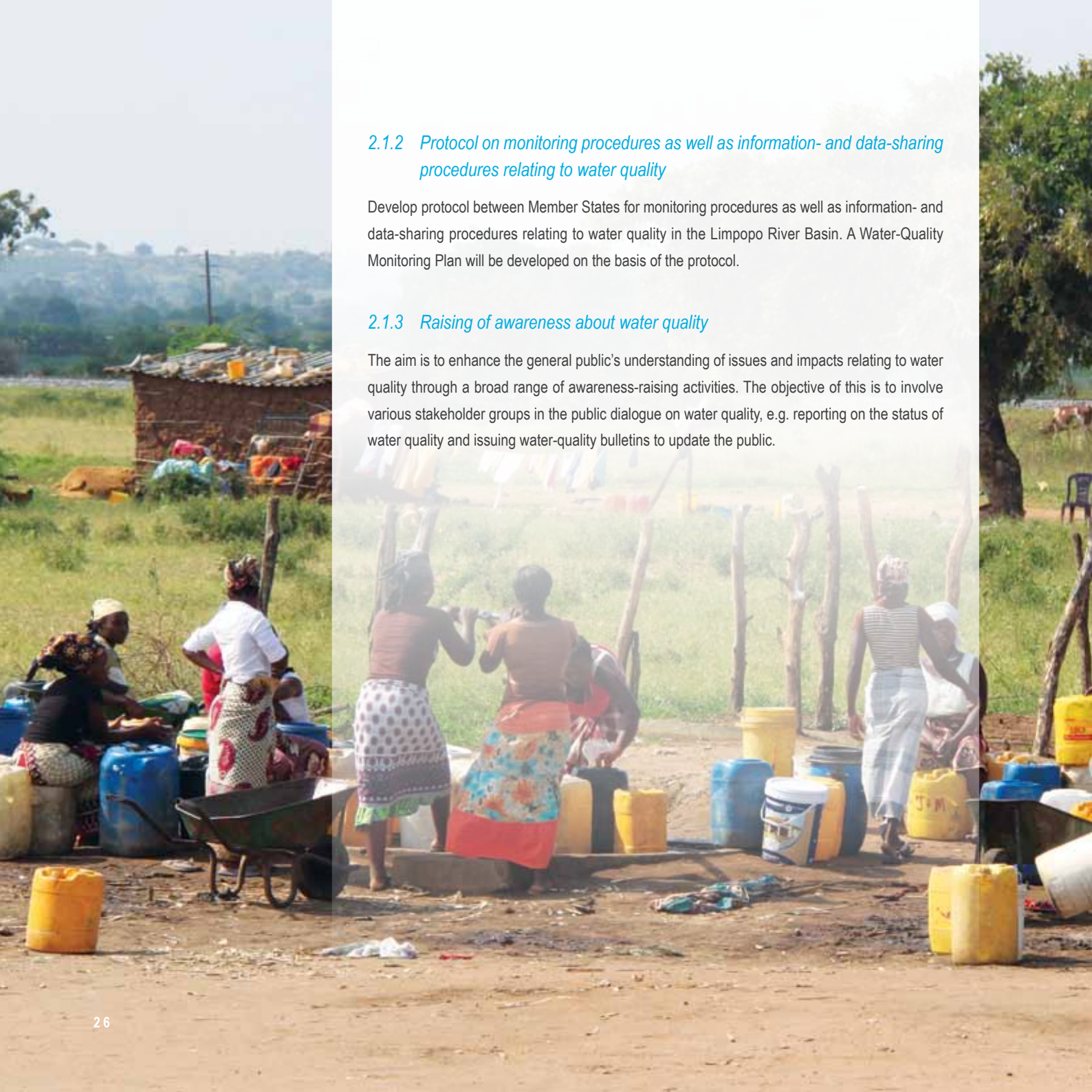
A baseline (monograph) will identify and assess the key parameters, methods and practices of water-quality monitoring applied by the Member States. An assessment of the requirements for aligning/harmonising standards, methods (based on internationally accepted methodologies) and practices of water-quality monitoring will, furthermore, be carried out. The assessment will also make use of guidelines for water-quality standards, which are included in SADC instruments such as the Regional Water Policy.

2.1.2 *Protocol on monitoring procedures as well as information- and data-sharing procedures relating to water quality*

Develop protocol between Member States for monitoring procedures as well as information- and data-sharing procedures relating to water quality in the Limpopo River Basin. A Water-Quality Monitoring Plan will be developed on the basis of the protocol.

2.1.3 *Raising of awareness about water quality*

The aim is to enhance the general public's understanding of issues and impacts relating to water quality through a broad range of awareness-raising activities. The objective of this is to involve various stakeholder groups in the public dialogue on water quality, e.g. reporting on the status of water quality and issuing water-quality bulletins to update the public.



		STRATEGIC AREAS		
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STRATEGIC OBJECTIVE	DISASTER MANAGEMENT	Disaster Preparedness	Early Warning	Water Infrastructure
	WATER QUALITY	Standards	**Monitoring & Reporting System**	Best Practices
	WATER ALLOCATION	Benefit Sharing	Monitoring	Water Use Efficiency

Operational Objective 2.2

Monitoring & Reporting System

LIMCOM to facilitate the development of a Transboundary Water-Quality Monitoring and Reporting System in the Limpopo River Basin.

PRIORITY INTERVENTIONS

2.2.1 Joint Basin Water-Quality Survey

Based on the positive lessons learned at regional level, a Joint Basin Water-Quality Survey will be conducted every five years with the full participation of the relevant stakeholders in the four Member States. This will establish the parameters, sampling points and frequency of water-quality monitoring, and produce an-flow assessment as well as a state-of-the-environment report.

2.2.2 *LIMCOM Water-Quality Database*

LIMCOM will establish a database for monitoring water quality in the Limpopo River Basin. The database will primarily contain data collected from the Joint Basin Water-Quality Survey conducted every five years, as well as data which is collected subsequent to an agreed Water-Quality Monitoring Plan, which specifies sampling points and time frequency. The Water-Quality Monitoring Plan will also specify the format, content and frequency of the monitoring reports LIMCOM will provide to the Member States. LIMCOM will maintain and operate the Water-Quality Database, which will be a part of the LIMIS.

		STRATEGIC AREAS		
		WATER GOVERNANCE	WATER MANAGEMENT	**WATER RESOURCES DEVELOPMENT**
STRATEGIC OBJECTIVE	DISASTER MANAGEMENT	Disaster Preparedness	Early Warning	Water Infrastructure
	WATER QUALITY	Standards	Monitoring & Reporting System	**Best Practices**
	WATER ALLOCATION	Benefit Sharing	Monitoring	Water Use Efficiency

Operational Objective 2.3

Best Practices

LIMCOM to facilitate the implementation of pilot projects and the assessment and dissemination of best practices for reducing the transboundary water pollution caused by different sectors.

PRIORITY INTERVENTIONS

2.3.1 Guidelines on formulating and implementing pilot projects

LIMCOM will develop common guidelines on how to establish pilot projects on core topics relevant to water quality. The pilot projects will aim to illustrate practical cases relating to how different sectors are dealing with the key water-quality topics that have basin-wide implications and impacts.

2.3.2 *Pilot projecton water sanitation (e.g. in relation to diseases such as cholera)*

The aim of the pilot project will be to improve sanitation measures in urban areas in particular in order to prevent choleric bacteria from entering the Limpopo River. The pilot project could include the monitoring of treated water from one or more urban locations and an assessment of the causes of the inadequate treatment of wastewater. Recommendations will be made on how to improve the treatment of wastewater. The levels of unwanted bacteria (that lead to diseases such as cholera) in the waters of the Limpopo will be measured and monitored downstream at strategic locations. The content of phosphates will also be assessed at the measurement sites. In addition, the pilot project will aim to include public awareness-raising of how diseases such as cholera can be prevented through better personal hygiene. It could also include drawing water samples from households and public standpipes for analysis, for example.

2.3.3 *Pilot project on nonpoint source (NPS) pollution in the agricultural sector*

The pilot project will be aimed at highlighting the issues around NPS pollution from agricultural practices that result in the leaching of nutrients into the groundwater and surface-water resources. The leaching of nutrients, particularly nitrogen, can be a contributing factor to potential eutrophication in the river system, and can also cause algae blooms in the Limpopo Delta area. Part of the pilot project will be focused on developing communication tools to raise public awareness about this issue.

2.3.4 *Pilot project on mining pollution (e.g. acid mine drainage)*

Acid mine drainage (AMD) is the flow or seepage of polluted water from old mining areas into groundwater and surface-water resources. Depending on the area, the water may contain toxic heavy metals and radioactive particles. These are dangerous for people's health, as well as for plants and animals. The pilot project will investigate how to reduce and stop the pollution from mines from entering the aquatic environment.

2.3.5 *Pilot project on water quality in the industrial sector*

The aim of this pilot project is to identify best practices for improving the quality of water used in industrial processes by different industries – e.g. paper mills, tanning factories – before it is released into the river or used to supply urban areas with water.

2.3.6 *Pilot project on municipal pollution*

This pilot project is aimed at addressing municipalities' roles and responsibilities in treating wastewater. In the context of growing urban areas, it is important to plan strategically for the location and size of treatment plants in order to provide municipalities with clean water, and keep effluents that flow into the natural environment within acceptable boundaries.

		STRATEGIC AREAS		
		WATER GOVERNANCE	WATER MANAGEMENT	WATER RESOURCES DEVELOPMENT
STRATEGIC OBJECTIVE	DISASTER MANAGEMENT	Disaster Preparedness	Early Warning	Water Infrastructure
	WATER QUALITY	Standards	Monitoring & Reporting System	Best Practices
	WATER ALLOCATION	Benefit Sharing	Monitoring	Water Use Efficiency

Operational Objective 3.1

Benefit Sharing

LIMCOM to promote the equitable and reasonable utilisation of water resources in the Limpopo River Basin.

PRIORITY INTERVENTIONS

3.1.1 Common understanding and practical examples of joint basin-wide development opportunities

In order to foster a common understanding by Member States, LIMCOM will coordinate the development of a concept note/position paper that outlines concrete examples of joint basin-wide opportunities and benefit-sharing arrangements in the Limpopo River Basin. The development of the concept note/position paper will be based on both LIMCOM-specific experiences and on experiences gained from the regional and global contexts.

One or two of the identified concrete pilot cases on basin-wide benefit-sharing arrangements will be developed subsequently, with specific information on the implicit costs, benefits and risks to the parties.

3.1.2 *Limpopo Information System (LIMIS)*

LIMCOM will coordinate the development of a basin-wide Information-Sharing Hub on Water Resources based on a consolidation of the existing information and communication tools for sharing information about water resources among stakeholders in the Limpopo River Basin. The LIMCOM Secretariat will host the Information-Sharing Hub, which will be accessible online to the relevant stakeholders in the four Member States.

		STRATEGIC AREAS		
		WATER GOVERNANCE	**WATER MANAGEMENT**	WATER RESOURCES DEVELOPMENT
STRATEGIC OBJECTIVE	DISASTER MANAGEMENT	Disaster Preparedness	Early Warning	Water Infrastructure
	WATER QUALITY	Standards	Monitoring & Reporting System	Best Practices
	WATER ALLOCATION	Benefit Sharing	**Monitoring**	Water Use Efficiency

Operational Objective 3.2

Monitoring

LIMCOM to facilitate the dissemination of data and information on water resources and water usage in the Limpopo River Basin.

PRIORITY INTERVENTIONS

3.2.1 Hydrological monitoring

An assessment of the groundwater and surface-water resources will be conducted together with an assessment of the environmental water requirements. Hydrological modelling will be applied when assessing water resources (surface and groundwater). Thereafter, the water demand of different users will be assessed to establish the 'Water Balance for the Limpopo River Basin up to 2030'. This work will be undertaken as part of developing the Limpopo River-Basin Monograph.

3.2.2 *Development of Economic Accounts for Water (EAW) for the Limpopo River Basin*

The development of Economic Accounts for Water (EAW) has already begun in two of the four Limpopo riparian states, namely in Botswana and South Africa. A follow-up of this initiative took place through the SADC Economic Accounts for Water Project (2009-2011), which saw SADC testing the concept of compiling Economic Accounts for Water at river-basin level. Establishing an Economic Account for Water essentially involves calculating the contribution by the river basin to national GDPs, which also serves as justification for regional collaboration at river-basin level.

		STRATEGIC AREAS		
		WATER GOVERNANCE	WATER MANAGEMENT	WATER RESOURCES DEVELOPMENT
STRATEGIC OBJECTIVE	DISASTER MANAGEMENT	Disaster Preparedness	Early Warning	Water Infrastructure
	WATER QUALITY	Standards	Monitoring & Reporting System	Best Practices
	WATER ALLOCATION	Benefit Sharing	Monitoring	Water Use Efficiency

Operational Objective 3.3

Water Use Efficiency

LIMCOM to promote methods of increasing water availability and the efficient use of water resources in the Limpopo River Basin.

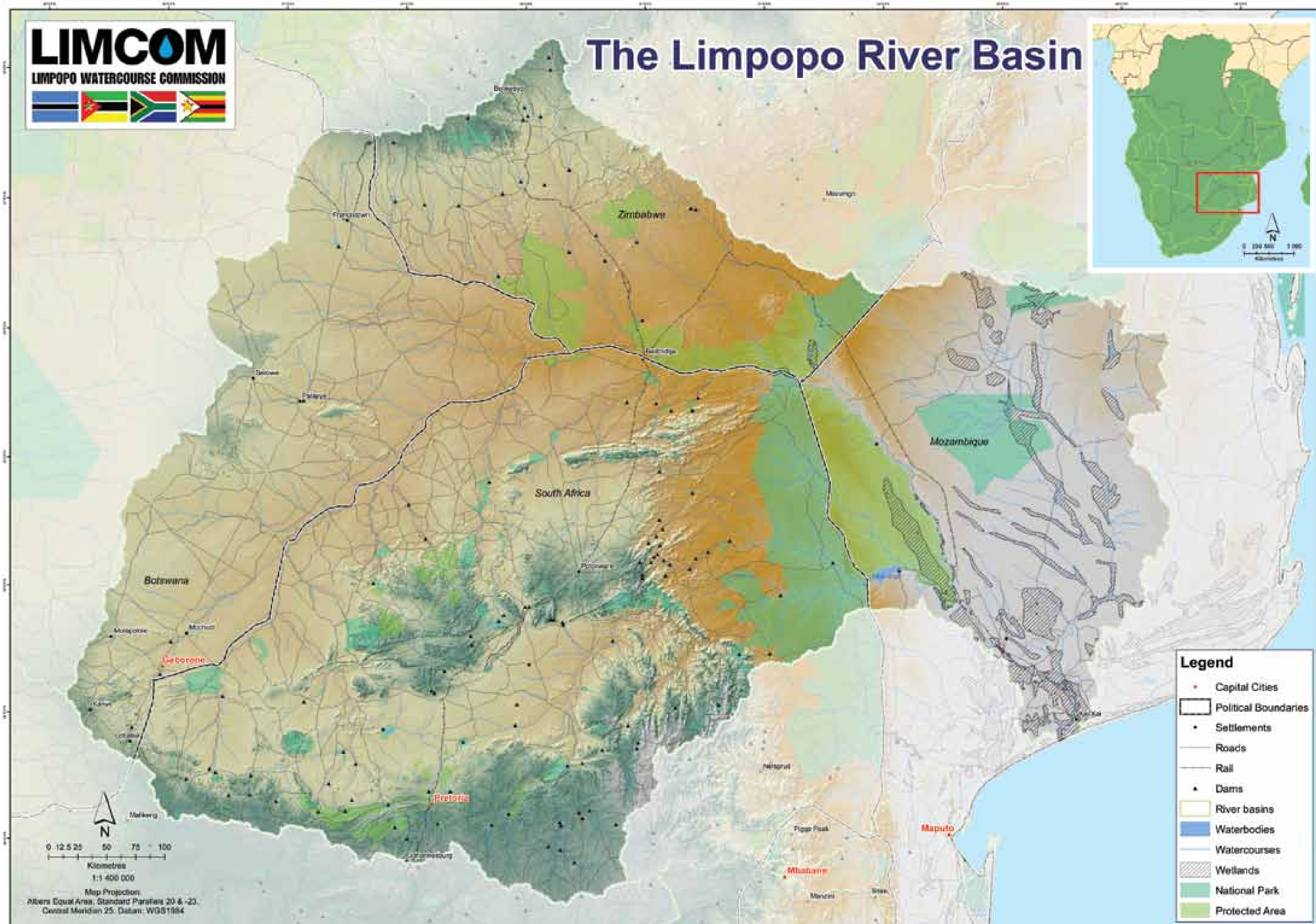
PRIORITY INTERVENTIONS

3.3.1 Feasibility studies of potential interventions

The Limpopo River-Basin Monograph will serve as the baseline for the Limpopo River Basin IWRM Plan, and will form a foundation for further steps, such as the development of basin scenarios and a long-term development strategy for the Basin to increase water availability and improve the efficiency of water use by different water users. As far as the long-term development strategy for the Limpopo is concerned, potential interventions will be identified and those will require feasibility studies for their implementation. Examples of areas in which feasibility studies could be carried out include the recycling of wastewater, desalinisation, water-demand management, inter-basin transfers, etc.

3.3.2 *Cost-benefit analysis of the recommended interventions*

Given that a cost-benefit analysis is an essential part of the process of improving the efficiency of water use by different actors, it will be important to conduct a cost-benefit analysis not only of the interventions recommended by the various feasibility studies, but also of other activities undertaken in the IWRM Plan to analyse and calculate the economic returns from various possible interventions.



LIMCOM
LIMPOPO WATERCOURSE COMMISSION
The Limpopo River Basin
Zimbabwe
Mozambique
South Africa
Botswana
Gaborone
Pretoria
Maputo
Mbabane
Legend
Capital Cities
Political Boundaries
Settlements
Roads
Rail
Dams
River basins
Waterbodies
Watercourses
Wetlands
National Park
Protected Area
N
0 12.5 25 50 75 100
Kilometres
1:1 400 000
Map Projection:
Albers Equal Area; Standard Parallels 20 & -23,
Central Meridian 25. Datum: WGS1984

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Limpopo River Awareness Kit

www.limpoporak.org

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