

**GOVERNMENT OF SOUTHERN SUDAN**

**WATER POLICY**

**NOVEMBER 2007**

**JUBA, SOUTHERN SUDAN**

## Foreword

The preparation of the Southern Sudan Water Policy is a corner stone in the development and management of water resources in the country after the historic signing of the Comprehensive Peace Agreement (CPA) on 9<sup>th</sup> January 2005. Water is vital for all forms of social and economic development and effective management of this scarce and valuable resource is a high priority. The purpose of policy is to outline the Government of Southern Sudan's vision for the water sector, and to establish basic principles and objectives to guide future water sector development.

The policy responds to emerging concerns surrounding: The allocation of water for different activities, the potential for conflict among competing water users, the availability and quality of freshwater resources and the integrity of environmental processes in Southern Sudan. We anticipate a rapid increase in demand for water as the economy and population continue to grow and it is therefore essential to act now to put in place measures which will ensure efficient, equitable and sustainable development and use of available water resources into the future.

Water resources in Southern Sudan remain relatively underdeveloped, existing water infrastructure is very limited and much of it is not operational. As a result we face a number of major challenges as reflected in limited use in irrigation, low coverage of safe water supply for drinking, inadequate provision of basic sanitation services and prevalence of poor hygienic practices. The importance of developing effective water supply and sanitation services is universally recognised as a basis for improving the overall health and productivity of the population, and is particularly important for the welfare of women and children.

A key challenge which lies at the heart of our efforts to develop water policy is the need to address basic needs while promoting economic development and to balance the needs of present and future generations. In this regard we have sought to take account of recent global trends in water policy, including the Dublin Principles (1992), the Millennium Development Goals (2000) and the World Summit on Sustainable Development (2002), as well as lessons learned from practical experience in Sudan and other countries. The resulting policy therefore builds on a number of basic principles including: recognition that water has social, economic and ecological value in all its competing uses; integration of decision making processes relating to water resources management on the basis of hydrological boundaries; separation of institutional roles relating to water resources management from those relating to resource development and service delivery; decentralisation of responsibility to the lowest appropriate administrative level; and participation of water users in decision-making processes surrounding planning, development and management of: Water resources, delivery of water and provision of sanitation services on equitable and sustainable basis.

The document addresses specific issues in relation to three main sub-areas of water policy, i.e. Water Resources Management (WRM), Rural Water Supply and Sanitation (RWSS), and Urban Water Supply and Sanitation (UWSS) and establishes guiding principles and objectives in relation to each. As such it represents an important first step towards the establishment of a comprehensive regulatory framework for rational management and utilisation of water resources in Southern Sudan; and provides a foundation for future development of more detailed strategies, setting out the institutional, administrative, technical and financial arrangements for policy implementation.

The GOSS recognises the scale of the challenge ahead, because effective management and use of water resources requires: Significant investment of financial and human resources; in addition to sensitisation of the population on the importance of water, including equipping them with the necessary knowledge and skills to manage it properly. Intensive efforts are required to build capacities in different areas such as water resource assessment and monitoring, research and development of appropriate technologies, disaster management, environmental protection and transboundary co-operation.

Water issues affect each and every one and the development of this policy ensured extensive consultation among a wide range of stakeholders at different levels of government including those from other sectors, as well as private businesses, nongovernmental actors and community groups. However, conclusion of a policy document is just a beginning; and the next step is to develop detailed Strategies and Acts to enable implementation of this Policy. Successful implementation will depend on continued collaboration among different arms of government; coordination between government and non-governmental partners; and active involvement of communities/beneficiaries.

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## List of Abbreviations and Acronyms

<b>CCD</b>	Convention to Combat Desertification
<b>CPA</b>	Comprehensive Peace Agreement
<b>CRC</b>	Convention of the Rights of the Child
<b>EIA</b>	Environmental Impact Assessment
<b>GDP</b>	Gross Domestic Product
<b>GNU</b>	Government of National Unity
<b>GOSS</b>	Government of Southern Sudan
<b>ha</b>	Hectare
<b>HIV/AIDS</b>	Human Immunodeficiency Virus/Acquired Immune Deficiency Syndromes
<b>ICSS</b>	Interim Constitution of Southern Sudan
<b>INC</b>	Interim National Constitution
<b>IWRM</b>	Integrated Water Resources Management
<b>lpcpd</b>	Litres per capita per day
<b>MDGs</b>	Millennium Development Goals
<b>NBI</b>	Nile Basin Initiative
<b>NGO</b>	Non-Governmental Organization
<b>Nile-TAC</b>	Nile Basin Initiative Technical Advisory Committee
<b>O&amp;M</b>	Operation and Maintenance
<b>RWSS</b>	Rural Water Supply and Sanitation
<b>UNICEF</b>	United Nations Children's Fund
<b>UWSS</b>	Urban Water Supply and Sanitation
<b>WRM</b>	Water Resources Management
<b>WASH</b>	Water, Sanitation and Hygiene
<b>WES</b>	Water and Environmental Sanitation
<b>WSS</b>	Water Supply and Sanitation

# CHAPTER 1: INTRODUCTION

## 1.1 Background

The historic signing of the Comprehensive Peace Agreement (CPA) on 9<sup>th</sup> January, 2005 brought hope for peace following decades of conflict which had resulted in near complete breakdown of basic infrastructure and institutions of government in Southern Sudan. The CPA provides for the establishment of an autonomous Government of Southern Sudan with a referendum on self-determination for the South at the end of a six year interim period. This policy has been developed within the framework of the 2005 Interim Constitution of Southern Sudan (ICSS) and the Interim National Constitution (INC). These set out power and wealth sharing arrangements for the interim period and provide the Government of Southern Sudan (GOSS) with a clear mandate to develop policies and strategies for reconstruction and development in the South<sup>1</sup>.

The Government of Southern Sudan (GOSS) is committed to alleviating poverty and promoting economic growth under the new Federal system of decentralised government. The immediate post-conflict priority has been the establishment of government administrative structures, rehabilitation of primary infrastructure and delivery of basic services. As it embarks on the long road ahead, GOSS recognises the central importance of developing policies to ensure sustainable management and utilisation of water resources and effective delivery of water and sanitation services in order to improve the health, welfare and productivity of the people of Southern Sudan.

An important guiding principle has been that wherever possible the process of developing water policy should involve those affected, or their representatives, in weighing up the options on an informed basis. This document addresses issues identified during a series of consultations held at all levels with water sector stakeholders between 2005 and 2007, including policy workshops in Nairobi (May, 2005), Juba (December, 2005), Rumbek (September, 2006) and the final one in Juba (August, 2007). It builds on local experience while taking into account regional and international best practice. The policy sets out key issues and priorities for water sector development and links to other sectors, and provides a basic framework to guide future development of sector institutions and detailed implementation strategies for Southern Sudan.

## 1.2 Water in Southern Sudan

Southern Sudan covers an area of about 640,000 square kilometres with the whole area distributed in the southern plains of the White Nile and its tributaries. It has substantial water resources but these are unevenly distributed across the territory and vary substantially between years with periodic major flood and drought events. Annual rainfall range from 400mm in the northern parts to 1600mm in the southern parts distributed across three major River Basins, namely: Bahr el-Ghazal, Bahr el-Jebel and the river Sobat. Within the region are various surface water sources comprising perennial rivers, lakes and wetland areas; seasonal pools/ponds, rivers, torrents, streams and extensive floodplains (known locally as Toich); and cataracts/falls/rapids upstream of the rivers. The population of around 8 million people mainly depend on crop production, livestock and fishing. Demand for water is, therefore, expected to increase rapidly in future given projected population growth and economic development. The impact of human activities on the availability and quality of water resources is already evident in the form of increased pollution, reduced river flows, lowering of water table in urban areas and contamination of both surface and ground waters, and is a growing concern.

### 1.2.1 Water Resources Availability

#### 1.2.1.1 Climate

The climate of Southern Sudan is generally seasonal with considerable annual variations and is characterised by a single rainfall season. The northern parts fall under the Sudano-Sahelian zone which is predominantly

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<sup>1</sup> The CPA established principles for equitable sharing of common wealth among different levels of government within Sudan. The INC of the Republic of Sudan (schedules A, B, C, D, E & F) while recognising the role of the Nile Water Commission in relation to trans-boundary waters and disputes arising from the management of interstate waters, it further recognises that natural resources fall under the executive and legislative powers of all three levels of government (GONU, GOSS, and States); hence it ensures management of different aspects of water is delegated to the most appropriate level, in accordance with best practice with respect to management and utilisation of water resources (Part 1, Ch 2: 11).

dry, sub-humid and semi-arid with extensive grazing. This zone is characterised by dry spells especially in the first months of the rainy season while the second half of the rainy season is marked by heavy and stormy rains of short duration. The southeast and eastern parts fall under dry sub-humid and semi-arid mountainous East Africa zone with potential for rain-fed crops. The southwest and western areas with good drainage conditions fall under the humid Central Africa zone, predominantly moist sub-humid and humid with a wide range of perennial tropical crops and extensive areas under forest. There is evidence to suggest that climate variability has increased in recent years.

### **1.2.1.2 Surface Water**

Southern Sudan is where three major tributaries meet and flow into the White Nile, namely: Bahr el-Ghazal (comprising three sub-basins of Kiir, Loll and Jur); Bahr el-Jebel (comprising numerous tributaries such as Yei, Aswa and Kiit; in addition to branches such as Bahr el-Zeraf); and River Sobat (comprising three sub-basins of Pibor, Akobo-Baro; in addition to branches and Khors such as Machar and Adar River Systems and Khor Nyanding). Also, there are seasonal rivers and streams that originate and flow inside Southern Sudan, namely the Drainage of Eastern Equatoria Plateau (Kurun, Hoss and Keneti), system of rivers flowing out of Western Equatoria (Tonj, Naam and Gel). Finally, the main stem of the White Nile (from Lake No to Wun-Thou, north of Renk) receives large volumes of water from systems of Khors and Wadis (Fulus, Atar, Lolle and Yabus).

When high river discharges occur, water spills over the banks of rivers and floods large areas of land (which is flat and lower-lying than the river banks) creating swamps with an area of approximately  $0.03 \times 10^6$  km<sup>2</sup> (3 million ha), 1.4 million ha are seasonal and the remaining 1.6 million ha are permanent wetland. Not all the water discharged into the swamp areas flows out, creating this permanent swamp and giving the region its name: Sudd (meaning barrier/blockage in Arabic). The swamps and marshlands of Sudd Region are characterised by high levels of vegetation cover. Altogether wetlands account for around 7% of the total land area of Southern Sudan.

### **1.2.1.3 Groundwater**

Southern Sudan is thought to possess large areas of land underlain by rich aquifers, including the Umm Ruwaba formation and some of the fractured and weathered zones of the Basement Complex formation. These water-bearing formations are recharged by seasonal rainfall and river flooding and in some cases extend across international boundaries. However, there is scanty information on the distribution, characteristics, annual extraction and recharge, depths, associated risks (sources of pollution and possibility of over-abstraction) and flow direction of these underground waters. The distribution and potential of groundwater and springs has not yet been fully determined and very little is known about the transboundary aquifers. More research is required in order to fully determine the potential of groundwater in Southern Sudan, which is of particular importance in those areas where the quantity/quality of surface water sources is inadequate.

## **1.3 Social and Economic Water Uses**

Water is a limited resource which forms an essential basis for human and animal life, for maintaining ecological balance and for social and economic development. Effective management of the quantity, quality and reliability of available water resources is vital in order to secure long-term social and economic benefits for the people of Southern Sudan.

### **1.3.1 Water for Life**

Access to basic water, sanitation and hygiene facilities is vital for the health, welfare and productivity of the population, but at the signing of the CPA in January 2005, only 27% of the population of 8 million of Southern Sudan had access to improved water supplies, while just 15% had access to basic sanitation<sup>2</sup>. The incidence of diarrhoeal diseases associated with lack of access to safe water and adequate sanitation is a major factor underlying high infant mortality rates<sup>3</sup>, and improved access to water and sanitation facilities is

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<sup>2</sup> See UNICEF/GoSS database for latest figures

<sup>3</sup> 2005 figures show 250 out of every 1,000 live births die before reaching the age of five years. This is compounded by the chronic under-five malnutrition and high maternal mortality rate of 1,700 in every 100,000 live births.

particularly important for people living with HIV/AIDS. The provision of safe drinking water, basic sanitation and clean environment at household level can have a major impact on health. There are also significant additional livelihood benefits associated with time and energy savings (especially for women) and small scale productive water uses which can lead to increased income and food security, improved school enrolment (especially girls), and wider social and economic benefits at household and community level. Improved access to water and sanitation can therefore make a significant contribution towards GOSS's wider objectives of reducing poverty and vulnerability and promoting livelihoods and economic growth.

### **1.3.2 Water for Agriculture**

Subsistence agriculture is the main livelihood activity for over 95% of the population, but Southern Sudan's considerable agricultural potential remains largely undeveloped. Nearly 50% of the total of 105.6 million hectares is prime agricultural land. Given adequate water supply, most tropical crops can be grown in these soils and it has often been referred to as a potential 'bread basket' for the region. The economic potential lies not only in the agricultural production of food and cash crops, but also in the supply of raw materials for processing and manufacturing industries to produce value added products for export. Agriculture and natural resources shall continue to provide the main source of livelihood and economic growth in Southern Sudan<sup>4</sup>.

In addition to predominant rain-fed cultivation practices, a range of irrigation techniques (traditional and modern) can be observed in different parts of Southern Sudan. Traditionally, in the dry season, at fishing and dry season settlements along rivers, tobacco and vegetable gardens are irrigated, and maize and cowpeas are planted in the highly fertile moist soils left by receding river flood. In the wet season, flood waters are diverted onto rice fields while sugarcane and banana are grown on dykes that protect fishing camps and lowland settlements. Irrigation has therefore played a critical role in traditional farming systems as a means to secure food supplies, especially in the drought-prone areas.

More recently, a number of modern irrigation techniques have been introduced in Southern Sudan. These range from small-scale systems used to support perennial fruit and vegetable production around major towns, to large scale tree plantations and farms irrigating rice, cotton, sugarcane and sorghum set up by the former regional government<sup>5</sup>. Civil war has constrained the development of irrigated agriculture to-date but irrigation will form an important component of future strategies for achieving food security and agriculture-based economic growth in Southern Sudan. Agriculture is expected to be the single biggest user of water in Southern Sudan in future and as demand for irrigation water grows there is need to establish policies and strategies to promote efficient and responsible water use and mitigate potential conflicts between competing users.

### **1.3.3 Water for Forestry**

The development of forestry has the potential to improve the livelihoods of the poor rural population in particular and the economy in general. Southern Sudan has extensive forests and woodlands but these are under increasing pressure due to population increase, expansion of agriculture, livestock grazing, harvesting of timber and fuel wood collection. This scenario if not checked will lead to environmental degradation and exacerbate poverty. Forests are not only major water users but also serve a range of important environmental functions including water conservation and mitigation climate change. Rehabilitation and conservation of the rich diversity of forest heritage in Southern Sudan can play an important role in supporting wider efforts to protect water catchments. As catchment areas are the basic units for managing water resources, this will also ensure an integrated approach to the development of catchment management strategies to maximise resource yield and utilisation, and guard against soil erosion and drying of water courses including springs.

### **1.3.4 Water for Livestock**

Southern Sudan has an abundance of livestock whose population is estimated at 10 million heads of cattle with an annual growth rate of 2-3%. The livestock sector contributes over 15% of GDP and employs, directly

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<sup>4</sup> Draft Southern Sudan Food & Agriculture Policy, 2005

<sup>5</sup> Successful trials conducted between 1972 and 1983 suggest that there is significant potential for irrigated agriculture in parts of Southern Sudan through a combination of improved flood control measures and the introduction of gravity schemes in the low lying plains surrounding the White Nile and its tributaries.

or indirectly, 70% of the population. As such the sector is of central importance in efforts to promote food security, poverty alleviation and enhanced economic growth.

Livestock is generally concentrated in areas where rainfall is marginal for cultivation and the distribution of livestock watering points is a major determinant of grazing patterns. Seasonal migrations in search of water and pasture frequently result in land and water use conflicts between different pastoral and agro-pastoral groups which are compounded by overstocking. The current uneven distribution of water points often leads to the concentration of large numbers of livestock, especially during the dry season, with negative impacts on water resources and the surrounding environment. Development of new water points in order to reduce pressure on existing grazing areas and open up new pastures is a high priority. There is need to develop a clear strategy for providing water for livestock, including construction of water harvesting structures such as haffirs and dams to trap seasonal waters for post-season watering of animals in areas where the natural terrains does not impound water.

### **1.3.5 Water for Fisheries**

Southern Sudan is endowed with considerable inland fisheries resources in the Nile River and its tributaries, which include a number of small lakes together with the Sudd swamps which cover an area of 100,000 square kilometres with an estimated yield of 300,000 tons of fish per year<sup>6</sup>. Fishing is the primary livelihood activity for around 12-15% of the population. As such the fisheries sector has great potential to help improve food security and alleviate poverty in Southern Sudan. It is observed that fish production is constrained by seasonal floods, as well as high cost of fishing gear, poor handling of fish including lack of storage facilities and marketing dynamics. In areas where fishing is difficult in natural water bodies, the establishment of artificial ponds may provide an alternative. However, the most pressing environmental and conservation concerns in the fisheries sector relate to pollution of water courses (including by oil), over abstraction or diversion of river courses, high nutrient loading and siltation due to changing land use in catchment areas, and destruction of wetland habitats and biodiversity loss due to invasive species. Development of the fisheries sector is thus heavily dependent on effective management of water resources and conservation of the environment.

### **1.3.6 Water for Industries**

Southern Sudan is endowed with abundant mineral and natural resources and their exploitation and processing requires that adequate and appropriate water supply systems are developed to meet the current and future demand. Supply of adequate quantities of water will be a catalyst to investment and spur economic growth. Recycling of industrial water will be encouraged as well as investment in appropriate technology that promotes a clean environment. Measures will need to be put in place in order to ensure that the discharge of effluents from industries is effectively regulated by a competent authority.

### **1.3.7 Water for Hydropower**

The assessment of water resources in the country will facilitate identification of potential sites for various purposes leading to the development of hydropower stations and multi-purpose schemes including hydropower production to promote rural electrification and industrialisation. Aiming at attaining sufficient energy production will also lead to regional co-operation for optimal development of hydropower in the region. Currently there is no hydropower station existing in Southern Sudan but there have been plans to generate power from the cataracts of Fola Falls below Nimule and Bedden Rapids above Juba. A small scale hydroelectric power station existed on the Keneti River in Eastern Equatoria which was used to provide domestic lighting and to power automotive workshops and saw mills. It is no longer operational as a consequence of the war and will need re-assessment and rehabilitation. Indeed, the assessment of water resources for the purpose of hydropower development will foremost include potential sites along all the rivers, focusing on small-scale rapids such as Aga Falls on River Yei, in Morobu Payam, in Wudabi Payam, to supply Yei, Kajo-Keji, Lainya and Morobu Counties with electricity.

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<sup>6</sup> Ministry of Animal Resources and Fisheries

### **1.3.8 Water for Navigation**

In Southern Sudan, waterways play a vital role within the transport network. The White Nile and its major tributaries of Bahr el-Jebel and Bahr el-Ghazal are navigable throughout the year. Minor tributaries such as the River Sobat, among others, are seasonally navigable. As traffic increases, regulation will become increasingly important in order to minimise obstruction of waterways, maintain required minimum water levels for transport and mitigate potential negative impacts on water quality that include invasion of aquatic vegetation. River training works, provision of navigation locks, rehabilitation of water courses (dredging) and construction of suitable ports and beaches will form an important component of future transport strategy to facilitate navigation of waterways in Southern Sudan.

### **1.3.9 Water for Environment, Wildlife and Tourism**

As it emerges from decades of conflict, Southern Sudan faces numerous environmental challenges associated with sustainable use of renewable natural resources in the context of reconstruction and development, rapid urbanisation and large scale population resettlement. Water resource development typically involves diverting water courses and altering environmental flows. Water uses such as in irrigation and mining can lead to pollution of water sources and other environmental effects such as water logging or salinisation of soils. There is, therefore, an urgent need to raise awareness of environmental issues and develop basic environmental standards to guide water resources development.

In particular there is a concern to maintain environmental flows necessary to support basic ecosystem functions. Maintenance of minimum flows in rivers and other water courses is important to maintain water quality and protect plants, fish and other animals. The natural cycle of seasonal flooding replenishes essential nutrients which maintain the productivity of ecosystems upon which people depend on for their livelihood activities. Of particular concern is the Sudd Wetland situated in the lower reaches of both Bahr el-Jebel and Bahr-el Ghazal. It is home to numerous endemic fish, bird, mammal and plant species and was recently declared a Ramsar Site<sup>7</sup> of international importance. It is also an important source of water for domestic use, livestock and wildlife.

Major causes of surface water pollution include discharge of untreated effluent and solid waste from urban areas (including small industries such as hotels, breweries, tanneries and abattoirs), discharge of water produced from agriculture, mining and oil drilling activities and pollution of waterways by river barges. Incidences of groundwater pollution have also been reported with negative impacts on drinking water quality in urban areas as in the case of digging pit latrines close to water sources. As such water resource development needs to be carefully integrated with environmental management and Environment Impact Assessment (EIA) will be required to ensure that the developments being undertaken do not adversely affect the environment.

Existing information on freshwater ecosystems in Southern Sudan is generally inadequate and technical capacity in this area is limited. In future water resources management will also need to focus on providing water for wildlife and recreational activities. Given the abundance of wildlife in Southern Sudan, the development of game parks will depend on water resources conservation and development which does not adversely affect flora and fauna. The rich cultural diversity, numerous rivers, lakes and hills, forestry and wildlife offer a great potential source of future tourism revenue.

## **1.4 Key Challenges**

The Government of Southern Sudan faces numerous challenges as it seeks to reverse the effects of decades of conflict and long periods of political and economic marginalisation in the South. Following the formation of GoSS and the southern state governments, there is a need to develop sectoral policies and strategies in order to maximise the impact of reconstruction and development efforts. While there are a number of different agencies working in the water sector, there exists no coherent policy to guide management and use of water resources and delivery of water supply and sanitation services in Southern Sudan.

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<sup>7</sup> The Ramsar Convention is an international treaty for the conservation and sustainable utilisation of wetlands. The List of Wetlands of International Importance now includes over 1,616 sites (known as Ramsar Sites).

There is no single official document which brings together existing policy and legislation relevant to water resources management and utilisation in Sudan. The need to consolidate and update existing policy and legislation and remove inconsistencies, redundancies and contradictions has long been identified as a high priority. The Comprehensive Peace Agreement (CPA) and subsequent Interim Constitution of Southern Sudan (ICSS) and Interim National Constitution (INC) of 2005 represent an important opportunity to review and update existing legislation in the light of the new Federal structure and provide the Government of Southern Sudan with a clear mandate to establish policy and institutions for water resources management within its territory.

The previous governments in the Republic Sudan adopted a top-down approach to water sector development with very limited stakeholder involvement in Southern Sudan. This approach largely proved ineffective and unsustainable mainly because water resource development did not correspond to the needs and priorities of end users. Institutional arrangements for managing water resources were unable to prevent degradation and pollution of the resource base and levels of access to water supply and sanitation services remained unacceptably low. The importance of developing a new GOSS policy for sustainable management and utilisation of water resources and effective delivery of water supply and sanitation services is therefore widely recognised. The following policy recognises the significance of changing approaches to water sector development during the 1980s and 1990s and seeks to take account of lessons learned and build on regional and international best practice, including efforts to establish a new Water Policy for Sudan in the 1990s<sup>8</sup>.

The major challenges currently faced in Southern Sudan can be summarised as follows:

- 1.4.1 Lack of coherent policy framework to guide water sector development:** The need to establish policy and legislative frameworks to guide water sector development has been recognised.
- 1.4.2 Inadequate sector institutional arrangements:** There is a need to review and clarify the functions of water sector institutions, and the roles and responsibilities of sector organisations in relation to policy objectives.
- 1.4.3 Low levels of access to basic water supply and sanitation services:** The majority of the population lacks access to a reliable supply of safe water and even fewer have access to basic sanitation facilities. Providing access to poor and vulnerable groups is a particular challenge.
- 1.4.4 Underdevelopment of available water resources compared with neighbouring countries:** Sustainable development and use of water resources is essential as a basis for future economic growth. Providing services to remote and dispersed rural populations is especially difficult.
- 1.4.5 Limited participation by water users in sectoral development processes:** Lack of user participation in planning, management and financing of water resources management and development undermines sustainability.
- 1.4.6 Sustainability of water infrastructure:** Much of the existing infrastructure is no longer functional and systems of operation and maintenance are extremely weak or absent.
- 1.4.7 Growing environmental concerns:** These include increased degradation and pollution of surface and groundwater resources and environmental problems associated with water resource development.
- 1.4.8 Management and mitigation of water related disasters:** Frequent flood and drought events impact negatively on food security, agricultural productivity and economic growth.
- 1.4.9 Water use conflicts:** There is a need to strengthen mechanisms for solving disputes over access to water which is often a source of conflict, especially at local level.
- 1.4.10 Management of trans-boundary waters:** The transboundary nature of the Nile waters necessitates the development of effective measures for regional and international cooperation.
- 1.4.11 Limited human resources and weak organisational capacity:** Protracted conflict has resulted in the breakdown of organisational structures and a shortage of core technical and administrative skills.

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<sup>8</sup> See Draft National Water Policy of Sudan (1992 & 2000)

**1.4.12 Lack of a clear financing strategy:** It necessary to attract investment required for effective management of water resources and delivery of sustainable water supply and sanitation services.

## CHAPTER 2: GOVERNMENT OF SOUTHERN SUDAN WATER POLICY

### 2.1 Goal

*The overall goal of the Government of Southern Sudan (GOSS) Water Policy is to support social development and economic growth by promoting efficient, equitable and sustainable development and use of available water resources, and effective delivery of water and sanitation services in Southern Sudan.*

### 2.2 Purpose and scope

The purpose of developing water policy is to outline the Government of Southern Sudan's vision for the water sector, and to establish basic principles and objectives to guide future water sector development. It aims to provide greater clarity to the sector entities, to reduce institutional fragmentation, to attract external investment, to support the emergence of effective government structures, and to support interventions in other sectors. In short, it provides a framework for optimal allocation of available water resources in Southern Sudan on an equitable and sustainable basis.

This policy represents an important first step towards the establishment of a comprehensive regulatory framework for rational management and utilisation of water resources and effective delivery of water services in Southern Sudan. It calls for a holistic sector-wide approach and provides a foundation for future development of more detailed strategies, which will set out the institutional, administrative, technical and financial arrangements for policy implementation (including establishment of management structures at appropriate levels such as a Water Council, Water Boards, Water Committees, etc). The following sections address specific issues relating to three broad sub-areas of water policy i.e. Water Resources Management (WRM), Rural Water Supply and Sanitation (RWSS), and Urban Water Supply and Sanitation (UWSS). It is important to note that policy should be dynamic and continuously evolving. Its purpose is to serve the people and as such it should be periodically re-assessed to ensure that it meets the future changing needs and demands of the people of Southern Sudan.

### 2.3 General principles

*'Water must be a lever for peace and not a source of conflict'*

The general principles outlined here build on local experience while taking account of regional and international best practices. This includes important recent global policy developments such as the Dublin Principles (1992) which established the basic principles for effective water resources management; the 2000 Millennium Development Goals (MDGs) which include targets for improving access to water and sanitation services; and the World Summit on Sustainable Development (2002) which recommended the development of national plans for integrated water resources management (IWRM).

The following general principles of GOSS Water Policy therefore provide a guiding framework for all water sector activities and an important point of reference for future development of more detailed implementation strategies:

- 2.3.1** Water is an important natural resource which is commonly owned by all riparian people.
- 2.3.2** The Government of South Sudan has a duty to ensure effective development and use of water resources for the benefit of all, including poor and vulnerable groups.
- 2.3.3** Access to sufficient water of acceptable quality to satisfy basic needs is considered a human right and shall be given highest priority in development of water resources.
- 2.3.4** Water is both an economic and social good. Optimal allocation of available resources shall be determined on the basis of social equity, economic efficiency, system reliability and environmental sustainability.
- 2.3.5** Effective water resources management requires an integrated approach which takes account of hydrological processes and boundaries and recognises linkages with other sectors.

- 2.3.6** Water resources planning and development affects everyone and shall be undertaken at the lowest appropriate administrative level with active participation of water users and stakeholders from different sectors in all relevant aspects
- 2.3.7** Water sector institutional arrangements shall be streamlined with clear separation of functions relating to resource management and services delivery, and efficient allocation of roles and responsibilities between government and non-government agencies.

## **CHAPTER 3: WATER RESOURCES MANAGEMENT POLICY**

*The overall goal of WRM policy is to promote effective management of quantity, quality and reliability of available water resources in order to maximise social and economic benefits while ensuring long term environmental sustainability.*

### **3.1 Guiding Principles for Water Resources Management**

Integration of different aspects of water resources management is widely recognised as the key to achieving the overall goal. The following principles will guide water sector stakeholders in laying the foundation for an integrated approach to water resources management in Southern Sudan in the long term.

- 3.1.1** Water is a shared resource and appropriate legal frameworks shall be established to govern all aspects of water use
- 3.1.2** Water is a limited resource; hence allocation of available resources shall be on the basis of fair and transparent procedures which maximise social and economic benefits.
- 3.1.3** Priority shall be given to basic human needs and maintaining critical environmental processes upon which economic activities depend.
- 3.1.4** Water resources management shall take account of the economic value of water and users shall be expected to contribute towards the costs of managing and supplying water according to the volume and quality used.
- 3.1.5** Water resources development, utilisation, protection and conservation go hand in hand and must be addressed in an integrated manner which takes account of linkages between sectors.
- 3.1.6** Water resources planning shall involve all relevant stakeholders and will be undertaken on the basis of natural hydrological boundaries. The river basin or catchment area shall be the basic unit for planning and managing water resources and will be clearly delineated.
- 3.1.7** Water conservation and protection shall be encouraged in all aspects of water resource development and use. The principle of ‘polluter pays’ shall be applied.
- 3.1.8** Water is essential for social and economic development and it shall be equitably developed and managed among the population of Southern Sudan

### **3.2 Specific Objectives of Water Resources Management**

In accordance with the guiding principles outlined above the specific objectives of WRM policy can be summarised as follows:

- 3.2.1** To ensure that all Southern Sudanese, including poor and vulnerable groups, have access to basic water and sanitation of acceptable quality and quantity.
- 3.2.2** To establish clear guidelines governing equity of access to water resources to maximise social and economic benefits for all people of Southern Sudan.
- 3.2.3** To develop procedures for prioritising allocation of water resources for different social, economic and environmental uses, including during shortage, on the basis of social equity, economic efficiency, system reliability and environmental sustainability principles.
- 3.2.4** To conserve available water resources, to manage water quality and to prevent pollution of ground and surface waters and to promote efficient and responsible development and use of water resources.

- 3.2.5 To manage floods and droughts and mitigate water-related disasters.
- 3.2.6 To promote mutual cooperation in planning, management and utilisation of water at local, regional and international levels.
- 3.2.7 To streamline institutional and legal frameworks relating to water resources management with clear separation of functions, roles and responsibilities.
- 3.2.8 To establish appropriate management structures including mechanisms for inter-sectoral coordination and stakeholder participation.
- 3.2.9 To build capacity and develop human resources at all levels
- 3.2.10 To establish information systems and promote scientific research that will contribute to sustainable development, management and use of water resources
- 3.2.11 To encourage local and private resource mobilisation and external project financing that supplement and complement public investment in water resource development and management

### **3.3 Key Issues and Priorities**

#### **3.3.1 Water Resources Allocation and Use**

Southern Sudan has substantial water resources but these are unevenly distributed across the territory and vary substantially between years and seasons. At the same time demand for water is projected to increase rapidly in line with population growth and economic development, leading to increased competition and potential for conflict. Apart from customary laws governing access to grazing and fishing grounds for communal use at a local level, there is currently no formal system for allocating water resources for different social and economic uses. Developing procedures for fair and equitable allocation of available water resources which maximise social and economic benefits is therefore a key priority<sup>9</sup>.

Provision of water for basic human needs shall be afforded highest priority and criteria will be developed to guide optimal allocation of water for other uses on the basis of social equity, economic efficiency, system reliability and environmental sustainability. Use of transboundary water resources shall remain subject to constitutional and international obligations regarding the flow of water within Sudan and between other co-riparians. Specific measures will be taken in order to preserve minimum flows of water required to maintain basic ecosystem functions. In order to support effective resource allocation the information base on water resources availability and existing uses (including customary uses) shall be strengthened, and procedures for issuing ‘water use permits’ for abstraction from surface and groundwater bodies shall be formalised.

#### **3.3.2 Water Conservation, Water Quality and Environment**

The breakdown of structures for managing common water resources during years of conflict has led to siltation, degradation and pollution of surface and groundwater sources in many areas with negative impacts on environment and socio-economic activities. Water shortages are frequently a source of conflict at local level and problems associated with water quality are on the increase. In order to protect water bodies, practical mechanisms for systematic water quality monitoring and pollution control will be put in place. In this regard, all commercial and industrial enterprises and other waste water generating concerns shall be required to incorporate waste water treatment in their designs. The principle of ‘polluter pays’ shall be applied and discharge of effluents into water bodies shall be subject to ‘discharge permits’. Issuing of permits shall take into consideration the need to protect ecosystems and conserve biodiversity in areas such as the Sudd wetlands.

Effective management of water resources for the benefit of all depends on recognising the full social and economic value of water in all its competing uses, and taking deliberate efforts to ensure sustainable utilisation of finite resources. In order to ensure the sustainability of existing resources for the benefit of future generations, economic incentives shall be introduced to encourage water users, large and small, to use

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<sup>9</sup> Sudan is a signatory to several international protocols which are important for development and implementation of water policy, including the Ramsar Convention on the Protection of Wetlands, the Convention on the Rights of the Child (CRC) and the Convention to Combat Desertification (CCD).

water efficiently and reduce unnecessary wastage. The principle of ‘user pays’ shall be applied with the gradual introduction of economic measures to ensure that water users contribute towards the costs of managing and supplying water according to the volume and quality used<sup>10</sup>. Specific measures will be taken to ensure poor water users are not disadvantaged. Water saving technologies, rainwater harvesting and wastewater recycling shall also be promoted where appropriate.

### **3.3.3 Water Resources Assessment and Monitoring**

Water resources assessment and monitoring of both surface and ground waters is a fundamental element in water resources planning process. Currently there are no formal procedures for assessment and monitoring of water resources development across Southern Sudan. Organisational structures at all levels lack the necessary technical and financial resources for effective water resources assessment and available information on hydrological and environmental processes, including annual renewable freshwater potential of both surface and groundwater sources, is generally inadequate for water resources management and development activities.

The long term objective is to move towards an integrated approach to water resources assessment and monitoring which brings together multiple different sectoral interests in the development of water use plans on the basis of hydrological catchment areas. Procedures for systematic assessment and monitoring of water resources development will need to be developed and basic systems (e.g. databases) established for collecting, storing and processing accurate and timely information on surface and groundwater resources with regard to quantity, quality, location, demand and patterns of use and making the same accessible to those tasked with planning and implementing projects.

### **3.3.4 Water Resources Planning and Development**

Historically water resources development in Southern Sudan has often been carried out without due consideration of needs and priorities of different stakeholders. Mechanisms for involving water users and stakeholders from other sectors in planning water development remain undeveloped. The result is inadequate planning frequently leading to poorly designed projects which are inefficient or unsustainable and often have unintended negative impacts on people and environment.

Establishing appropriate management structures is a key priority in the context of rapidly increasing water use. In future, an integrated approach to water resources planning will be developed on the basis of the natural hydrological boundaries. The river basin or catchment area shall be the basic unit for planning and managing water resources and will be clearly delineated. Specific measures will be taken to enable active involvement of water users and stakeholders from other sectors in planning processes that will lead to the development of catchment management strategies.

### **3.3.5 Disaster Management**

Southern Sudan has experienced several episodes of major floods and droughts in the last four decades. The floods which are due to poor drainage and riverbank overflows have resulted in the proliferation of water-related diseases with ensuing loss to life, livelihoods and widespread environmental degradation. The worst floods hit Bor and Fangak areas in the 1960s, causing large scale population displacement to urban areas. Due to the topographic conditions and poor drainage, there is a constant risk of flooding in Greater Upper Nile and parts of Greater Bahr el-Ghazal.

The severest drought to hit Southern Sudan in modern times occurred in Gogrial and surrounding areas of Greater Bahr el-Ghazal in 1998. The resulting food shortage was compounded by the then ongoing conflict in that area leading to widespread famine and loss of life. There is currently no effective means of predicting the occurrence of flood and drought events. Another type of disaster which has been widely predicted is accidental spillage of toxic chemicals such as petroleum and burned hydrocarbons into major water courses due to lack of effective regulation of oil drilling activities.

Given the devastating impact of previous water-related disasters, in terms of loss of life, destruction of property and infrastructure, there is need to take deliberate action to mitigate and manage future disasters, including non-water related such as earthquakes which can impact negatively on water structures and

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<sup>10</sup> Water pricing shall be considered a possible mechanism for managing demand and conserving water in the long term.

courses. This requires identification of disaster prone areas, establishment of basic early warning systems and development of guidelines and procedures for managing and mitigating the impact of disasters with clearly defined roles and responsibilities for organisations operating at different levels.

### 3.3.6 Trans-boundary Waters

Southern Sudan occupies an important strategic position within the Nile Basin. The transboundary nature of the Nile waters has important implications for water resources development in Southern Sudan and necessitates close collaboration with both upstream and downstream riparian in planning, development and management of basin-wide resources. The CPA established principles for equitable sharing of common wealth among different levels of government within Sudan. The Interim National Constitution (INC) of the Republic of Sudan states that natural resources fall under the executive and legislative powers of all three levels of government (GONU, GOSS, and States)<sup>11</sup> while recognising the role of the Nile Water Commission in relation to trans-boundary waters and disputes arising from the management of interstate waters. It further emphasises the need to ensure that roles pertaining to different aspects of water are delegated to the most appropriate level, in order to enhance best practice in management and utilisation of water resources<sup>12</sup>.

The Government of Southern Sudan is committed to playing an active role within the Federal structure in order to ensure Sudan fulfils its international obligations, while protecting the rights of the people of Southern Sudan to an equitable share of the benefits of water resource development within the wider Nile Basin. In order to engage effectively with other Nile Basin stakeholders, the Government of Southern Sudan will need to undertake a detailed assessment of its own needs and priorities with regard to development of the Nile waters. Technical understanding of status and trends in the availability and use of Nile waters within Southern Sudan is limited due to lack of scientific research in recent years. Existing forms of technical collaboration with the Federal Government and member countries of the Nile Basin will be strengthened in order to build the necessary capacity for effective management and utilisation of transboundary waters within a basin-wide framework of cooperation, which calls for active participation within the Nile Basin Initiative (NBI) programs, including representation in the NBI Technical Advisory Committee (Nile-TAC).

### 3.3.7 Institutional and Legal Framework for Regulating Water Resources Management

The Government of Southern Sudan has a constitutional mandate to establish appropriate institutional and legal frameworks for water resources management within its territory. Institutional arrangements under the former governments were generally inadequate to meet the complex challenges of water resources management in Southern Sudan and institutional functions were not always clearly defined<sup>13</sup>. The CPA and subsequent ICSS and INC of 2005 represent an important opportunity to review and update existing legislation in the light of the new Federal structure, and the Government of Southern Sudan is committed to establishing an effective institutional framework to guide water resources management in Southern Sudan and perform the basic core functions outlined above. To this end a new institutional framework shall be developed in line with the following basic principles:

- *Integration* of decision making processes surrounding management of water resources on the basis of hydrological boundaries;
- *Separation* of institutional roles relating to water resources management, including development and enforcement of regulatory standards, from those relating to resource development and service delivery;
- *Decentralisation* of responsibility for resource management to the lowest appropriate administrative level; and
- *Participation* of water users including women and children in decision making processes surrounding planning, development and management of water resources.

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<sup>11</sup> Schedules A, B, C, D, E & F.

<sup>12</sup> Part 1, Ch 2: 11

<sup>13</sup> There is no single document which brings together existing policies and legislations relevant to water resources management and utilisation in Sudan and the need to consolidate existing legislation and remove inconsistencies, redundancies and contradictions has long been identified as a high priority. At least three overlapping legal regimes have been identified, dating back to the Nile Pumps Control Act of 1939, the Irrigation and Drainage Act of 1990 and the Water Resources Act of 1995 (Draft National Water Policy of Sudan, 2000).

An independent authority will be established at GOSS level to oversee water resources management in Southern Sudan with gradual decentralisation of regulatory responsibility, where capacity allows, to Basin and Sub-Basin levels. Institutional mechanisms for coordination with other sectors such as education, health, environment, agriculture, livestock, fisheries, transport, and industry will also be established. The roles and responsibilities of government and non-government stakeholders under the new institutional framework shall be clearly defined in future implementation strategies. GOSS shall take all necessary steps to establish a supporting legal and regulatory framework to enable efficient and effective functioning of newly established water resources management institutions in Southern Sudan.

### **3.3.8 Human Resource Development and Capacity Building**

Lack of staff with adequate skills and technical qualifications to fulfil different water resources management functions presents a major constraint. As GOSS seeks to reverse the effects of decades of conflict and long term political and economic marginalisation in the South, there is a need for intensive training and human resource development in order to enable water sector stakeholders at all levels of government to understand and fulfil their new roles and responsibilities. The core functions of water resources management outlined above require a range of specialised technical qualifications as well as strong planning and management capabilities. In order to have an adequate number of appropriately qualified staff in the water sector short, medium and long term strategies shall be developed for human resource development and training through technical collaboration with relevant institutions in other countries. In parallel GOSS shall work to strengthen and capacitate water resources management institutions at all levels through programmes of technical and financial assistance.

### **3.3.9 Research and Technological Development**

Various different water technologies have been used in Southern Sudan with some proving unsustainable in the long run. Furthermore integrated water resources management is a complex process which takes into account environmental, ecological and socio-economic concerns in the planning and management of the resource aimed at solving the problems of supply, demand and control. This scenario calls for research and technological innovations for the purposes of allocating the available water resources to the needs of society in an efficient and cost effective manner.

Scientific research on water issues and identification of low cost and appropriate technologies will be promoted as a basis for sustainable development and management of water resources. Water resources research and technological development centres will be established and mechanisms of collaborating with other research institutes developed including sharing and dissemination of research findings. Adequate financial support will be required, particularly for problem-oriented research programmes aimed at the development of improved water resources, water supply and sanitation management systems according to the priorities based on sector needs.

### **3.3.10 Financing Water Resources Management**

Water resources management is costly and must be properly funded. Effective management of water resources requires significant investment of financial and human resources in the various technical, logistical, administrative and legal activities associated with resource assessment, monitoring of resource abstractions and effluent discharges, and development and enforcement of standards. For example, continuous monitoring of water resources requires capital expenditure in specialised equipment plus recurrent expenditure to cover the costs of operation and maintenance of the equipment and the established facilities including staff involved in collection, processing and dissemination of information.

A small proportion of these costs will be recovered through fees and levies charged to water users for specific services such as delivery of irrigation water, operation of dams/reservoirs and issuing of abstraction/discharge permits. Private sector investment will be actively encouraged wherever possible (for example in catchment rehabilitation and management) but the day-to-day costs of managing water resources require significant ongoing public investment. Government of Southern Sudan recognises the central importance of water resources management for development in Southern Sudan and is committed to developing an effective strategy for sustainable financing of associated capital and recurrent expenditures in the long term.

## **CHAPTER 4: RURAL WATER SUPPLY AND SANITATION POLICY**

*The overall goal of Rural Water Supply and Sanitation Policy is to improve access to safe water supply and sanitation facilities and to promote hygiene education for all people living in rural areas of Southern Sudan.*

### **4.1 Guiding Principles for Rural Water Supply and Sanitation**

The following guiding principles build on local experience while taking account of regional and international best practice in delivering rural water supply and sanitation services on an equitable and sustainable basis:

- 4.1.1** Access to sufficient water of acceptable quality to satisfy basic needs is considered a human right and shall be accorded highest priority in water resources development
- 4.1.2** Sanitation and hygiene education shall be actively promoted in order to maximise the social and economic benefits of rural water supply development
- 4.1.3** Investment in RWSS shall be targeted firstly to those areas which are currently unserved and/or experiencing acute water shortage
- 4.1.4** Selection of technologies appropriate for the delivery of RWSS services shall be guided by criteria on social equity, economic efficiency, system reliability and environmental sustainability.
- 4.1.5** Rural communities shall be supported to take an active role in planning, managing and financing RWSS schemes on a sustainable basis
- 4.1.6** Involvement of private sector and NGOs in the delivery of goods and services shall be actively encouraged and supported wherever appropriate

### **4.2 Specific Objectives for Rural Water Supply and Sanitation**

In accordance with the guiding principles outlined above, the specific objectives of GoSS RWSS policy can be summarised as follows:

- 4.2.1** To provide adequate, affordable and sustainable safe water supply services to the rural population on an equitable basis and to contribute to the survival and development of children
- 4.2.2** To actively promote sanitation and hygiene education alongside water supply
- 4.2.3** To establish effective structures to manage delivery of rural water supply and sanitation services at the lowest appropriate level
- 4.2.4** To promote active participation of water users, including women and children, in all aspects of planning, design, operation and maintenance of RWSS schemes and to support communities to take ownership of rural schemes.
- 4.2.5** To support water users to make informed technology choices which take account of local needs and priorities and existing capacity for management and financing of O&M
- 4.2.6** To encourage users to contribute towards O&M costs while ensuring that poor and vulnerable groups are not disadvantaged.
- 4.2.7** To promote involvement of private sector in the delivery of RWSS services where appropriate
- 4.2.8** To clearly define institutional arrangements within the RWSS sub-sector including clear separation of institutional functions and roles and responsibilities of government and non-government organisations.
- 4.2.9** To emphasise capacity building & human resource development at all levels throughout the RWSS sub-sector
- 4.2.10** To mobilise sufficient finances from public and private sources to cover capital and operational expenditure and develop a sector-wide financing strategy to ensure long term sustainability
- 4.2.11** To promote mainstreaming of HIV/AIDS and gender issues in water and sanitation services

## 4.3 Key Issues and Priorities

### 4.3.1 Service Levels and Quality

Overall levels of access to improved water supply and sanitation facilities in Southern Sudan<sup>14</sup> are among the lowest in the world and existing services are unevenly distributed reflecting historical imbalances in service provision and economic development. Average water consumption in Southern Sudan is around 6 litres per capita per day (lpcpd) which is far below the minimum standard of 20 lpcpd recommended by the World Health Organisation. Even small improvements in the quantity and quality of water consumed by the majority of rural households will therefore have a significant overall impact on health, welfare and productivity of the people. The GoSS RWSS programme has adopted an interim target of increasing consumption to 15 lpcpd by the year 2010 with not more than 500 persons per safe water point within a range of not more than 1.5km.

Procedures shall also be developed for identifying and targeting investment in those areas which are currently unserved and/or experiencing acute water shortages - including strategic siting of livestock watering points in order to reduce pressure on existing sources and mitigate potential conflicts. There is a further need to develop norms and standards for progressive improvement of RWSS service levels in future. In this regard, the first priority shall be to increase the *quantity* of water consumed through improved access to water. The second priority shall be to improve the *quality* of water consumed through improved technologies and education. The main objective shall therefore be to increase the number of people with access to adequate quantities of water of an acceptable quality for basic needs and livelihood uses, within a reasonable walking distance. Improving access to basic sanitation facilities is an even greater challenge and efforts should focus firstly on small towns and peri-urban areas where the need is greatest. Finally there is a need to strengthen information and reporting systems in order to ensure effective monitoring and evaluation of service levels and quality.

### 4.3.2 Sanitation and Hygiene Education

Levels of access to sanitation and hygiene facilities in rural areas of Southern Sudan are extremely low. This is reflected in the high incidence of diarrhoeal diseases associated with lack of access to safe water and adequate sanitation. Hygiene education has been shown to greatly improve the impact of water and sanitation interventions, whereas providing water alone has minimal impact, because most contamination of water occurs after leaving the source during transportation and storage. Wherever possible hygiene education shall therefore be integrated with RWSS interventions in order to improve the impact of water supply development in the short term and generate increased awareness and demand for sanitation facilities in the long term. Effective integration of sanitation and hygiene education with water supply interventions depends on establishing procedures for effective coordination and collaboration between water sector agencies and other relevant government ministries and departments including health and education. Specific long term strategies shall be developed in order to increase public awareness of sanitation and hygiene issues and generate effective demand for uptake and use of sanitation technologies in rural areas.

### 4.3.3 Technology Choice and Sustainable Operation and Maintenance

Sustainability of rural water supply and sanitation schemes remains a major challenge in Southern Sudan. Available data suggests that up to 30% of existing water points are not functional. Problems of sustainability are often due to inappropriate choice of technology type, location or design. There is a general bias towards borehole technologies but these frequently breakdown because users do not have the technical or financial capacity to maintain them without external assistance. Large areas of Southern Sudan are remote or inaccessible making it difficult to maintain supply chains for spare parts.

An important principle is that RWSS services should be provided according to needs and priorities identified by water users themselves. Implementing agencies shall therefore be required to support communities to make informed choices based upon the full range of available technologies including surface water catchments, hand dug wells and springs (not just boreholes). Technology selected should be appropriate to local management and financing capacity in order to ensure sustainability. In remote or inaccessible areas

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<sup>14</sup> See UNICEF/GoSS database for latest figures

preference should be given to technologies which can be maintained with minimal external assistance. Progressive improvements in the level of services provided shall be guided by criteria of appropriateness, affordability and sustainability and where feasible rural water supply systems should be designed to provide for additional small scale productive uses including livestock watering and micro-irrigation.

#### **4.3.4 Community Participation**

Experience has shown that the sustainability of community-based water supplies depends on the active participation of user communities in planning, design, operation and maintenance of schemes. Where water users are not adequately involved in the process and schemes do not reflect the needs and priorities of end users, including women and children, there is less incentive for user communities to invest time and money in maintaining them. Community-based approaches are well-established in Southern Sudan due to the absence of effective government for long periods of the conflict. However, the role of communities as legal owners and managers of rural water supply schemes has not yet been formally recognised.

The respective roles and responsibilities of communities and local authorities regarding the planning, financing and management of infrastructure development and subsequent operation and maintenance shall be clearly defined within the institutional framework and legally recognised. Guidelines shall be developed to encourage the participation of user communities in all aspects of the RWSS project cycle, including planning, design and construction, and empower them to make informed decisions regarding selection of different technology options. User communities shall be mobilised and trained to gradually take over full responsibility for management and financing the operation and maintenance of RWSS schemes. Procedures shall be developed to facilitate registration of water user groups as legal owners of rural water supply facilities in order to empower communities to manage schemes themselves.

#### **4.3.5 Gender Issues**

The women of Southern Sudan have made a significant contribution in the liberation struggle and have at the same time suffered from the effects of war through heavy workload, abduction, separation, physical violence and lack of basic social services. Although responsible for most of the agricultural and domestic work, women in many parts of Southern Sudan have limited access to safe drinking water and basic sanitation and spend long hours collecting water. This situation has also impacted negatively on the survival and development of children. In order to improve equity and sustainability of rural water supply and sanitation services, specific measures shall therefore be taken to promote active involvement of women and children in planning and design of rural schemes which are appropriate to their own needs and priorities.

#### **4.3.6 HIV/AIDS Issues**

The main purpose of RWSS interventions is to improve people's health, welfare and productivity by providing access to safe water and adequate sanitation facilities. Access to water supply and sanitation facilities is particularly important for people living with HIV/AIDS and the provision of home-based care to AIDS patients. Improved access increases the dignity of both patients and caregivers and the burden of care is felt more when water has to be fetched from long distances or when facilities breakdown. Water is needed for bathing patients and washing bed linen and clothes. Safe drinking water is essential for taking medicines and preparation of safe formula for babies, while nearby latrines make life more tolerable for weak patients. Water is also needed to keep the house environment and latrines clean in order to reduce the risk of opportunistic infections such as diarrhoea and skin diseases which commonly affect people with AIDS. In addition to this, hygiene education is particularly important in order to encourage hygienic behaviour and ensure safe storage and handling of water within the household.

GoSS recognises that HIV/AIDS has important implications for RWSS policy. It not only affects the ability to pay for water and sanitation services but also the ability to influence water supply decisions due to marginalisation, discrimination and stigmatisation. Measures shall therefore be taken to mainstream awareness of HIV/AIDS in all aspects of RWSS planning and development in order to reduce susceptibility to HIV infection in the first place, and to ensure services provided adequately address the needs of people living with HIV/AIDS.

### **4.3.7 Private Sector Participation**

The private sector has played an important role in the development of rural water supplies to-date. Working in partnership with government or NGOs to develop and operate water supply infrastructure, the private sector offers a number of potential advantages in terms of efficiency and flexibility but the difficulties of access in the Southern Sudan mean that competition is far from perfect. Regulation is mostly through contracts but there is currently no mechanism for independent monitoring and enforcement, resulting in significant variation in the quality of services currently provided. Despite growing demand, the number of private operators equipped and capable of providing quality services in Southern Sudan remains small. The majority are based in neighbouring countries and employ a small number of local staff on the ground. The number of Southern Sudanese private sector operators is expected to increase in future. Significant opportunities exist to increase private sector involvement in scaling up delivery of rural water supply and sanitation services in Southern Sudan. There is a need to build the capacity of government to work in partnership with the private sector to enhance development and sustainability of RWSS services (e.g. strengthening supply chains). To this end the role of the private sector within the institutional framework for RWSS service delivery shall be legally recognised and procedures and guidelines developed for monitoring the performance of private operators.

### **4.3.8 Institutional Framework for Regulation of Rural Water Supply and Sanitation**

There is broad consensus that the future role of government in the RWSS sub-sector should shift from direct implementation to regulation, facilitation and coordination. GoSS level authorities have an important role to play in development of policies, strategies and guidelines to ensure coordinated development and management of the RWSS sub-sector, but responsibility for planning and managing service provision shall be handed to lower levels of government<sup>15</sup>. State and County level water authorities are better placed to respond to the needs and priorities of their constituents and are expected to take a lead in coordinating and regulating RWSS development activities at a local level. Private sector and NGOs will continue to play an important role in supporting communities to develop and manage their own RWSS facilities. It is essential that this new approach to RWSS service delivery is effectively institutionalised.

GoSS will retain overall responsibility for sector development and remains directly accountable to the people for the quality of services provided. An appropriate institutional and legal framework shall be developed to reflect the changing role of government including clear separation of functions relating to regulation and service delivery. Government departments responsible for RWSS shall be streamlined to ensure efficient and effective functioning. The roles and responsibilities of government and non-government actors in developing and managing RWSS facilities shall be clearly defined including procedures for working in partnership and mechanisms for coordination and collaboration with other sectors. RWSS sector organisational structures at all levels shall be strengthened and capacitated in order to fulfil these new roles and responsibilities.

### **4.3.9 Human Resource Development and Capacity Building**

There is a general lack of staff with adequate skills including technical and administration qualifications to implement different RWSS functions outlined above. As Southern Sudan emerges from decades of conflict, a deliberate strategy is needed in order to develop the necessary manpower across a range of different fields for effective and efficient service delivery. A comprehensive and detailed training needs assessment will therefore be undertaken to reflect the changing role of government from direct implementation to regulation and supervision, and build the capacity of government to develop effective partnerships with non-state partners including NGOs and private sector.

Human resource development and capacity building shall be achieved through a combination of study tours, vocational training and university scholarships both from within and outside the country, and the establishment of water resources research and technological development centres in Southern Sudan. Emerging organisational structures for RWSS service delivery shall be strengthened and capacitated at all levels through programmes of technical and financial support from government, external donors and collaboration with relevant institutions in other countries and networks of experienced water sector professionals.

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<sup>15</sup> See Local Government Framework for Southern Sudan, 2006.

### **4.3.10 Financing Rural Water Supply and Sanitation**

Substantial investment is required in order to improve service levels across Southern Sudan. GoSS is committed to increasing investment in WSS as a basic need, especially in rural areas, but will also need to solicit additional funds from public donors in order to support achievement of targets. A sector-wide financing strategy shall be developed in order to ensure mobilisation of adequate financial resources to meet RWSS sub-sector objectives and targets. GoSS, State and Local Government will continue to support rural communities in meeting the capital costs of infrastructure development. Following years of protracted conflict, rural communities have only limited capacity to contribute towards capital costs. However, it is generally agreed that communities can reasonably be expected to contribute towards the costs of operation and maintenance. In many cases they are already doing so either in cash or kind but there is a need to formalise such arrangements in order to improve the financial sustainability of scheme operation and maintenance. To this end, guidelines shall be developed for progressive involvement of user communities in financing the cost of operating and maintaining RWSS schemes while ensuring that poor and vulnerable groups are not disadvantaged.

## **CHAPTER 5: URBAN WATER SUPPLY AND SANITATION POLICY**

*The Government of Southern Sudan is committed to ensuring rapidly growing urban populations benefit from access to safe, affordable and reliable water supply and sanitation services. The overall objective of UWSS policy is to ensure efficient development and management of UWSS services on a sustainable and equitable basis.*

### **5.1 Guiding Principles for Urban Water Supply and Sanitation**

The following guiding principles build on local experience while taking account of regional and international best practice in delivering urban water supply and sanitation services on a sustainable basis:

- 5.1.1** Urban populations in Southern Sudan have a basic right to enjoy access to safe, affordable and reliable water supply and sanitation.
- 5.1.2** Improving sanitation and sewerage facilities is considered one of the highest priorities in peri-urban and urban areas.
- 5.1.3** Investment in UWSS shall be targeted to those areas which are currently unserved and where need is greatest.
- 5.1.4** Planning and development of piped water supply and waste disposal infrastructures shall be carried out in an integrated manner.
- 5.1.5** The regulatory and delivery functions for UWSS shall be carried out by separate institutions.
- 5.1.6** Responsibility for regulation, delivery and management of UWSS services shall be decentralised to the lowest appropriate level, in accordance with the principle of subsidiarity.
- 5.1.7** Efficient management practices shall be required so as to ensure the operational sustainability of UWSS systems.
- 5.1.8** Involvement of private sector in the management and development of UWSS services shall be encouraged where appropriate
- 5.1.9** The regulatory framework shall be designed to promote effective development of UWSS services, combined with transparency and accountability in operations.

### **5.2 Specific Objectives of Urban Water Supply and Sanitation**

Specific objectives can be summarised as follows:

- 5.2.1** To provide safe, affordable and reliable UWSS services to the urban population on an equitable basis, including poor and vulnerable groups.

- 5.2.2 To promote an integrated approach to planning the development of piped water supplies and waste water disposal infrastructures.
- 5.2.3 To develop an effective institutional framework in which functions relating to regulation are separated from those relating to delivery of UWSS services.
- 5.2.4 To establish effective decentralised structures for managing delivery of UWSS services so as to combine efficiency and accountability.
- 5.2.5 To promote active involvement of private sector in the development and management of UWSS services where appropriate.
- 5.2.6 To improve the financial sustainability of UWSS systems through the introduction of efficient management practices and effective revenue generation mechanisms.
- 5.2.7 To promote the technical and management training of staff working at all levels in UWSS services so as to improve the overall quality and effectiveness of institutions.

## **5.3 Key Issues and Priorities**

### **5.3.1 Urban Service Levels and Quality**

Southern Sudan remains predominantly rural but has experienced rapid urbanisation in recent years placing considerable strain on existing urban water supply and sanitation infrastructure. Water treatment plants continue to operate in Juba, Wau and Malakal and a number of smaller towns - including the designated state capitals - have managed to maintain small piped water supply networks, but the majority of the urban population are not connected to piped water supply. Sanitation facilities are extremely limited in urban areas resulting in major public health problems. There is an urgent need therefore to rehabilitate and extend existing UWSS infrastructure in order to respond to growing urban demands.

Urban water supply and sanitation needs are fundamentally different from RWSS and there is a need to establish separate standards and targets for UWSS services which take account of higher levels of demand associated with increased population density. These shall include special provision for dealing with public health emergencies including water shortages and cholera outbreaks. Specific strategies will be developed for those areas not covered by piped networks, including informal settlements. Guidelines and procedures shall be developed for monitoring the quality, affordability and reliability of services provided. Mechanisms shall be established for effective coordination and collaboration between agencies involved in water supply, sanitation and environmental health in urban areas.

### **5.3.2 Urban Water Supply and Sanitation Infrastructure Development**

In most urban areas, existing water supply and sanitation infrastructure has been severely degraded by decades of conflict and underinvestment. Remaining systems are old and unable to cope with current and projected demand. Resulting service levels, in terms of quantity and quality of water supplied, are unacceptably low which makes it difficult to collect revenues required for reinvestment in the sector. Major investment is required in order to reach GOSS targets for improving UWSS service levels across Southern Sudan.

GOSS will prioritise public investment to rehabilitate and extend old infrastructure and where appropriate to build new networks. Public investment in UWSS infrastructure shall be targeted to areas in greatest need, including informal settlements. The development of UWSS plans shall consider the full range of available water sources and select an appropriate mix of technologies based upon criteria of equity, affordability and sustainability. An integrated approach to development of piped water supplies and associated waste water disposal infrastructures (including storm drainage) shall be promoted. In particular, waste water from industrial establishments shall be properly treated before being discharged into natural water courses.

Procedures and guidelines will be developed to ensure conservation and protection of urban water sources and safe disposal of urban waste water<sup>16</sup> so as to minimise negative impacts on the environment. Given the strong linkage between sanitation services and public health, solution to urban sanitation problems including

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<sup>16</sup> This forms an important part of an integrated approach to urban planning

policy development should involve the health sector and close collaboration and coordination within and between different levels of government, and between government and non-government agencies.

### **5.3.3 Operation and Maintenance of Urban Water Supply and Sanitation Services**

Sustainable operation and maintenance of UWSS services presents a major challenge in Southern Sudan. It is essential that UWSS systems are efficiently operated and assets adequately maintained in order to meet the demands of a growing urban population, but ongoing efforts to delegate responsibility for operation and maintenance need to take account of management and financing capacity constraints at a local level. In the long term it is hoped that UWSS providers will be able to operate on a commercial basis and attract external investment.

Establishing effective semi-autonomous structures to manage the operation and maintenance of UWSS at decentralised levels is a key priority. Financial sustainability of UWSS systems shall be improved through the introduction of efficient management practices and effective revenue generation mechanisms. Technical and management training of staff working at all levels in UWSS services shall be supported so as to improve the overall quality and effectiveness of institutions. Where appropriate government may contract private sector to operate and maintain UWSS infrastructure.

### **5.3.4 Private Sector Participation**

Opportunities exist for private sector participation in different aspects of UWSS planning and service delivery with potential benefits in terms of efficiency gains and technological innovation. In addition to capital intensive works and the supply of goods and services to UWSS utilities, there are opportunities for private sector to operate and manage UWSS infrastructure on behalf of government. Apart from the large urban centres there are significant opportunities for private sector involvement in development and operation of small water supply and sanitation schemes in peri-urban areas and small towns. However there are some obstacles to private sector involvement in the existing legal and regulatory framework.

GoSS is committed to exploring the potential for private sector participation in the provision of UWSS services in Southern Sudan. In order to create a more conducive environment for private sector participation there is a need to legally recognise the role of private sector within the institutional framework for UWSS and establish procedures and guidelines for monitoring performance of private operators. Additional measures shall be taken to promote the development of local private sector and to build the capacity of government to work effectively in partnership with private operators.

### **5.3.5 Institutional Framework for Regulating Urban Water Supply and Sanitation**

A key factor underlying the weak performance of UWSS utilities in the past has been the lack of an adequate institutional framework regulating UWSS. In the absence of a central regulatory authority existing Urban Water Corporations have been expected to regulate themselves. An important principle guiding UWSS policy is that regulatory and service delivery functions should be carried out by separate institutions, in order to promote efficient and effective functioning and improve transparency and accountability in service delivery.

An appropriate institutional and legal framework for UWSS shall therefore be developed that incorporates clear separation of functions relating to regulation and service delivery. Government departments responsible for UWSS shall be streamlined to ensure efficient and effective functioning. The roles and responsibilities of government, private sector and NGOs in developing and managing UWSS facilities shall be clearly defined, including arrangements for working in partnership and mechanisms for coordination and collaboration with RWSS and other sectors. Where capacity exists, responsibility for development and management of UWSS services shall be progressively decentralised and Urban Water Corporations shall be supported to become semi-autonomous entities. UWSS sector organisational structures at all levels shall be strengthened and capacitated in order to fulfil their new roles and responsibilities.

### **5.3.6 Human Resource Development and Capacity Building**

There is a general lack of staff with adequate skills including technical and administration qualifications to implement the different UWSS functions outlined above. As Southern Sudan emerges from decades of conflict, a deliberate strategy is needed in order to develop the necessary manpower across a range of

different fields for effective and efficient service delivery. A comprehensive and detailed training needs assessment will therefore be undertaken to reflect the changing role of government from direct implementation to regulation and supervision, and build the capacity of government to develop effective partnerships with non-state partners including private sector and NGOs.

Human resource development and capacity building shall be achieved through a combination of study tours, vocational training and university scholarships both from within and outside the country, and the establishment of water resources research and technological development centres in Southern Sudan. Emerging organisational structures for UWSS service delivery shall be strengthened and capacitated at all levels through programmes of technical and financial support from government, external donors and collaboration with relevant institutions in other countries and networks of experienced water sector professionals.

### **5.3.7 Financing Urban Water Supply and Sanitation.**

UWSS facilities in Southern Sudan have suffered from decades of underinvestment as a result of conflict. Levels of capital investment have been insufficient to keep pace with demand, and systems for billing and payment have broken down making revenue collection difficult. The net result is that UWSS utilities have a very weak financial resource base. They are unable to operate commercially or to invest adequately in maintaining existing assets and providing quality UWSS services on a sustainable basis.

GoSS is committed to increasing investment in UWSS. Strategies will be developed for mobilising the financial resources necessary for rehabilitation and extension of UWSS infrastructure and sustainable operation and maintenance, in line with operational capacity. GoSS, State and Local Government will continue to meet the capital costs of infrastructure development and will actively solicit additional funds from public donors. Consumer contributions towards the costs of managing and supplying UWSS services shall be progressively introduced in order to promote financial sustainability. Transparent mechanisms will be established for setting and regulating tariffs for UWSS services, with special provision for low income groups. GoSS will support progressive financial autonomy for decentralised UWSS utilities to enable them to apply for credit and attract external investment.

## ANNEX: GLOSSARY OF TERMS

<b>Abstraction</b>	The removal of water from surface or ground source
<b>Accountability</b>	The principle that individuals, organisations, communities and governments are answerable for their actions and can be held to account for failures.
<b>Annual renewable freshwater potential</b>	The total amount of freshwater which is available in a year and will be replaced by rain each year if it is used.
<b>Aquifer</b>	An underground layer of earth, gravel or stone that contains water.
<b>Awareness raising</b>	Awareness raising is the objective of information, education and communications activity, usually directed at the intended beneficiaries of the project or programme, being services recipient, policy/decision making stakeholders like government officials, politicians and private companies
<b>Basement Complex formation</b>	A base layer of metamorphic rock beneath a surface of igneous or sedimentary rocks.
<b>Best practice</b>	A technique that has been shown by research and experience to be the best, most reliable way to achieve a result.
<b>Biodiversity</b>	The range and variety of living organisms and ecosystems in a given area.
<b>Borehole</b>	A narrow hole drilled to extract groundwater.
<b>Capacity building</b>	Developing and supporting the ability of organisations or individuals to perform specific functions, by improving and facilitating the skills of individuals, the institutional structures and processes of organisations.
<b>Capital costs/Capital investment</b>	One-off costs or investments involved in the construction of new infrastructure.
<b>Catchment Area</b>	The area of land which drains into a stream or river.
<b>Community mobilisation</b>	When action is planned and carried out by a community on a participatory and sustained basis to improve their welfare.
<b>Community-Based Water Supply</b>	Water supply which is managed by a community on a participatory and sustained basis to improve their welfare.
<b>Co-riparians</b>	People who share a water body which flows across legal or political boundaries (e.g. people living within the Nile river basin)
<b>Critical environmental processes</b>	Environmental processes such as erosion control and afforestation which are necessary to support human wellbeing and ecological function.
<b>Customary laws</b>	Established rules and behaviours which are treated as laws by communities, even if they are not written down.
<b>Decentralisation</b>	The transfer of decision-making responsibilities from higher levels of government to lower levels (e.g. from central to regional or local government).
<b>Drainage</b>	The flow of rain or floodwater from the land where it falls or originates into rivers, lakes or aquifers, via surface or underground flows.
<b>Economic efficiency</b>	Using the minimum resources necessary to achieve a desired goal.
<b>Economic incentives</b>	Taxes, subsidies, fees, penalties and markets which are designed to change the behaviour of the people and organisations. For example, to encourage water saving or discourage water pollution.
<b>Ecosystem</b>	A community of organisms and their environment.
<b>Effluents</b>	Wastewater and other liquids that flow out of a treatment plant, industrial works or agricultural site.
<b>Endemic species</b>	A species which is only found in a small region where it is native.

<b>Environmental Impact Assessment</b>	A study which assesses the impact of a project on the environment. These are usually carried out before the project takes place and are used to decide whether the project should go ahead.
<b>Environmental Sustainability</b>	The ability to maintain key ecological functions into the future.
<b>Equity</b>	Treating everybody the same, distributing benefits proportionally and targeting those who are currently underserved.
<b>External Investment</b>	Investment in water supply and sanitation services other than by the government or semi-autonomous service providers, for example by the private sector or donor interventions.
<b>Federal Structure</b>	A political system of partially self-governing states with a central national government, as in Sudan presently.
<b>Financial autonomy</b>	The freedom of an organisation to manage its financial affairs independently.
<b>Financial sustainability</b>	Having sufficient funds or guaranteed sources of financing to keep a system running.
<b>Financing</b>	Raising the necessary funds to create productive and service delivery assets; in addition to payment for operation and maintenance.
<b>Food security</b>	Access at all times to enough food for an active healthy life, both in normal conditions and at times of droughts, floods or other shocks.
<b>Gender issues</b>	Issues related to different needs and activities of men and women in a society.
<b>Groundwater</b>	Water that lies beneath the earth's surface in underground formations (aquifers).
<b>Haffir</b>	Subsurface open reservoir.
<b>Human right</b>	Something which all people are entitled to in international law.
<b>Hydrological boundary</b>	The boundary of a system of interconnected water courses, e.g. a river basin; hence it is a line that separates neighbouring land drainage systems, in such a way that water flows in one system does not interact with those in the other.
<b>Hydrological process</b>	Process relating to the cycle movement and storage of water in natural systems including evaporation, rainfall, river flow and aquifer recharge.
<b>Hygiene education</b>	Increasing people's knowledge about safe hygiene practices such as hand washing and sanitation.
<b>Infrastructure</b>	The physical equipment or facility for water supply and sanitation provision, such as dams, Hafiirs, boreholes, wells, pumps, pipes, canals and treatment plants.
<b>Institutions</b>	Organisations, laws, customs, practices and other elements governing political or social life.
<b>Integrated approach</b>	A broad, inclusive approach to water management, development and supply which takes into account the needs of all different water users and stakeholders as well as the natural environment. It usually focuses on the river basin level.
<b>Irrigation</b>	The harnessing of water using pumps and specially constructed water control gates, to supply water to an area of land through canals and pipes to grow crops. Further, based on the overall on-farm water management, irrigation includes draining and evacuating of excess water from fields, so as to control water in the crop root zone, therefore drainage is synonymous with irrigation.
<b>Khor</b>	A small seasonal gouge watercourse (usually a narrow rather deep flow course scoured into clayey or rocky soils).
<b>Legal and regulatory framework</b>	All the laws and regulations which control how water supply and sanitation is provided and how service providers and regulators are run.
<b>Management structures</b>	The arrangement and allocation of roles and responsibilities in organisation or sector.

<b>Metering</b>	Systems of metering for calculating water consumption, and thereby charges owed by the customer per unit of water consumed, are needed in cases where charges or tariffs for water are set at a flat rate per user
<b>Micro-irrigation</b>	A small-scale irrigation method in which water is applied directly to the root zone of the plant in frequent drops through smaller diameter pipes (known as drippers). This uses far less water than conventional gravity irrigation or pressure irrigation method in which water is sprayed onto the crop field through nozzles at the end of pipes (known as sprinklers).
<b>Minimum environmental flow</b>	The minimum level of water flow which must remain in stream or river in order to maintain ecological function.
<b>Operation and maintenance</b>	The best possible way of running and sustaining of facilities for better sharing and utilisation of resources among different users and sectors for the overall interests of society.
<b>Optimal use</b>	Best possible use in terms of the interests of society and economic efficiency.
<b>Polluter-pays principle</b>	This is based on an economic approach to pollution control designed to ensure that the polluter bears the cost of pollution damage/or the cost incurred in controlling the pollution.
<b>Pollution</b>	Contamination of the natural environment (in this case, watercourses and water bodies) by harmful substances as a result of human activities.
<b>Private sector</b>	Private companies.
<b>Private Sector Participation</b>	The basis for its advocacy is the recognition that compares to govern-run utilities private commercial companies tend to operate services in a sustainable way, with greater efficiency and less wastage while managing to recover their costs.
<b>Productivity</b>	The amount of output (e.g. goods produced) per unit of input (e.g. hours of labour, cubic meters of water, etc). Increased productivity can fuel economic growth, poverty reduction and conservation of resources.
<b>Rainwater harvesting</b>	Collecting and storing of rainwater runoff for post rain use e.g. growing of crops, watering of livestock, aquaculture, etc
<b>Ramsar Convention</b>	The Convention on Wetlands, adopted in Ramsar, Iran, in 1971 came to force in 1975. It was the first of the modern global intergovernmental treaties designed to protect the natural environment and preserve natural resources.
<b>Recurrent expenditure</b>	Money spent on costs which occur continually or very frequently, for example salaries.
<b>Regulation</b>	The application of rules or standards (regulations) to govern how service providers or other organisations act.
<b>Reinvestment</b>	Investing funds from user fees, permit fees or penalties back into water supply and sanitation provision.
<b>Resource allocation</b>	The sharing of resources (water) between different users and sectors.
<b>Re-use and recycling of water</b>	The growing scarcity of freshwater makes the re-use or recycling of drainage water, wastewater, brackish water or polluted groundwater economically and environmentally beneficial and practicable.
<b>River basin</b>	The entire land drained by a river and its tributaries.
<b>River Basin Organisations</b>	The river basin as a planning and management unit for water resources is seen as a means of developing an integrated approach. Its closed geographical boundary system permits various sectors and users in a basin to work together
<b>River training</b>	Alluvial rivers frequently change their courses following a curving spiral while meandering across lowland areas resulting in a series of bends known as 'oxbows'. The process follows a scouring and deposition mechanism; in such a way that scouring occurs at the outer bend and the deposition takes place at the inner bend. In this way the 'oxbows' eventually become cut off forming small

	lakes with a rather straight reach of a river in between. <i>Constructions (including dredging) that are carried out in river channels to prevent this phenomenon of morphological changes along rivers are called river training works.</i>
<b>Safe water</b>	Water which is considered safe for drinking because it does not contain dangerous bacteria, toxic chemicals or other harmful substances. Safe water is protected from contaminants and pollutants.
<b>Sanitation</b>	The safe and hygienic disposal of human waste and domestic wastewater
<b>Semi-autonomous structures or Semi-autonomous entities</b>	Organisations which are partly independent from government.
<b>Separation of functions</b>	The division of roles and responsibilities so that the individuals, departments or organisations carrying out service delivery are not the same as those who regulate service providers. This makes regulation more independent (services providers are not regulating themselves) and can increase efficiency.
<b>Service delivery</b>	The provision of water supply or sanitation services to users.
<b>Service provider</b>	The organisation responsible for implementation and delivery of water supply or sanitation schemes, and collection of any user fees.
<b>Sewerage</b>	A system of sewers or drainage pipes for the disposal of human waste and domestic wastewater.
<b>Siltation</b>	The build-up of soil and rock particles in a watercourse, for example on streambed or in reservoir upstream of a dam.
<b>Springs</b>	A point where groundwater rises to the surface through a natural opening in the earth or rock.
<b>Stakeholder</b>	Individual, group or organisation affected by or having an interest in decisions regarding water resources management
<b>Standards</b>	Measurable levels of performance which service provider aim to reach, for example that a certain amount of water will be provided each day.
<b>Subsidiarity</b>	The principle that decisions should be taken at the most local level possible, where they are closest to the people they affect.
<b>Sudd region/ Sudd swamps</b>	As described by Sir William Garstin (1908-1909), a hydrological engineer and colonial administrator of the time; they are “a huge area of vegetation of the Nile in Southern Sudan, which can absorb and dissipate half or more of the water it receives”. Therefore, since part of river discharges entering this area does not flow out, the region was termed Sudd (barrier/blockage in Arabic Language). In fact, high river discharges spill over the banks of the upper tributaries of the White Nile (namely Bahr el-Jebel and Bahr el-Ghazal); spreading into large areas, which are relatively flat and lower than banks of these rivers, forming this vast seasonal and permanent swamps.
<b>Supply chain</b>	All the people, organisations and steps involved in getting a product from the point where it is made to the point where it is used.
<b>Surface water</b>	Water that sits or flows above the earth’s surface, including rivers, streams, lakes and pools.
<b>System reliability</b>	A system of sewers or drainage pipes for the disposal of human waste and domestic wastewater
<b>Tariffs</b>	Tariffs or charges raise revenues for water services and are necessary for operation and development of water supply and wastewater services
<b>Tariff Structures</b>	Criteria for fixing tariff structures should be developed to take into account different classes of consumers including the poor at different times and locations
<b>Trans-boundary waters</b>	Rivers or other water bodies which cross administrative boundaries (which may be national boundaries) and are shared between neighbouring populations

<b>Transparency</b>	Openness and communication by decision-makers, regulators and service providers, so that people affected by their actions are able to know what decisions have been made, and how.
<b>Tributary</b>	A stream or river which flows into another stream or river.
<b>Urbanisation</b>	The process of increasing urban populations relative to rural populations, through birth rates and /or migration.
<b>User fees</b>	Payments charged to users of water supply or sanitation services by the service provider.
<b>User participation</b>	The involvement of service users in decision-making, planning, implementation and evaluation processes relating to service delivery.
<b>‘User pays’</b>	The principle that the user of a service should pay for at least part of the costs of the service.
<b>Vulnerability</b>	Susceptibility of individuals, households or communities to specific risk events, according to their location, asset status, social networks, etc
<b>Wadi</b>	Arabic terminology for an ephemeral (or a transient watercourse) e.g. a seasonal stream bed that only flows during the rainy season; usually a wide and shallow flow course through sandy soils)
<b>Wastewater recycling</b>	Re-using wastewater from domestic, agricultural or industrial uses, with or without water treatment, to reduce overall water use.
<b>Water-borne diseases</b>	The term water-borne disease is often used loosely to describe all diseases carried by water. Strictly, water-borne diseases are those in which the infectious agent is itself carried by water; diarrhoeal diseases including typhoid, cholera and dysentery; and infectious hepatitis. Others are water-washed: skin diseases such as scabies, leprosy; eye diseases such as trachoma; or water-related, in which case the disease is spread via an organism living in water such as schistosomiasis (via snails) and guinea-worm.
<b>Water demand management</b>	The use of instruments such as water pricing, technology and education, to promote efficient and responsible use of available water resources
<b>Water ownership</b>	It is important to distinguish between ownership of water and the right to have access to water and use it. Regulation of the resource can only arise out of authority, explicit or implicit, that the government has a custodian right to manage this resource as a public good
<b>Water point</b>	Point of access to drinking water, e.g. tap, pump, spring, etc
<b>Water Policy</b>	Policy defines the overall direction of water sector development and identifies related objectives and priorities
<b>Water quality standards</b>	Whether water quality is satisfactory depends on the intended use like drinking, bathing, irrigation and industrial purposes. Setting the standards is the responsibility of the government regulatory authority and should be enshrined in law.
<b>Water resource development</b>	Making water resources available and suitable for human and productive uses e.g. building of a dam to store water or generate electricity
<b>Water resources assessment</b>	Assessment of all aspects of the supply and demand for water resources
<b>Water resources management</b>	Water resources development, utilisation, conservation and protection including social, economic, physical and environmental aspects
<b>Water resources planning</b>	Planning the development, utilisation, protection and conservation of water resources, balancing supply and demand, and allocating resources according to defined criteria
<b>Water Strategy</b>	A strategy that defines the activities to be undertaken, in order to implement the water policy and meet objectives in the water sector

<b>Water supply</b>	The provision of water for domestic, agricultural or industrial use
<b>Water table</b>	The upper surface of groundwater which is free to rise and fall. If more water is removed from the aquifer than is returned to by the rivers and rains the water table falls and vice versa.
<b>Water use/discharge permits</b>	Permissions issued (usually by government) for the extraction of water from, or the disposal of effluents into, a water body.
<b>Water User Associations</b>	Water User Associations normally comprise a formal, usually legally-bound, group of farmers (or water users), often grouped around a particular canal or a borehole, with the responsibility for managing and maintaining the part of the system that serves them
<b>Water user group</b>	A group of water users who work together to manage or improve water services in their community or to make their voice heard.
<b>Water-related disasters</b>	Events where too much or too little water causes severe loss of life, damage to health, loss of land, homes or possessions, damage to infrastructure or other negative impacts. The main ones are drought and flood.
<b>Waterways</b>	Navigable river, canal and other inland bodies of water
<b>Wetland</b>	An area that is regularly or permanently saturated by surface or groundwater, and where vegetation is adapted for life in saturated soil.
<b>Willingness-to-pay surveys</b>	These surveys aim to uncover users' preferences for the proposed service and what they would be willing to pay for it.