WATER NEWS 2 DAY

2019/20 2ND EDITION

RIVER SAND **MINING** PAGE 28-29

WATER RESOURCE AVAILABILITY STATUS PAGE 24-25

GROUNDWATER PAGE 30-33

WATER SAVING TIPS PAGE 15

CAREER GUIDANCE FOR LEARNERS IN WATER RESOURCE MANAGEMENT PAGE 34-37

INKOMATI-USUTHU
CATCHMENT MANAGEMENT AGENCY

ECOSTATUS OF THE KOMATI RIVER CATCHMENT PAGE 20-23

IMPORTANCE OF IMPOSING **WATER USE RESTRICTIONS** PAGE 10-11

VISION

Sufficient, equitable and quality water resources for all in the Inkomati-Usuthu Water Management Area

MISSION

To efficiently manage water resources by empowering our stakeholders in our quest to contribute towards transformation by promoting equal access to water and protecting our environment

VALUES

Integrity
Customer Orientation (Batho pele)
Efficiency
Accountability
Diversity
Transparency

SLOGAN:

"INKOMATI-USUTHU CMA, YOUR PARTNER IN WATER MANAGEMENT"

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CONTENTS

WATER NEWS 2DAY

FOREWORD
BY THE CEO
Dr Thomas Gyedu-Ababio

Colleagues and comrades in water, I say welcome to the new calendar year, 2020. It is stressing to note that our water situation has still not improved to the level that we expect. As if the water situation is not bad enough on us. The outbreak of the Coronavirus (COVID-19) makes the situation worse. We can no longer go about our businesses as we used to. We need to take extra caution in our interactions with our stakeholders. In the midst of this Pandemic we continue to appreciate your part in ensuring that the little we have is equitably distributed to our water users. We salute you for your efforts. We should not drop our guards but continue to do the good work to save water as every drop counts.

The new Governing Board I mentioned in the previous edition is up and running. They are doing a good job in the governance circles. I urge you to give them your support to lead the IUCMA as they are the accounting authority.

Kudos to the Catchment Management Forums. They continue to lead and organise our stakeholders in our water management area to advance the interest of water resources management. We welcome the new leadership of the forums. We believe that you will contribute to strengthen further the work done by your predecessors in: the awareness campaigns, river cleaning programmes and the school science programmes initiated by the IUCMA. The impact of climate change is affecting the hydrology of our water management area. We can only survive the threat of climate change if we work as a collective to create awareness and adopt adaptation techniques. We constantly monitor the health of the river ecosystems and we pledge to continuously provide you with our findings.

IUCMA is responding to the COVID-19 pandemic. I will plead with all stakeholders to bear with us. We need to change the way we do things. The frequency and the mode of communication may change so I urge you all to co-operate with the IUCMA in our bid to beat this deadly pandemic. I know together, we can win the war against COVID-19.

I say a big thank you to all our stakeholders who have been paying their water use charges. We need the water use charges to be able to serve you better. Please, help us to help you. The monies you pay as water use charges enable us to undertake various water resource projects in our water management area.

In conclusion, I will say we need to adapt to climate change and the deadly Coronavirus. This is the time that weed to care for each other. Listen to the specialists and obey the rules that come from the Government Departments. We know there can be no life without water. We cannot beat COVID-19 without water so let us wash our hands with soap and running water as often as necessary. Use sanitizers as well. If we all come together, we can make our water management area and South Africa happy again. Thank you.

SOME OF THE **DAMS** UNDER INKOMATI-USUTHU WATER MANAGEMENT AREA

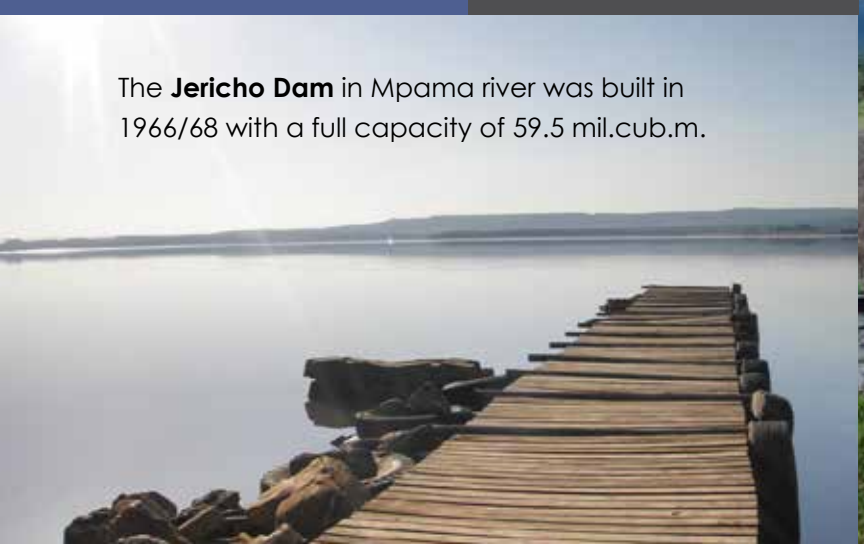
The **Primkop dam** has a total lenght of 5.88 km

The **Driekoppies Dam** along the Lomati river boost a full capacity of 251 mil.cub.m and was opened in 1998.

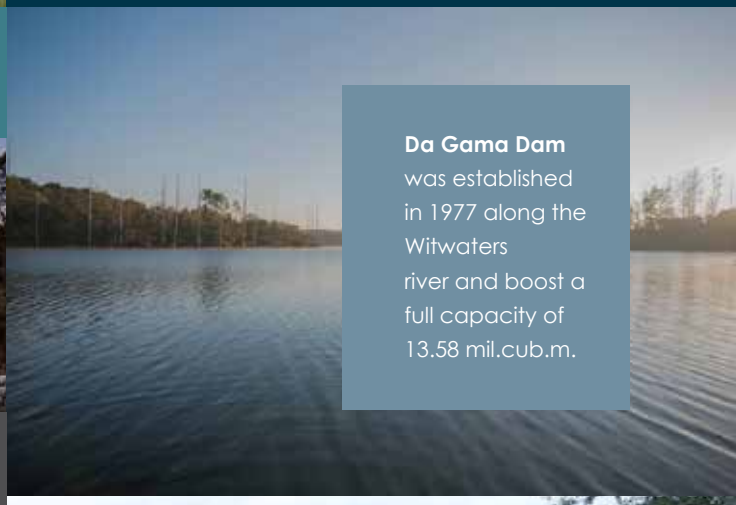
Located along Crocodile river, the Kwena Dam is a combined gravity and arch type boosting a total catchment area of 954 sq.km.

The **Vygeboom Dam** built in 1969 along the Komati river boost a full capacity of 78 mil.cub.m.

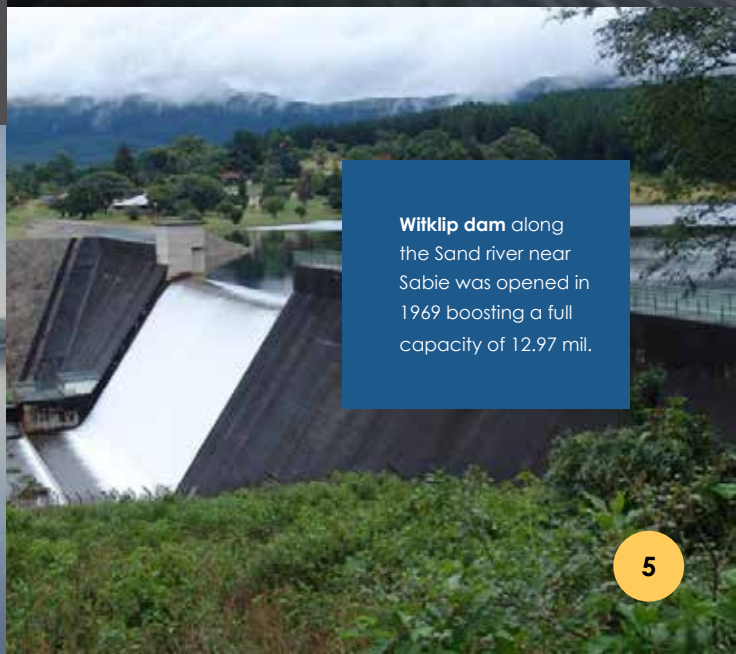
The **Jericho Dam** in Mpama river was built in 1966/68 with a full capacity of 59.5 mil.cub.m.



Injaka Dam along the Marite river boost a full capacity of 124 mil.cub.m.



Da Gama Dam was established in 1977 along the Witwaters river and boost a full capacity of 13.58 mil.cub.m.



Witklip dam along the Sand river near Sabie was opened in 1969 boosting a full capacity of 12.97 mil.

Editor's NOTE

Dear valued stakeholders

This newsletter comes at a time when the country is at a total shutdown due to the COVID-19 pandemic. I trust that the country will rise above the storm only if we follow all the guidelines from the presidency and the ministry of health and other recognized powers who can give us matching orders in these trying times.

The water management area has been hit by dry weather in the past few years. The situation has not gotten any better. In South Africa, water demand has grown since the 1990s, especially with expanding domestic and agricultural water uses. The same affects our water management area. While the IUCMA must manage the water resources to enable sufficient water for all, it also has to be cognisant of the ecological requirements as gazette in 2016, as well as adhering to the increased cross-border flows to Mozambique. As water demand goes up, water use allocation restrictions will therefore become a routine. A detailed discussion can be found on Page 10 of this publication.

Annually, the IUCMA conducts a detailed a study of one of our catchments. This newsletter also zooms into the ecological status of the Komati River Catchment. You can find this on page 20. This one of the important parts of water resource management. Aquatic ecosystems perform many important environmental functions. They are an indication of the health status of rivers and other water resources. For example, they recycle nutrients, purify water, attenuate floods, recharge ground water and provide habitats for wildlife.

The IUCMA therefore request our stakeholders and the general public to continue protecting our resources. They a source of life.

Together we can conquer COVID-19!

Together we can save our planet. Save water, every drop count!

Wishing you all good health,

Sylvia Machimana

QR CODE FOR THE IUCMA WEBSITE

CATCHMENT MANAGEMENT **FORUMS**

Catchment management forums (CMFs) are voluntary non-statuary bodies with open membership providing a voice for catchment residents, particularly people who in the past have had little say over the management of resources.

The existence of catchment management forums means that other organisations do not have to set themselves up as consultative bodies, but rather should be represented in the local catchment management forum and may exercise their participatory requirements under the NWA through these forums. The forums are in position to explore water-related issues in their respective regions in a holistic manner, engaging with stakeholders through catchment management forums.

It is expected that these forums can serve as feasible platforms to ensure that a balance is found between the strong, frequently well-organised and resourced "voice" of large scale water users and relatively under resourced, less represented and organised small-scale water users. CMFs are appropriate vehicles to foster cooperative governance between the CMA's, local government, and other stakeholder interest groups, in the interests of integrated management to support Water Resource Management.

ITINERARY FOR CATCHMENT MANAGEMENT FORUMS INKOMATI-USUTHU CMA 2020/21

Forum	Date	Coordinator
Sabie CMF	04/05/2020	Ms Nomsa Maider
Sand CMF	08/05/2020	Ms Assah Thibela & Mr Solly Ndlovu
Lower Komati CMF	12/05/2020	Ms Liketso Khaile
Crocodile CMF	15/05/2020	Ms Gugu Motha
Upper Komati CMF	25/05/2020	Mr Tony Sibiya
Usuthu CMF	26/05/2020	Mr Sibonangaye Mkhatshwa & Mr Thabiso Nkosi
Sand CMF	10/08/2020	Ms Assah Thibela & Mr Solly Ndlovu
Sabie CMF	14/08/2020	Ms Nomsa Maider
Lower Komati CMF	18/08/2020	Ms Liketso Khaile
Upper Komati CMF	21/08/2020	Mr Tony Sibiya
Usuthu CMF	25/08/2020	Mr Sibonangaye Mkhatshwa & Mr Thabiso Nkosi
Crocodile CMF	26/08/2020	Ms Gugu Motha
Sand CMF	09/11/2020	Ms Assah Thibela & Mr Solly Ndlovu
Sabie CMF	13/11/2020	Ms Liketso Khaile
Lower Komati CMF	17/11/2020	Ms Nomsa Maider
Upper Komati CMF	20/11/2020	Mr Tony Sibiya
Usuthu CMF	26/11/2020	Mr Sibonangaye Mkhatshwa & Mr Thabiso Nkosi
Crocodile CMF	27/11/2020	Ms Gugu Motha
Sand CMF	08/02/2021	Ms Assah Thibela & Mr Solly Ndlovu
Lower Komati CMF	12/02/2021	Ms Liketso Khaile
Sabie CMF	16/02/2021	Ms Nomsa Maider
Upper Komati CMF	19/02/2021	Mr Tony Sibiya
Usuthu CMF	25/02/2021	Mr Sibonangaye Mkhatshwa & Mr Thabiso Nkosi
Crocodile CMF	26/02/2021	Ms Gugu Motha

Mr Joseph Mabunda (Manager: Institutions & Participation)	**078 456 3402**	**mabundaj@iucma.co.za**
Mr Hasani Makhubele (Assistant Manager: Institutions & Participation)	**062 156 5050**	**hasanim@iucma.co.za**
Ms Nomsa Maider (Community Officer: Sabie)	078 459 0348	maidern@iucma.co.za
Ms Assah Thibela (Community Officer: Upper Sand)	078 451 0166	thibelaa@iucma.co.za
Mr Solly Ndlovu (Community Officer: Lower Sand)	078 459 0344	ndlovusolly@iucma.co.za
Mr Tony Sibiya (Community Officer: Upper Komati)	078 803 5276	sibiyat@iucma.co.za
Ms Liketso Khaile (Community Officer: Lower Komati)	078 459 0344	khailel@iucma.co.za
Ms Gugu Motha (Community Officer: Upper Crocodile)	078 459 0349	mothag@iucma.co.za
Mr Sbonangaye Mkhatshwa (Community Officer: Southern Usuthu)	061 337 2715	mkhathswas@iucma.co.za
Mr Thabiso Nkosi (Community Officer: Nothern Usuthu)	064 757 9254	nkosith@iucma.co.za

Learn about water irrigation and make a change to save water

What is irrigation?

Irrigation is the application of controlled amounts of water to plants at needed intervals. Irrigation helps grow agricultural crops, maintain landscapes, and revegetate disturbed soils in dry areas and during periods of less than average rainfall.

Environmental impact of irrigation

This may cause the following issues: rising water tables. increased storage of groundwater that may be used for irrigation, municipal, household and drinking water by pumping from wells. waterlogging and drainage problems in villages, agricultural lands, and along roads - with mostly negative consequences.

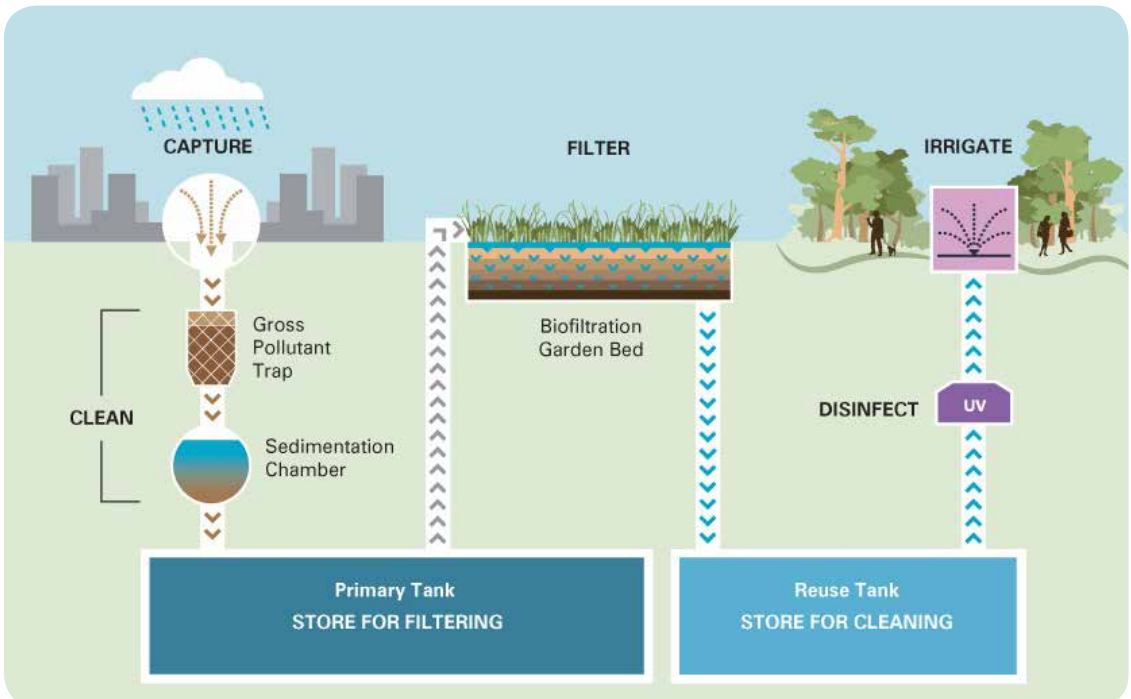
What are the advantages of irrigation?

Installing an irrigation system may seem like a costly endeavor, including the labor involved, but sprinkler or drip configurations have several advantages.

- Prevents Disease and Weeds
- Conserves Water and Time
- Preserves Soil Structure and Nutrients
- Gardening Flexibility

How irrigation works?

It carries important nutrients from the soil and is an important trigger for germination and the process of photosynthesis. Without water, plants simply won't grow. Surface irrigation such as border irrigation, furrow irrigation and other forms of irrigation that use flooding.



IMPORTANCE OF IMPOSING WATER USE RESTRICTIONS

ON USERS DURING PERIODS OF LOW FLOWS WITHIN INKOMATI-USUTHU WATER MANAGEMENT AREA

The impacts of rainfall variability and climate change is being witnessed in this 2019-2020 hydrological year within parts of Inkomati Usuthu Management Area, but specifically in the Sabie-Sand and Crocodile River Catchments. This therefore indicates the importance of restricting water use allocations for the different sectors when water availability is insufficient in the rivers and dams. The 2015/16 hydrological year was dry, but it should not be seen as exceptionally dry when preparing for the future. In terms of rainfall in the Crocodile River Catchment for instance, the 2015/16 drought was the first driest in the 49-year Crocodile River Catchment historical record (Figure 1). Climate change is likely to increase the frequency of these extremes.

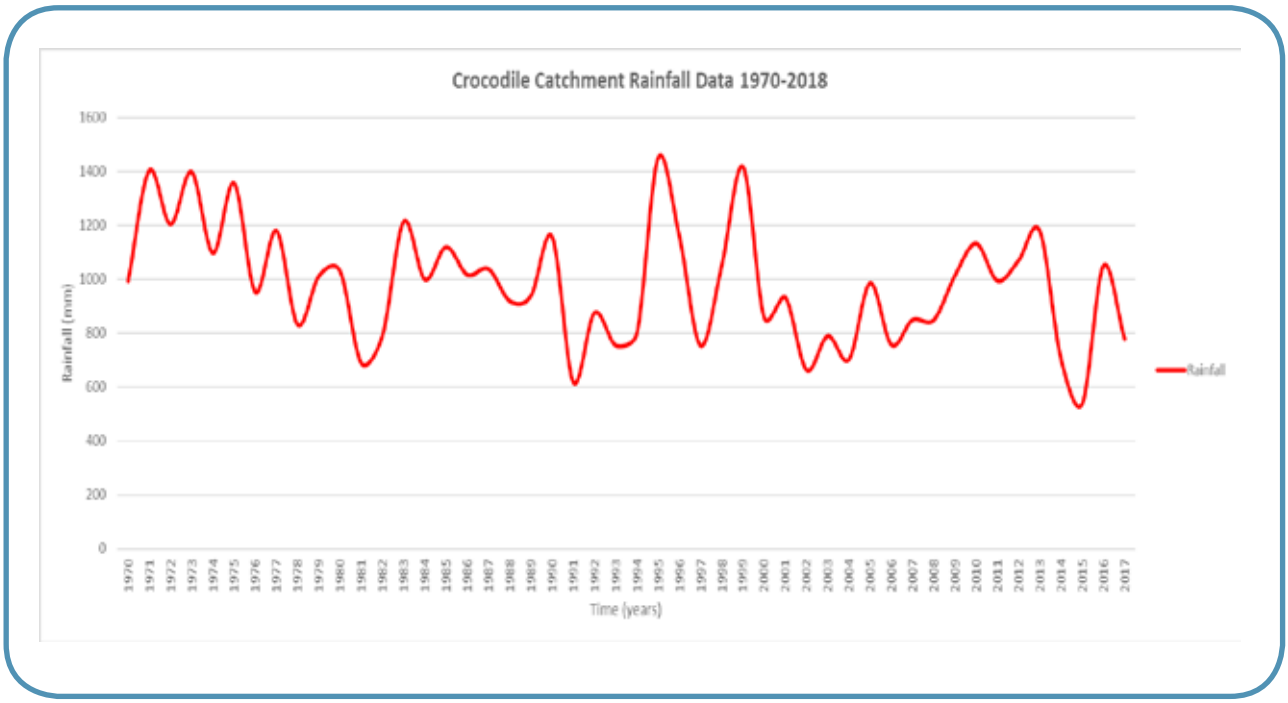


Figure 2: Crocodile Catchment Rainfall Data 1970-2018

The Inkomati-Usuthu Catchment Management Area is currently experiencing serious shortages resulting from far below average rainfall from the previous two rainy seasons and this has resulted in the low inflows in the rivers and into dams. The main culminating problem the IUCMA now faces is the deficits on water requirements (international obligations) to Mozambique (Figure 2).

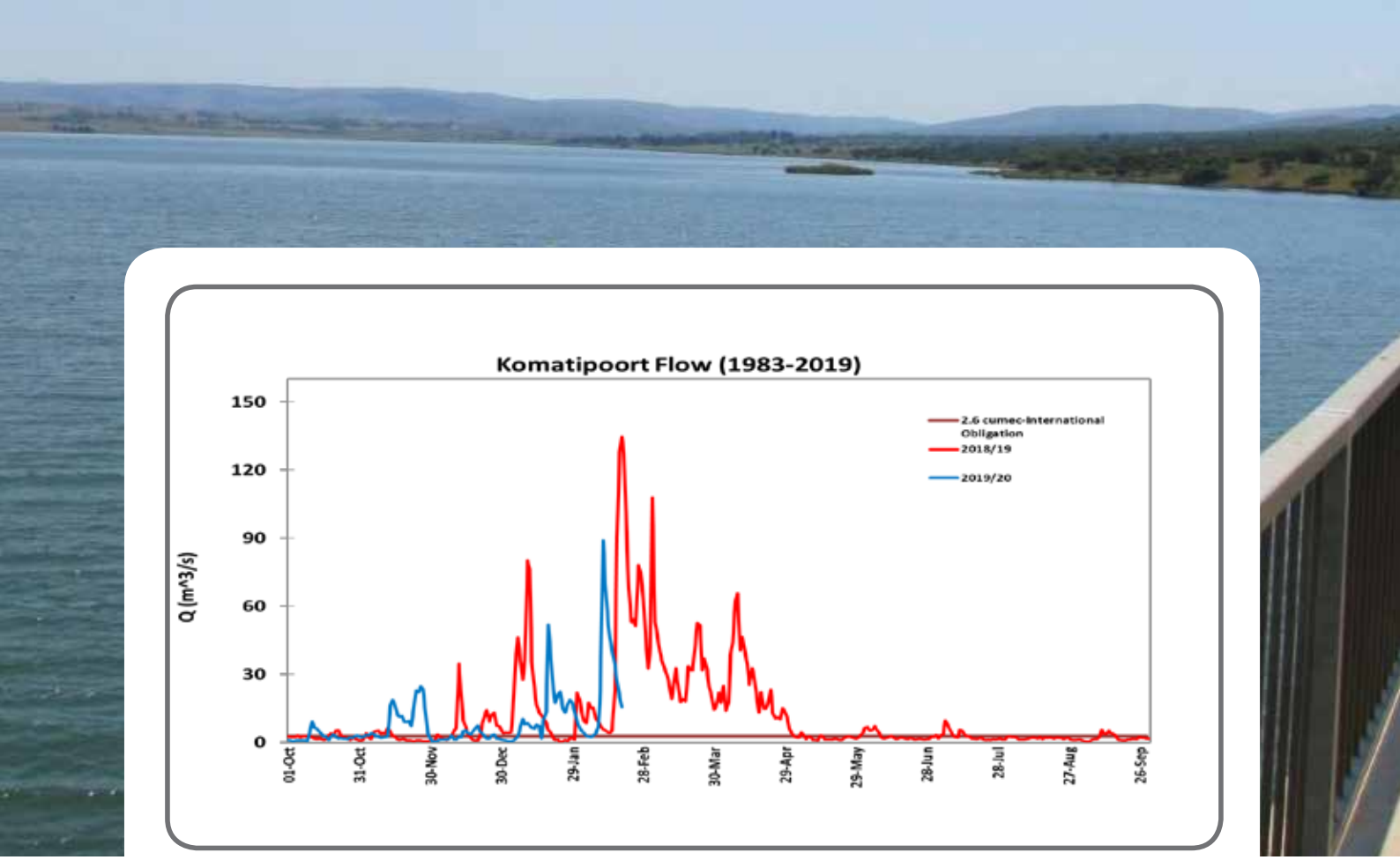


Figure 1: Komati River at Komatipoort flow into Mozambique

Water demands have grown since 1990s, particularly with expanding domestic and agricultural water uses, and recent (2016) gazette on the ecological requirements for the Inkomati catchment and the implementation of increased cross-border flows to Mozambique from October 2019. With the ever-increasing water use demand, water use allocation restrictions will go from rare to almost routine management options available to manage water resources. An already stressed water resource system like the Crocodile River Catchment is likely to become increasingly stressed over time, especially since the system has a finite supply capacity and a growing demand.

While South Africans may conceivably opt to take the risk and not restrict their water use during drought and hence risk getting no water at some time in the future, the National Water Act is clear about the rights for the Reserve and International Obligations, both which will be seriously violated should the catchment not be managed in a rational manner by restricting water use during periods of drought.

Water resource restrictions seeks to mitigate the impact of insufficient available water resources in a short-medium term by prioritizing supply to different water use sectors. Water resource restrictions main effort is to prevent the system from failing. It is imperative that, alternative water use options need to be considered such a groundwater development and water conservation and demand management practices by the urban sector as well as water use efficiency practices by the irrigation sector to alleviate water use shortages during low flow periods.


By (from left to right) Dr Tendai Sawunyama and Mr Sipho Magagula from River Systems Operations and Planning






Water
ALLOCATION REFORM
WHAT YOU NEED TO KNOW

Water, like all other resources in this country is historically allocated unequally. Thus the National Water Act, Act No. 38 of 1998 (the NWA) and subsequently the National Water Resources Strategy (NWRS) in line with the constitutional imperative provides for the correction of such imbalances.

The South African Constitution states that there is a commitment from the nation to reform in order to bring about equitable access to all South Africa's natural resources, including water resources. Water Allocation Reform (WAR) is deduced from the NWA as a measure to redress past imbalances with its intention to ensure that the nation's water resources are protected, used, developed, conserved, managed and controlled in an effective and efficient manner. The state is not impeded to effect water reform by taking legislative and other steps in order to redress the results of past racial discrimination, so as to achieve socio-economic equity.

As one of the measures aimed at addressing inequities in access to water for productive purposes, equitable access to water, or to the benefits derived from using water, the Department of Water and Sanitation (DWS) through the relevant Catchment Management Agencies (CMA) has embarked on Water Allocation Reform (WAR) which is critical in eradicating poverty and promoting economic growth. WAR is the Inkomati-Usuthu Catchment Management Agency's key programme for redressing these inequities. The programme aims to:

- Meet the basic human needs of present and future generations;
- Promote equitable access to water, redressing past imbalances based on gender and race;
- Promote the efficient, susutainable and beneficial use of water in the public interest;
- Meet international obligations, etc;
- Take steps to meet the water needs of HDIs and the poor and
- Ensure participation by these groups in water resource management.

The IUCMA has deduced a short and long term plan to be used towards achieving WAR. which encompasses a number of actions including the provision of financial assistance to resource poor farmers, Compulsory Licensing to support the equitable (re)allocation of water in any catchment, and the processing of Licenses and/or General authorizations to support the uptake of water by historically disadvantaged individuals.

DON'T DISPOSE DIAPERS IN RIVERS AND DAMS

Dispose diapers in rubbish bins and stop pollution

Tel: 013 753 9000 | Website: www.iucma.co.za

Inkomati-Usuthu CMA, your parther in water management

INKOMATI-USUTHU
CATCHMENT MANAGEMENT AGENCY

What are Water Resources ?

Water resources are defined as the sources by which we can get the water for our different types of uses and also those sources that gives the huge benefit to the life of the humans is referred to as the water resources.

The water that is used in the production of different types of useful products, like electricity, is also included in the water resources. Basically the function of the water resources is that to overcome the desires or the requirement of the water for the agricultural, industrial, social or household purposes.

TYPES OF WATER RESOURCES:

The water resources are divided into different categories because of their composition and also on the basis of their uses for the benefit of the humanity. Some important types of water resources that are used to provide the useful sources of water are as follows

SURFACE WATER RESOURCES:

Surface water resource is that type of water resource in which the water present in the rivers or in the streams plays an important role in maintaining different types of technologies and also used to upgrade the productivity. Basically this type of water is used in many useful purposes such as for the industrial use, for agricultural use and for the generation of different types of energy i.e. hydro electrical energy. Surface water is very important because 98% is used in the industry for manufacturing of different products.

UNDERGROUND WATER RESOURCES:

It is that type of water resource that is comprised of the different types of water resources that are fresh in nature, found under the surface of the earth. Because of its high use fulness people use groundwater to increase the growth rate of plants.

The ground water makes the soil moist and increases its productivity. Another common type of underground water is an aquifer. This is a porous rock that can allow water to pass through it, and it can usually hold water for a long time.

WETLANDS:

A wetland is a land area that is saturated with water, either permanently or seasonally, such that it takes on characteristics that distinguish it as a distinct ecosystem. The primary factor that distinguishes wetlands is the characteristic vegetation that is adapted to its unique soil conditions. Wetlands are made up primarily of hydric soil, which supports aquatic plants.

DAMS:

A dam is a barrier that impounds water or underground streams. Dams generally serve the primary purpose of retaining water, while other structures such as floodgates or levees (also known as dikes) are used to manage or prevent water flow into specific land regions. Hydropower and pumped-storage hydroelectricity are often used in conjunction with dams to generate electricity. A dam can increase the available water that can be utilised from the resource by capturing excess flows in the wet season for use during the dry season. Operating rules of dams manage the use of water from them effectively, which maximize the yield and water use.

WATER SAVING TIPS

Kettles should
not be filled
to the brim but with just enough water for your needs. This will reduce your electricity bill too.

Taking a bath can use between
80 and 150
litres of water per bath.

Do not overfill
containers like pots, as this may result in using more energy to heat the water.

Fix a **leaking toilet** otherwise it can waste up to
100 000 litres

ENVIRONMENTAL MANAGEMENT INSPECTORS (EMI'S)

("Blue Scorpians")

1. Environmental Management Inspectors (EMI's)

("Blue Scorpions")

EMIs are a network of environmental management and enforcement officials operating across all spheres of government.

These officials are designated by the Minister in terms of the National Environmental Management Act (Act 107 of 1998) (NEMA). EMIs can be easily identified by their uniform. This uniform has a specific logo or it can be an EMI badge.

EMIs are required to monitor, investigate and enforce compliance with the NEMA and the Specific Environmental Management Acts (SEMAs) for which they have been designated.

2. SEMAs are the following Acts:

- National Water Act (Act No.36 of 1998) (NWA)
- National Environmental Management: Biodiversity Act (Act No.10 of 2004) (NEMBA)
- National Environmental Management: Protected Areas Act (Act No.57 of 2004) (NEMPA)
- National Environmental Management: Waste Act (Act No.59 of 2008) (NEMWA)
- National Environmental Management: Integrated Coastal Management Act (Act No.24 of 2008)
- World Heritage Convention Act (Act No. 49 of 1999)
- Environmental Conservation Act (Act No. 73 of 1998)

National Water Act (Act No.36 of 1998) (NWA)

Powers and duties of Authorized Persons (Section 125 of NWA):

(1) An authorized person may, at any reasonable time and without prior notice, enter or cross a property with the necessary persons, vehicle, equipment and material in order to carry out routine inspections of the use of water under any authorization.

(2) An authorized person may enter a property with the necessary persons, vehicles, equipment and material

(a) After giving reasonable notice to the owner or occupier of the property, which notice must state the purpose of the proposed entry; and

(b) After obtaining the consent of the owner or occupier of that property,

In order to-

(i) Clean, repair, maintain, remove or demolish any government water work operated by any water management institution;

(ii) Undertake any work necessary for cleaning, clearing, stabilizing and repairing the water resource and protecting the resource quality;

(iii) Establish the suitability of any water resource or site for constructing a water work;

(iv) Undertake any work necessary to comply with an obligation imposed on any person under this Act, where that person has failed to fulfil that obligation;

(v) Erect any structure and to install and operate any equipment on a temporary basis for monitoring and gathering information on water resources; or

(vi) Bring heavy equipment on to a property or occupy a property for any length of time

(3) An authorized person may, at any reasonable time and without prior notice, on the authority of a warrant, enter a property with the necessary persons, vehicles, equipment and material, and perform any action necessary to-

(a) Investigate whether this Act, any condition attached to any authorized water use by or under this Act or any notice or directive is being contravened;

(b) Investigate whether any information supplied in connection with the use of water is accurate; or

(c) Carry out any of the activities referred to in subsection (2) where the consent of the owner or occupier of that property has been withheld.

(4) A warrant referred to in subsection (3) must be issued by a judge or a magistrate who has jurisdiction in the area where the property in question is situated, and must only be issued if it appears from information obtained on oath that-

(a) There are reasonable grounds for believing that this Act, any condition attached to any authorized water use by or under this Act or any notice or directive, is being contravened;

(b) There are reasonable grounds for believing that any information supplied in connection with the use of water is inaccurate; or

(c) It is necessary to carry out an activity mentioned in subsection (2) and access to that property has been denied.

(5) If a warrant is likely to be issued if applied for but the delay involved in obtaining a warrant is likely 0to defeat the object of an inspection in terms of subsection (3) (a) or (b), an authorized person may enter a property without a warrant.

(6) An authorized person entering property in terms of this section must, at the request of any person on that property, identify himself or herself and present a certificate of appointment contemplated in section 124 (2).

(7) Notwithstanding any provision of this section an authorized person may not, under any circumstances, enter a dwelling without the consent of the occupier or without a warrant authorizing entry.

3. Powers and Responsibilities of EMIs

The range of powers given to EMIs to fulfill their mandate include:

- Conducting routine inspections (entering premises to ascertain compliance, seizing evidence of non-compliance,
- Investigating (questioning witnesses, copying documents, removing articles or substances, taking photographs and video recordings, taking samples),
- Enforcing powers (search and seize establishing road blocks and arrest) and
- Administrative powers (issuing compliance notices and directives).

4. Offences Relating to EMIs

A person is guilty of an offence if that person:

- Hinders or interferes with an EMIs duties or;
- Pretends to be an EMI,
- Gives false or misleading information to an EMI and/or
- Fails to comply with a request from an EMI

ACT AND SECTION	OFFENCES	PENALTY
Section 151 of NWA	Use of water otherwise than as permitted under this Act;	Fine or imprisonment for a period not exceeding five years, or to both a fine and such imprisonment and, in the case of a second or subsequent conviction, to a fine or imprisonment for a period not exceeding ten years or both a fine and such imprisonment.
	Fail to provide access to any books, accounts, documents or assets when required to do so under the Act;	
	Fail to comply with any condition attached to a permitted water use under this Act;	
	Fail to comply with a directive issued under section 19, 20, 53 or 118;	
	Unlawful and intentionally or negligently tamper or interfere with any water work or any seal or measuring device attached to a water work;	
	Fail or refuse to give data or information, or give false or misleading data or information when required to give information under the Act;	
	Fail to register an existing lawful water use when required by a responsible authority to do so;	
	Intentionally refuse to perform a duty, or obstruct any other person in the exercise of any power or performance of any of that person's duties in terms of this Act;	
	Unlawfully and intentionally or negligently commit any act or omission which pollutes or is likely to pollute a water resource;	
	Fail to register a dam with a safety risk;	
	Fail to comply with a temporary restriction on the use of water in terms of item 6 of Schedule 3; or	
	Commit contempt of the Water Tribunal	

Information continues on page 18

7. Frequently asked questions

What are environmental crimes?

Examples:

- Taking water from a water resource without authorization
- Storing water without authorization
- Impeding or diverting the flow of water in a watercourse without authorization
- Engaging in a stream flow reduction activity contemplated in section 36 without authorization
- Engaging in a controlled activity identified as such in section 37(1) or declared under section 38(1) without authorization
- Discharging waste or water containing waste into a water resource through a pipe, canal, sewer, sea outfall or other conduit
- Disposing of waste in a manner which may detrimentally impact on a water resource
- Disposing in any manner of water which contains waste from, or which has been heated in, any industrial or power generation process
- Altering the bed, banks, course or characteristics of a watercourse
- Removing, discharging or disposing of water found underground if it is necessary for the efficient continuation of an activity or for the safety of people; and
- Using water for recreational purposes

Will my name be disclosed after reporting an environmental Crime?

The identity of every person who reports a crime is protected and will not be disclosed to any other party unless you give consent to have you name disclosed to any other party.

Where can I report environmental crimes?

- Inkomati-Usuthu Catchment Management Agency (IUCMA): 013 753 9000 or email: information@iucma.co.za
- Department of Water and Sanitation: 0800 200 200
- Nearest SAPS: 10111

What should I do when I witness an environmental crime?

Gather as much information about the crime and immediately report it as indicated above.

Such information may include:

- Nature of activity
- Photos, if possible
- Registration and make of the vehicle involved in the crime if any e.g. in case of illegal dumping of wastewater.

By Mr Andrew Mbhalati
from Compliance Monitoring and Enforcement

REPORT WATER POLLUTION *INCIDENTS*

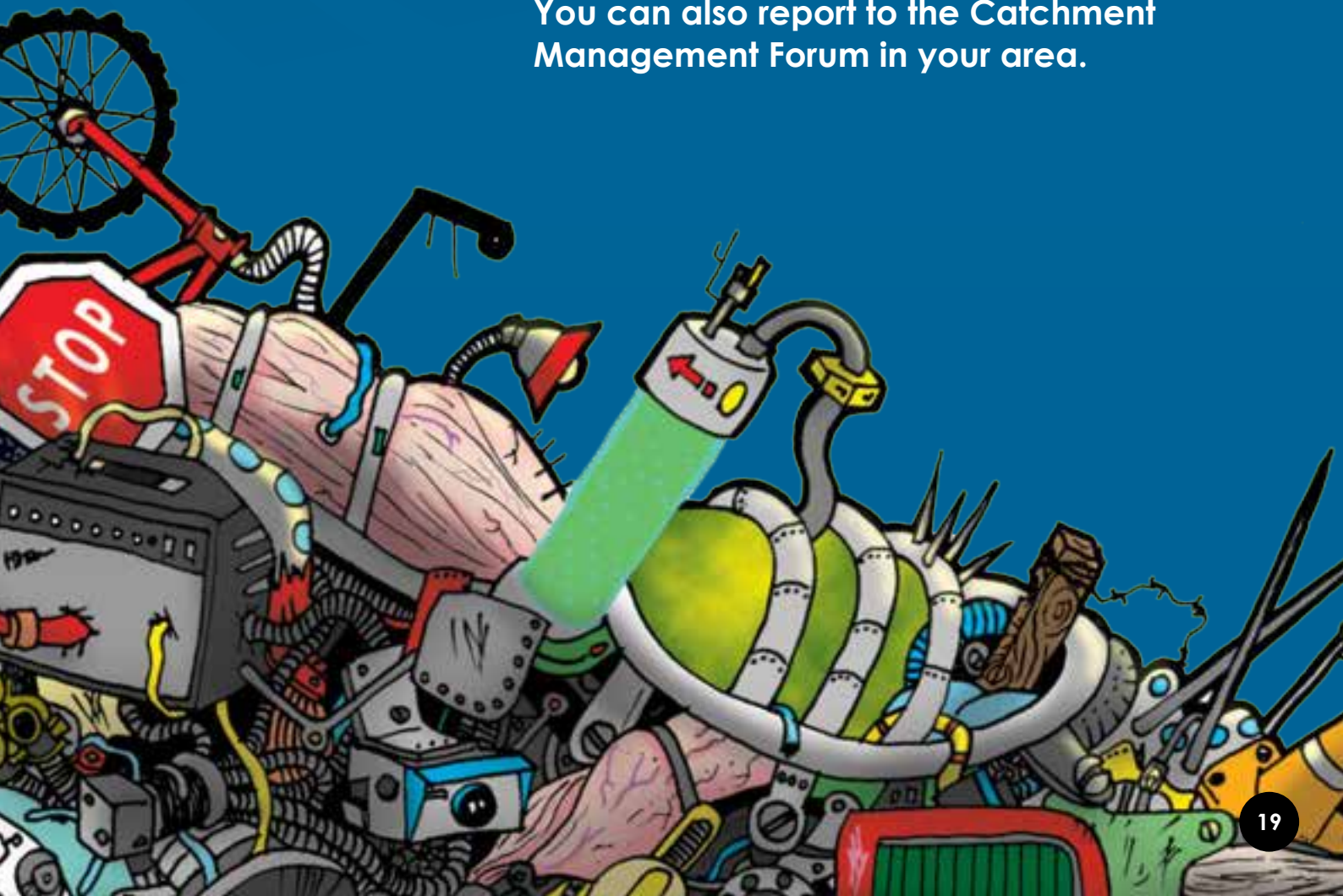
The IUCMA is aware that pollution incidents occur occasinally in the the catchment. Therefore, for any water pollution incidents like sewage leakages and others, please report at **water@iucma.co.za**

OR CALL US AT
013 753 9000

OR ALTERNATIVELY DROP US A MESSAGE ON THE "CONTACT US" BUTTON ON THE WEBSITE.

www@iucma.co.za

You can also report to the Catchment Management Forum in your area.






ECOSTATUS OF THE KOMATI RIVER CATCHMENT

Aquatic ecosystems all over the world are severely stressed by the ever-increasing demand for water, linked to growing industrial and agricultural developments as well as large-scale urbanization. This situation is exacerbated in South Africa by our dry climatic conditions, resulting in most of our rivers being small non-perennial rivers with erratic flow. Although aquatic ecosystems are frequently subjected to extreme events such as floods or droughts they can recover, which suggests that rivers can be used without causing permanent damage or change to their physical and chemical properties. However, a water resource is an aquatic ecosystem that comprises the physical aquatic habitat with its biota (both instream and riparian), linked to its physical, chemical and ecological processes. An understanding of its natural structure and function and its responses to development and exploitation are therefore essential to conserve it in a state where it can maintain its natural biodiversity. A recent analysis of the long-term trends in the water quality of rivers in the Olifants-Limpopo and Inkomati catchments, indicated a general decrease in "water quality at sites in mid to low catchments" (Griffin et al. 2014). Indeed, the quality of South Africa's water resources are deteriorating (CSIR 2010). Some of the main known challenges include the following (Dallas & Day 2004; Davies et al. 1993; Davies & Day 1998; Griffin et al., 2014): Over abstraction;

- habitat alteration (e.g. sedimentation, bank and bed scouring, flow regulation, and more);
- eutrophication;
- acid mine drainage;
- sewage effluents;
- anthropogenic salinization;
- toxic organic compounds, and
- invasive species (fauna and flora).

A world-wide trend since the 1980's has been the introduction of instream biomonitoring as part of water resources management. This type of monitoring commonly referred to as biomonitoring is increasingly being recognized as an important component in the overall assessment of water resources. The use of biological field assessments of fish and/or macro-invertebrate communities provides an integrated and sensitive

measurement of environmental problems and represents progress in the assessment of ecological impacts and in the management of aquatic ecosystems (Karr et al., 1986).

A national bio-monitoring program for South African Rivers, the River Health Program (RHP) was implemented and launched in September 1996 to monitor and thus improve and manage the health of South African freshwater ecosystems. The RHP has been established to provide water managers with relevant information to manage the resource. The RHP focuses on selected ecological indicators that are representative of the larger ecosystem and are practical to measure (http://www.dwa.gov.za/iwqs/rhp/rhp background.aspx). In 2016 the RHP programme was replaced with the River Ecostatus Monitoring Programme (REMP) as captured in the Department of Water and Sanitation Business plan also stipulated as a function of the Catchment Management Agencies (CMA's) (http://www.dwa.gov.za/iwqs/).

What is the objective of this study?

The objective of this study is to determine the current Ecostatus (2018) of the Komati River and some of its main tributaries based on the rapid assessment of aquatic macro-invertebrates using the South African Scoring System version 5 (SASS5) with the Macro-invertebrate Response Assessment Index (MIRAI) (Thirion, 2008), the Fish Response Assessment Index (FRAI) (Kleynhans, 2008), Riparian Vegetation Response Assessment Index (VEGRAI) (Kleynhans et al., 2007), Index for Habitat Integrity (Kleynhans et al., 2009), the Physico-chemical driver Assessment Index (PAI) model (DWAF 2008), and the integration of these indices to provide an integrated Ecostatus per sub-quaternary reach (SQR) (Kleynhans & Louw, 2008). This study will provide useful ecological information through an aquatic assessment. The determination of the Present Ecological State (PES) of the associated aquatic habitat of the Komati River and trends in aquatic health over time, as well as a comparison with previous surveys (2014) to inform on management interventions required to address systemic and point specific impacts. Monitoring is only a valid term to use if the results of this survey are measured against targets (Greenwood & Robinson, 2006.)

The Reserve and Classification studies for this system provide background information, ecological objectives and monitoring targets. The Chief Directorate: Resource Directed Measures (CD: RDM; now CD: Water Ecosystems) commissioned the Komati Catchment Reserve Determination study during 2003 which was undertaken by AfriDev consultants over a three-year period between April 2003 and March 2006 (AfriDev, 2006a; b). As the hydrology was outdated, Reserve results were updated during subsequent studies. The Inkomati Water Resource Classification Study (WRCS); also referred to as "Classification", followed the Reserve studies, and provided the Target Ecological Categories (TECs) and associated RQOs for monitoring purposes.

The results of this 2018 survey should therefore be compared to the gazetted Target Ecological Categories (TECs) and associated Resource Quality Objectives (RQOs) defined for water quantity and quality, and habitat and biota. TECs and RQOs are defined for each prioritised Resource Unit (RU) within every Integrated Unit of Analysis (IUA) (Government Gazette No 40531, 30 December 2016; DWA, 2014b).

Information continues on page 22 & 23

What is EcoStatus?

EcoStatus or Ecological Status refers to an integrated ecological category for rivers. In other words, the ecological category derived for each of the biological response components for a particular river is used to derive an overall, integrated ecological state or EcoStatus.

Inkomati River catchment description

The Inkomati River drains parts of Mpumalanga, Swaziland and Mozambique between the Limpopo River system in the north and the Pongola River system in the south (Figure 1). The Inkomati River basin is one of the most important river basins in South Africa and it consists of three adjacent sub-basins, the Komati, Crocodile and Sabie (Figure 1). The Inkomati River basin incorporates the Mpumalanga Province in South Africa, part of northern Swaziland and a part of southern Mozambique. The main river descents from the highland plateau in Mpumalanga and Swaziland and flows through the coastal plains of Mozambique towards the Indian Ocean. The river flows eastwards through the Lowveld region of Mpumalanga and Swaziland where it is heavily used for agricultural purposes before finally flowing into Mozambique where it discharges into the Indian Ocean just north of Maputo at Villa Laisa. The total basin area is about 46,800 km2 of which 63% is in South Africa, 5% in Swaziland and 32% in Mozambique. The average discharge of the Inkomati Water Course at the estuary is about 100 m3s-1 to 200 m3s-1, corresponding to about 3,600 million m3 per year, to which South Africa contributes 82%, Swaziland about 13% and Mozambique about 4% (Darwall et al., 2009; DWS, 2015).

There are several dams in the basin which can be classified as large and most of them are in South Africa. Dams with more than 2,060 million m³ combined storage capacity have been built in the Inkomati basin in South Africa and Swaziland, these dams are primarily used for irrigation. Two of these major dams are in the lower Inkomati basin, the Driekoppies Dam in South Africa and the Maguga Dam in Swaziland. These dams disrupt the natural flow regimes of the rivers and are managed by Komati Basin Water Authority (KOBWA) which is responsible for the Komati River Basin Development Plan (Roux, 2013). Both these dams have no provision for fish ways and are completely obstructing the upstream movement of fish. Other large dams in the Komati River include the Nooitgedacht and Vygeboom Dams. Water use is intense, with 50% of the water generated in the basin being abstracted. Water scarcity has been evident since the mid – 1980's, and has become more severe, as well as the effects of droughts and floods. The intensive use of water of the Inkomati system for irrigation has impacted on the health of the river system. Loss and degradation of habitats also threaten the health of the river system, particularly as a result of excessive sedimentation and eutrophication, flow modification and the introduction of alien invasive species. In addition, extensive coal mining in the headwaters is a further threat, with high risks of pollution from acid mine waters (Darwall et al. 2009).

The most unique topographical feature of the drainage area is the Drakensberg Escarpment that follows a winding course across the area, its general trend being from north to south. From the escarpment steep slopes trail down eastwards and merge with the granite hills of the typical Middleveld. The land west at the Great Escarpment is mountainous and deeply dissected. From west to east, the basin comprises the Precambrium granites and gneiss of the primitive systems, the Cretaceous (west of the Lebombo) and Karroo lavas of the Mesosoic period followed by Cretaceous basins east of the Lebombo (Darwall et al., 2009).

The fish fauna is dominated by Zambezian elements and is characterized by relatively high endemicity with many restricted range species. The Inkomati support an estimated 56 species of fish (16% of the regional total), 120 species of Odonata (73% of the national total) have been recorded to date, 202 of the selected aquatic plants (39% of the regional total), and 24 Molluscs (21% of the regional total) (Darwall et al., 2009).

Komati River

The Komati River catchment originates near Breyten (Vaalwaterspruit) on the Highveld before flowing into Nooitgedacht Dam near Carolina, onwards into Vygeboom Dam near Badplaas before entering Swaziland. In Swaziland it flows through the Maguga Dam and then back into South Africa again before finally flowing into Mozambique near Komatipoort with the confluence of the Crocodile River.

The Komati River catchment is ecologically severely stressed due to the water demands imposed on this catchment. In this catchment ESKOM and agriculture are the major water users. There are also various abstraction weirs that affect the aquatic ecosystem and are creating serious obstructions to fish migrations. Dams are also known to change the quality of the water when released back into the river system. Return flows from irrigation mobilizes a number of chemicals such as pesticides, fertilizers and salts that can affect the quality of water in this system. Point sources along the river discharge water of various qualities into the river system, not knowing what the effect may be on the ecosystem. Alien invasive fish species introduced into the numerous dams have entered the rivers and modify habitat or predate on indigenous species.

Although the ecological status of some sections in the Komati River is still in a relatively good condition, the lower Komati River is in a very poor condition. Rapid flow changes and reductions, poor water quality, excessive impoundments by weirs causing deficiency in available riffle areas and the absence of fish ways are the major perturbations contributing towards the poor state of the river.

By (from left to right) Mr Marcus Selepe from IUCMA's Resource Protection and Waste and Mr Francois Roux from Mpumalanga Tourism and Parks Agency

Download detailed report available on the IUCMA website: www.iucma.co.za

WATER RESOURCE AVAILABILTY STATUS IN THE INKOMATI-USUTHU WATER MANAGEMENT AREA

This is an overview of the drought and rainfall status for 21 February 2019 issued by the Inkomati-Usuthu Catchment Management Agency (IUCMA), an entity responsible for managing water resources in the Inkomati-Usuthu water management area (WMA)

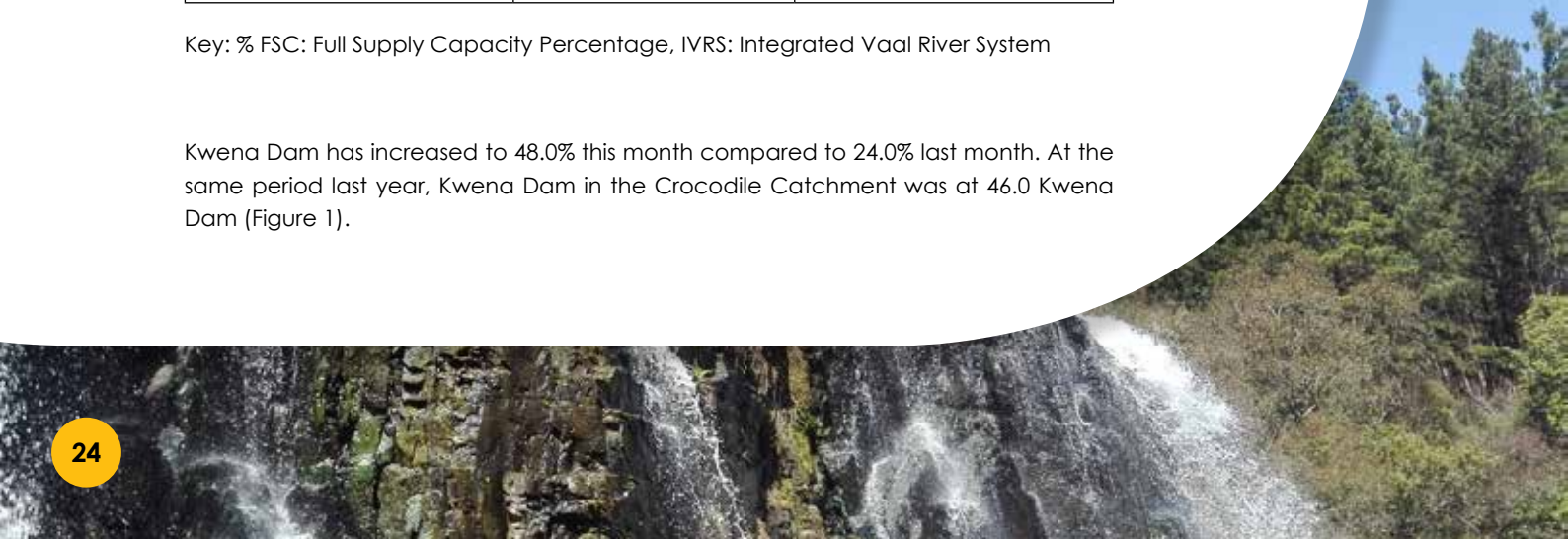
Dam levels in the Inkomati Usuthu WMA are on a steady increase due to light showers experienced in some parts of the WMA in the previous few weeks (Table 1).

Table 1: Dam levels in the Inkomati Usuthu WMA 21 February 2020

Dam Name	21 Feb 2020 % FSC	Areas Supplied
Da Gama Dam	56.8%	Keipersol
Driekoppies Dam	67.0%	Nkomazi South
Inyaka Dam	54.1%	Bushbuckridge
Klipkopjes Dam	18.5%	White River
Kwena Dam	49.0%	Nelspruit, Kanyamazane, Malelane
Longmere Dam	69.7%	White River
Nooitgedacht Dam	99.4%	Upper Komati
Primkop Dam	75.2%	Karino Area
Vygeboom Dam	100.9%	Upper Komati
Witklip Dam	78.4%	White river
Lomati Dam	16.2%	Barberton / Umjindi
Maguga Dam	77.2%	Nkomazi South
Heyshope Dam	82.1%	IVRS and Piet Retief area
Jericho	78.1%	IVRS

Key: % FSC: Full Supply Capacity Percentage, IVRS: Integrated Vaal River System

Kwena Dam has increased to 48.0% this month compared to 24.0% last month. At the same period last year, Kwena Dam in the Crocodile Catchment was at 46.0 Kwena Dam (Figure 1).



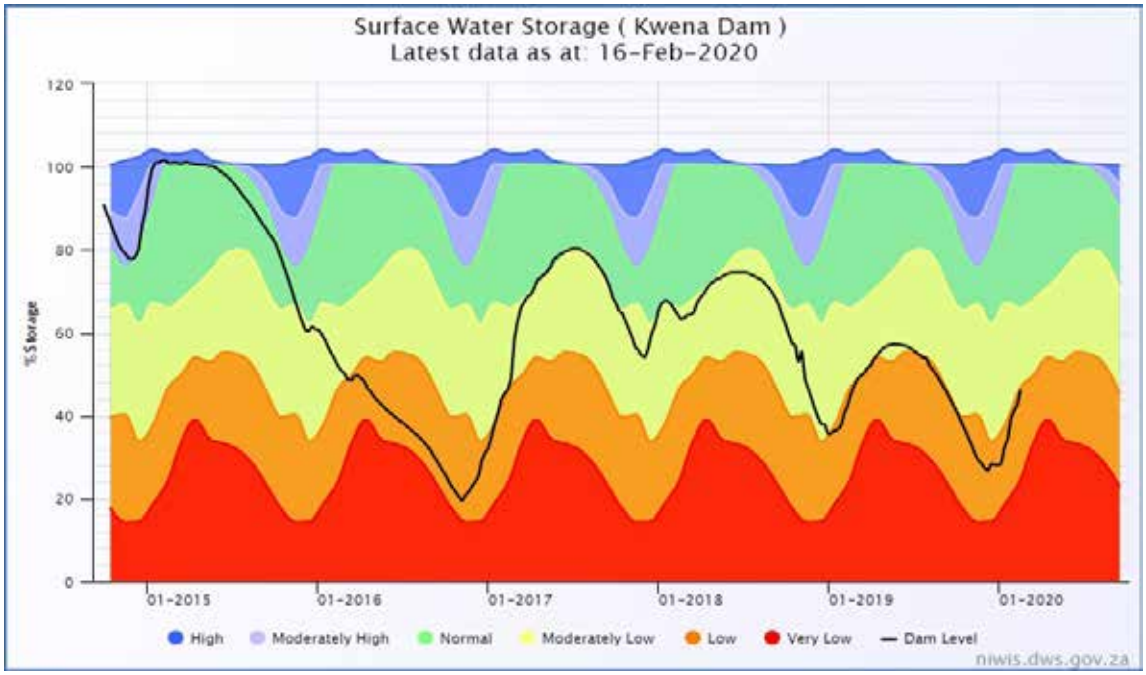


Figure 1: Kwena Dam Volume

Domestic and Irrigation water use restrictions are still in place in the Crocodile, Sabie Sand, White River, and Lomati catchments as per systems operating rules. In the Crocodile catchment restrictions are 20% and 60% restriction on domestic and irrigation use respectively, Sabie Sand catchment restrictions are 10% and 40% restriction on domestic and irrigation use respectively, Lomati catchment restriction has increased from 30.0% to 50.0% for domestic use, the White River catchment restriction is 65.0% on irrigation use, and in the Lower Komati catchment the restriction is 35.0% on irrigation use on the areas supplied by Maguga and Driekoppies Dam.

All efforts to improve the situation must be implemented by affected and responsible parties, and the restrictions are to remain in place until further notice.

Irrigation Boards and Municipalities are still encouraged to ensure that these restrictions are adhered to by water users, whilst the IUCMA continues to monitor usage and ensuring compliance and enforcement where necessary.

Projected Weather

According to the latest South African Water Services (SAWS) Seasonal Climate Watch report for February 2020 to June 2020; indicates that the El Niño-Southern Oscillation (ENSO) is currently in a borderline weak El Niño state and the forecast indicates that it will most likely remain at the border between the weak El Niño and neutral states for the rest of the summer season and early autumn

The rainfall forecast for early-autumn (Feb-Mar-Apr) and mid-autumn (Mar-Apr-May) from the SAWS/NOAA-GFDL Multi-Model system indicates enhanced probabilities of below-normal rainfall over most of the country with the exception of the eastern parts during mid-autumn which favours above-normal rainfall conditions.

This report clearly shows that even though it rains, the falling rain is not enough to make significant changes in the water resources as can be seen through the slight increases in water levels in our water resources and dams.

The IUCMA appreciates the water user's efforts to continue saving water and adherence to the restrictions. And to further stress that while there has been some slight rainfall received across the Inkomati Usuthu WMA, there is a high probability that more severe restriction will be imposed in September 2020.

Issued by the Inkomati-Usuthu CMA-Contact: IUCMA: River Systems Planning and Operations Manager, Dr Tendai Sawunyama on 013 753 9000 or sawunyamat@iucma.co.za

For latest river flow and dam levels visit:

http://riverops.inkomaticma.co.za
www.dws.gov.za/hydrology
http://niwis.dws.gov.za/niwis2/

By (from left to right) Dr Tendai Sawunyama and Mr Sipho Magagula from River Systems Operations and Planning

WONDERFUL WETLANDS

There is clear water up to your ankles and a dragonfly zips past your head as you watchsome ducks fly off the water - welcome to the soggy world of the wetland.

WHAT ARE WETLANDS ?

Wetlands are difficult to define because of their great variation in size and location. The most important features of wetlands are: Waterlogged soils or soils covered with a shallow layer of water (permanently or seasonally), unique types of soil, and distinctive plants adapted to water-saturated soils. Marshes, bogs, swamps, vleis and sponges are examples of wetlands.

WHY ARE WETLANDS IMPORTANT ?

FLOOD BUSTERS:

Wetlands associated with streams and rivers slow floodwaters by acting as giant, shallow bowls. Water flowing into these bowls loses speed and spreads out. Plants in the wetland play an important role in holding back the water. The wetland acts as a sponge as much of the flood water is then stored in the wetland and is slowly released to downstream areas, instead of it all rushing to the sea within a few days. This greatly reduces flood damage, particularly erosion, and ensures a more steady supply of water throughout the year.

FILTERS:

Wetlands improve water quality as they are very good natural filters, trapping sediments, nutrients (e.g. nitrogen and phosphorus), and even pathogenic (disease-causing) bacteria. In addition, pollutants such as heavy metals (e.g. mercury, lead) and pesticides, may be trapped by chemical and biological processes. In other words, the water leaving the wetland is cleaner than the water entering it.

WETLANDS AND WILDLIFE:

Wetlands are filters where sediments and nutrients accumulate, so many plants grow there, e.g. bulrushes, grasses, reeds, waterlilies, sedges and trees. The plants, in turn, provide food and a place for attachment and shelter for many creatures. There is more life, hectare for hectare, in a healthy wetland than in almost any other habitat. These productive places support huge numbers of insects, fish, birds and other animals. Some animals are completely dependant on wetlands, whilst others use wetlands for only part of their lives. The wattled crane, for example, is dependant on wetlands for breeding. The rich diversity of waterbirds in southern Africa (totalling 130 species) is possible because of the many wetlands spread across the subcontinent. The wetlands of Southern Africa are of international importance as they are the southern destination for many migratory wading birds.

PEOPLE AND WETLANDS:

Wetlands have been used for centuries as grazing for domestic stock, and as a source of reeds used for thatching, hutconstruction and basket weaving. They are provide fishing, hunting and the opportunity to observe wildlife, especially birds. Wetlands are appreciated for their beauty as open spaces and also for their educational value.

FRESH WATER FACTS

- 97.25% of all water is found in oceans.
- 2.05% of the earth's water is locked up in the polar ice caps and glaciers.
- Only 0.7% of water is found in a freshwater form in lakes, rivers, and groundwater.
- As the Earth's population grows and the demand for fresh water increases, water purification and recycling become increasingly important.
- Nature - one of the most respected scientific journals in the world - reported recently that worldwide, wetlands are worth someover R30 trillion a year!
- There are only 12 countries in the world that supply tap water that is fit to drink, and South Africa is one of them. Our tap water quality is third best overall in the world.

RIVER SAND MINING:

WHAT YOU NEED TO KNOW

1. Background

The Inkomati-Usuthu Catchment Management Agency (IUCMA) is facing serious challenges in the water management area about illegal river sand mining which has negative impact on the water resource

2. What is Sand Mining?

Sand mining is the extraction of sand through a river bed or instream for use in the construction industry. Mining is of great importance to the South African economy. It should however be recognised that the processes of prospecting, extracting, concentrating, refining, and transporting minerals have great potential for disrupting the natural environment (Rabie et al., 1994). The environmental effects caused by the mining of sand from a river, is no exception, often causing adverse impacts to biota and their habitats.

Sand-mining operations have been classified into four types (Hill and Kleymhans 1999: McDivitt et.al.,1990)

- **Dry-pit mining:** mining of pits on dry ephemeral streambed and exposed sand bars with conventional shovel, trucks, bulldozers, scrappers or loaders. Dry pits are located above water table.

- **Wet-pit mining:** involves the use of dragline or hydraulic excavators to remove sand or gravel from below the water table or in a perennial stream channel. In wet pits dewatering or partial dewatering is frequently undertaken to allow the site to be more easily excavated.

- **Bar skimming:** this requires scraping off the top layer from gravel bar without excavating below the summer water level.

- **Mining of pits on adjacent floodplains or river terraces:** this refers to the mining of a pit that has been isolated from main river channel. Sudden changes in channel course during a flood, or in the gradual migration of the channel may breach small levees and the channel will shift into the sand or gravel pits.

3. Impacts of Sand Mining on the Water Resource

Some of the negative impacts of sand mining includes the following:

- **Operation of heavy equipment in the channel bed**

This can cause hydrocarbon pollution which can spread downstream and into ground water afterwards.

- **Altering the channel hydraulics**

Stockpiles and overburden left in the river or floodplain can alter channel hydraulics during high flows. River sand mining can also affect ground water system and the uses that local make of the river, such as livestock falling and being trapped to death on the pools. It can also increase turbidity of water, thereby making domestic water use impossible. The deep pools maty slow flows preventing downstream users to access the resource.

- **Impacts on Recreational Use**

Changes to the river channel, riparian habitat or floodplains can affect hiking, canoeing, boating, fishing, places of religion, cultural places, housing by fragmentation of the river continuum. It also affects migratory species.

4. Legal Requirement for Sand Mining in terms of the National Water Act, 36 of 1998 (NWA)

- In terms of (S 21) of the NWA, in-stream mining of sand is a water use activity and requires authorisation/license in terms of section 22 of the NWA.

- Section 21(c) of the NWA: impeding or diverting the flow of water in a watercourse;

- Section 21(1) of the NWA: altering the bed, banks, course or characteristics of a watercourse;

- In terms of Government Notice No. 704 of 1999 and Regulation 10 (1), 10 (2) makes provision for additional regulation related to winning sand and alluvial minerals from a watercourse as follows:

- No person may extract sand, alluvial minerals or other materials from the channel of a watercourse or estuary, unless reasonable precautions are taken too

- Ensure that the stability of the watercourse or estuary is not affected by such operations;

- Prevent scouring and erosion of the watercourse or estuary which may result from such operations or work incidental thereto;

- Prevent damage to in-stream or riparian habitat through erosion, sedimentation, alteration of vegetation or structure of the watercourse or estuary, or alteration of the flow characteristics of the watercourse or estuary; or

- Every person winning sand, alluvial minerals or other materials from the bed of a watercourse or estuary must

- Construct treatment facilities to treat the water to the standard prescribed in Government Notice No. R.991 dated 26 May 1984 as amended or by any subsequent regulation under the Act before returning the water to the watercourse or estuary;

- limit stockpiles or sand dumps established on the bank of any watercourse or estuary to that realised in two days of production, and all other production must be stockpiled or dumped outside of the 1:50 year flood-line or more than a horizontal distance of 100 metres from any watercourse or estuary; and

- Implement control measures that will prevent the pollution of any water resource by oil, grease, fuel or chemicals

- **The Department of Water and Sanitation (DWS) has developed a Sand Mine Guideline for South Africa for water use authorisation of Sand Mining/ Gravel Extraction, and Best Practice Guideline for Water Resource Protection in South African Mining Industry A1, Small Scale Mining (Standard Format). These guidelines are available at DWS and Inkomati-Usuthu Catchment Management Agency (IUCMA) both hard copy and soft copy.**

- **Alleged illegal sand mining can be reported to the IUCMA at**

013 753 9000 or water@iucma.co.za

Issued by the Inkomati-Usuthu CMA-Contact:
IUCMA: Control Environmental Officer,
Ms Busisiwe Mahlangu on 013 753 9000 or
mahlangub@iucma.co.za.

For latest river flow and dam levels visit:
http://riverops.inkomaticma.co.za /
http://iucma.co.za

By Ms Busisiwe Mahlangu
from Compliance Monitoring
and Enforcement

LEARNER'S CORNER

KNOW MORE ABOUT GROUNDWATER

What is groundwater and why is it important?

The excess soil moisture that saturates subsurface soil or rock and migrates downward under the influence of gravity. In the literal sense, all water below the ground surface is groundwater: In hydrogeologic terms, however, the top of this saturated zone is called the water table, and the water below the water table is called groundwater. (source: Encyclopedic Dictionary of Hydrogeology; 2009).

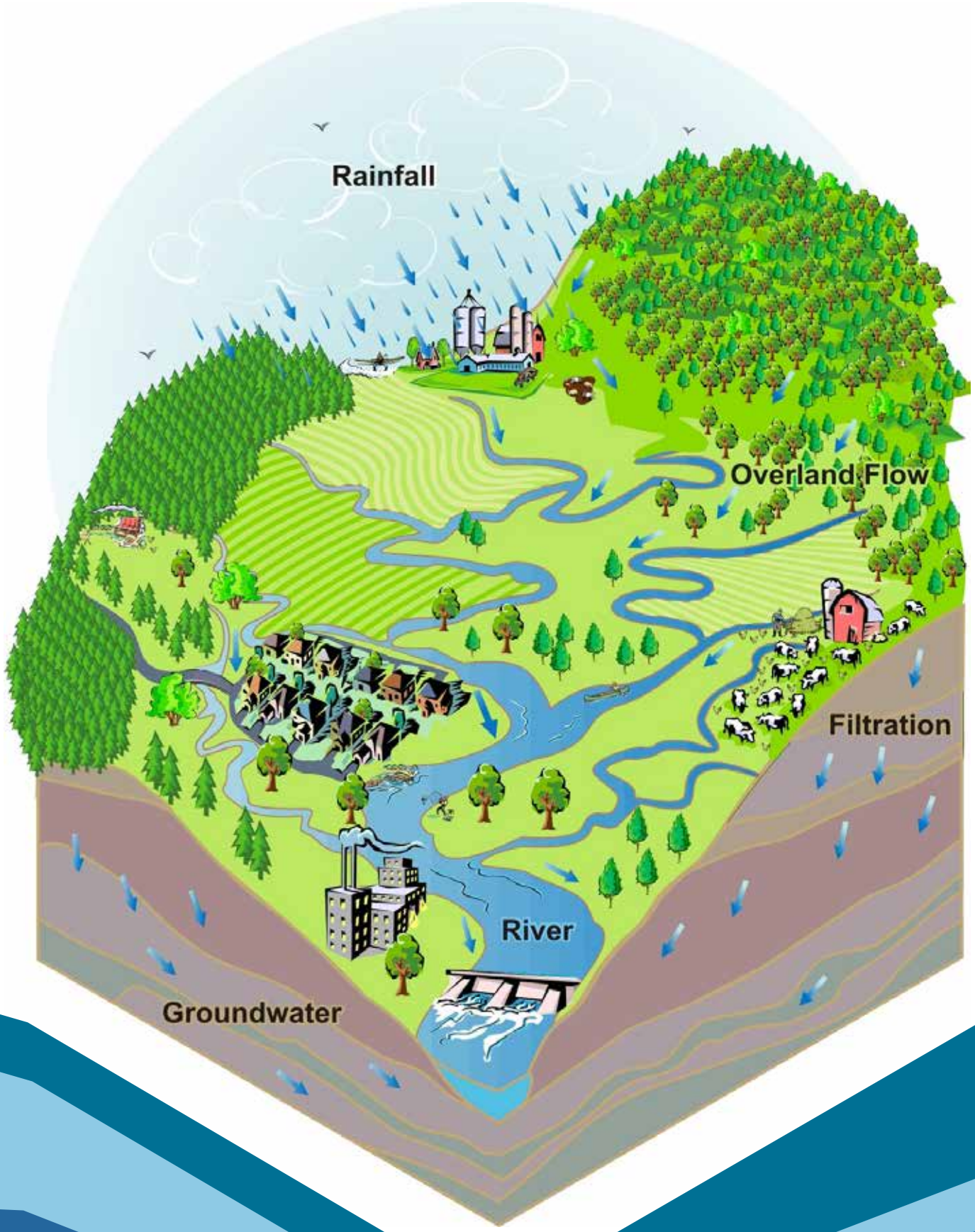
Groundwater has many benefits to human beings. It is usually cheap to develop because it's generally of a good quality and widespread occurrence. Being stored underground where evaporation is minimized, it is a more reliable source than surface water in times of drought.

Where does groundwater come from?

Groundwater is an important part of the water cycle. It comes from rain, snow, sleet and hail that soak into the ground. The water moves down into the ground because of gravity, passing between particles of soil, sand, gravel, or rock, until it reaches a depth where the ground is filled, or saturated, with water. The area that is filled with water is called the saturation zone and the top of this zone is called the water table. The water table may be very near the ground's surface or it may be hundreds of meters below.

Although groundwater exists everywhere underground, some parts of the saturated zone contain more water than others. An aquifer is an underground formation of permeable rock or loose material which can produce useful quantities of water when tapped by a well. These aquifers may be small, only a few hectares in area, or very large, underlying thousands of square kilometers of the earth's surface.

Even if groundwater is not used by people, it may still play an important role in the local environment and sustain rural livelihoods that way. Plants may tap into it with their roots and animals may drink it when it comes to the surface as springs.



Information continues on page 32 & 33

Groundwater in South Africa

Groundwater, despite its relatively small contribution to the total water supply in South Africa (~13%), represents an important strategic water resource. Owing to the lack of perennial streams in the semi-desert to desert parts, two-thirds of South Africa's surface area is largely dependant on groundwater. In these water-scares areas, groundwater is more valuable than gold. Although irrigation is the largest user of groundwater, groundwater provides the water supply to more than 300 towns and smaller settlements.

In over about 90% of the surface of South Africa, groundwater occurs in hard rock that is rocks with no pore spaces. Here it is contained in faults, fractures and joints and in dolomite and limestone, in dissolved openings called fissures.

Hard rock aquifers are known as secondary aquifers because the groundwater occurs in openings which were formed after the rock was formed. Over the remainder of the country groundwater occurs in primary aquifers. These comprise porous sediments and soils where groundwater is contained in the spaces between sand grains. Primary aquifers are found in river (alluvial) sediments, in coastal sand deposits, and the Kalahari deposits.

Groundwater Quality

One of the most important natural changes in groundwater chemistry occurs in the soil. Soils contain high concentrations of carbon dioxide which dissolves in the groundwater, creating a weak acid capable of dissolving many silicate minerals. In its passage from recharge to discharge area, groundwater may dissolve substances it encounters or it may deposit some of its constituents along the way. The eventual quality of the groundwater depends on temperature and pressure conditions, on the kinds of rock and soil formations through which the groundwater flows, and possibly on the residence time.

As a result the groundwater chemistry from various places in South Africa will differ depending on the aquifer in which it is found and may make the water unsuitable for certain uses. For example, water from the Malmesbury shales is unsuitable for most uses due to high total dissolved salts. Groundwater in granites (eg. in Limpopo) naturally contains fluoride in high concentrations.

It is essential to have the quality of the water from a borehole intended for domestic use tested before consumption. Even natural groundwater may contain substances which can make it unfit for consumption.

Groundwater Pollution

Just because water is underground does not mean that it cannot be polluted. Groundwater can be contaminated in many ways. Groundwater associated with coal deposits often contains dissolved minerals poisonous to plants and animals. Pollutants dumped in the ground, in landfills and at sites of animal husbandry or pollutants introduced below ground such as in unlined latrines and burial sites, may leak into the soil and work their way down into aquifers.

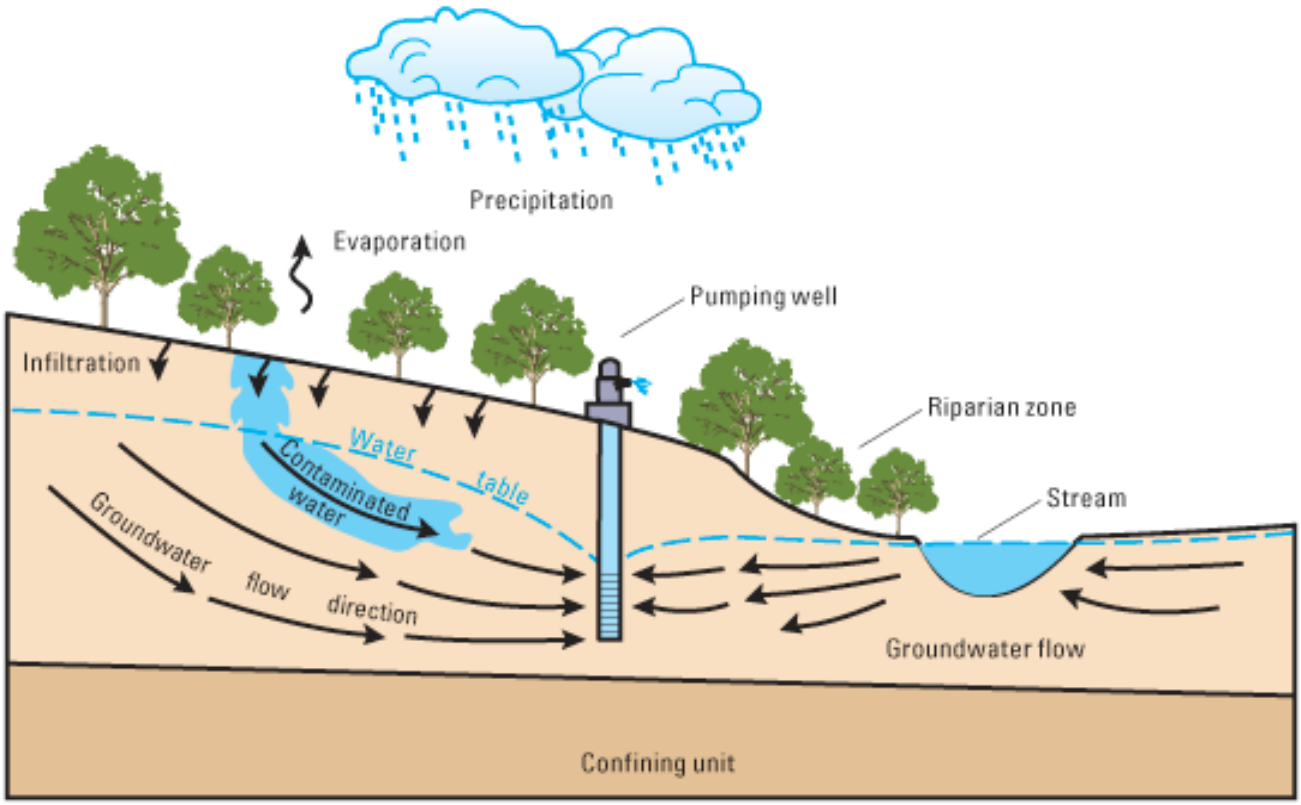
Pollutants include substances that occur as liquids like petroleum products, dissolved in water like nitrates or are small enough to pass through the pores in soil like bacteria. Movement of water within the aquifer is then likely to spread these pollutants over a wide area, making the groundwater unusable and spreading disease.

The Danger of Over Abstraction

While groundwater is an abundant resource, it does not mean we should waste it. The maximum quantity of groundwater that can be developed economically in South Africa is estimated at about 6 billion/m³ a year. Some groundwater resources take a long time to replenish. If too much groundwater is extracted too fast, it may become depleted. In coastal areas, fresh water, being less dense, floats on salt water. Over extraction of fresh water may allow salt water to replace it. Therefore, it is important to decide how much water can be extracted from an aquifer before it is developed.

Can we run out of groundwater?

Groundwater supplies are recharged naturally by rain and snow melt. That means we are only able to abstract as much water as that being recharged, otherwise the groundwater supply will run into a "deficit". It is therefore possible that we can run out of groundwater, at least until the supply has been recharged again. This recharge process can take months, years or even hundreds of years. It is important to know how much water is available for abstraction from a specific aquifer BEFORE we start to utilise it.



CAREER GUIDANCE

FOR LEARNERS IN WATER RESOURCE MANAGEMENT

The Inkomati-Usuthu Catchment Management Agency (IUCMA) is an agency that has been established in terms of the relevant section of the National Water Act, Act 36 of 1998. The IUCMA has been established by the National Department of Water Affairs (DWA) in terms of the Act, to specifically implement certain sections of the Act. The mentioned sections of the Act address the management, protection, development and prevention of pollution of the national water resources.

The IUCMA is the first agency to be established by the DWA in the Mpumalanga area. The IUCMA has the responsibility to protect and manage the Crocodile River, Sabie, Inkomati Rivers and their tributaries within the Inkomati Water Management Area.

Career options and study opportunities in the form of financial assistance are offered by IUCMA. Since the IUCMA is a science focused institution, subject choices during high school should include science, geographical sciences, biological sciences and mathematics.

The breakdown of career choices offered by the IUCMA is indicated below:

1. Water Resource Specialist/Manager

Academic qualifications:

1.1. Bachelor of Science degree in (Aquaculture; Biology; Chemistry; Chemical Engineering; Biochemistry; Microbiology, Limnology; Zoology; Botany; Civil Engineering)

1.2. Bachelor of Science in Environmental Sciences (Geography; Geographical Information System; Geology)

1.3. Bachelor of Technology Water Care

1.4. Bachelor of Technology Analytical Chemistry

2. Hydrologist

Academic qualification:

2.1. Bachelor of Science (Hydrology; Hydrological Modelling; Water Quality Modelling)

3. Aquatic scientist

Academic qualification:

3.1. Bachelor of Science (River Health; Aquaculture; Bio-monitoring; Water and Waste Water; Water Quality Management; Zoology; botany; Limnology)




4. Water Resources Planners

Academic qualification:

4.1. Bachelor of Science/Engineering (Water Engineering; Chemical; Waste Water Treatment; Water Resources Modelling)

5. Water Resources Compliance Monitoring and Enforcement

Academic qualifications:

5.1. Bachelor of Science degree in (Biology; Chemistry; Chemical Engineering; Biochemistry; Microbiology, Environmental Law; Hydrology; Geohydrology; Civil Engineering

5.2. Bachelor of Science in Environmental Sciences in (Geography; Environmental Law, Geographical Information System)

5.3. Law degree (Environmental Law)

6. Geohydrologist

Academic qualifications:

6.1. Bachelor of Science (Hydro-geology; Hydrology)

6.2. Bachelor of Technology (Geo-hydrology; Hydrology; Water Resources Modelling; Water Quality Management)

7. Stakeholder Management

Academic Qualifications:

7.1. Bachelor of Arts (Developmental Studies; Public Administration; Public Management; Social Studies)

7.2. Bachelor of Technology (Developmental Studies; Public Administration; Public Management)

LIST OF SOUTH AFRICAN UNIVERSITIES

EASTERN CAPE

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Tel: 041 504 1111
Website: www.mandela.ac.za
Email: info@mandela.ac.za

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Email: postmaster@wsu.ac.za

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Tel: 040 653 2312
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Email: admissions@ufh.ac.za

NORTHERN CAPE

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Tel: 018 299 1111/2222
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Email: information@spu.ac.za

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LIMPOPO

University of Venda
Creating Future Leaders

Tel: 015 962 8000
Website: www.univen.ac.za
Email: info@univen.ac.za

Tel: 015 268 9111
Website: www.ul.ac.za
Email: enrolment@ul.ac.za

FREE STATE

Central University of Technology, Free State

Tel: 051 507 3911
Website: www.cut.ac.za
Email: tomttomple@cut.ac.za

UFS·UV
UNIVERSITY OF THE FREE STATE
UNIVERSITEIT VAN DIE VRYSTAAT

Tel: 051 401 2114
Website: www.ufs.ac.za
Email: Studentadmin@ufs.ac.za

KWAZULU NATAL

DUT
DURBAN UNIVERSITY OF TECHNOLOGY

Tel: 031 373 2411
Website: www.dut.ac.za
Email: info@dut.ac.za

UNIVERSITY OF KWAZULU-NATAL

Tel: 031 260 2227
Website: www.unizulu.ac.za
Email: enquiries@ukzn.ac.za

UNIVERSITY OF ZULULAND

Tel: 035 902 6000
Website: www.ukzn.ac.za
Email: info@unizulu.ac.za

MUT
MANGOSUTHU UNIVERSITY OF TECHNOLOGY

Tel: 031 907 7111
Website: www.mut.ac.za
Email: info@mut.ac.za

NORTH WEST

NWU

Tel: 018 299 1111/2222
Website: www.nwu.ac.za
Email: applicationsug@nwu.ac.za

MPUMALANGA

UNIVERSITY OF MPUMALANGA

Tel: 018 299 1111/2222
Website: www.nwu.ac.za
Email: info@ump.ac.za

GAUTENG

University of the Witwatersrand, Johannesburg

Tel: 011 717 1102
Website: www.wits.ac.za
Email: studentaffairs@wits.ac.za

UNISA

Tel: 012 429 3111
Website: www.unisa.ac.za
Email: study-info@unisa.ac.za

Tshwane University of Technology
We empower people

Tel: 021 382 5911
Website: www.tut.ac.za
Email: info@ump.ac.za

Universiteit van Pretoria
University of Pretoria
Yunibesithi ya Pretoria

Tel: 012 420 4111
Website: www.up.ac.za
Email: ssc@up.ac.za

VUT
Your world to a better future

Tel: 016 950 9214/5
Website: www.vut.ac.za
Email: reception@vut.ac.za

University of Johannesburg

Tel: 011 489 3000
Website: www.uj.ac.za
Email: mylife@uj.ac.za

WESTERN CAPE

University of the Western Cape

Tel: 021 959 3900
Website: www.uwc.ac.za
Email: admissions@uwc.ac.za

University of Cape Town
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Universiteit van Kaapstad

Tel: 021 650 9111
Website: www.uct.ac.za
Email: admissions@uct.ac.za

Universiteit Stellenbosch University

Tel: 021 808 9111
Website: www.sun.ac.za
Email: info@sun.ac.za

Cape Peninsula University of Technology

Tel: 021 959 3900
Website: www.cput.ac.za
Email: info@cput.ac.za

RIVER OPERATIONS WEB PORTAL

The Inkomati-Usuthu Catchment Management Agency is committed to bring you all the information you need to enable you to use water wisely and considerably. The IUCMA has established a web portal for River Operations that brings you the daily flows of the water in the Catchment. To gain access to this information, please log on to

http://riverops.inkomaticma.co.za/

The link to the River Operations portal is also available on the website at www.iucma.co.za to access it go to the **home page of the IUCMA website. click Hydrology water quality status then click the river operations web portal link**

STEP 1

STEP 2

References

EcoStatus definition

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Water irrigation

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