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SOUTHERN AFRICAN POLITICAL PARTIES AND DIALOGUE PROGRAMME.

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Southern African Political Parties and Dialogue (SAPP&D) Programme

Participants Hand Book
For
Political Actors

on

Training curricula on energy and water for political parties and CSOs for the Southern Africa Political Parties and Dialogues (SAPP&D) Programme

December 2021

Disclaimer

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Quick guide to the handbook:

Introduction

***Note to the participants**: It is important to note that the concepts in this module have been explained in simple terms because these modules were prepared for capacity building of the Political Actors, who may not be experts in energy and water resources management.*

*This document is meant for Political Actors to aid them in influencing and advocating for formulation of policies that relate to access to renewable clean energy and sustainable clean water. This document is referred to as a **Participants handbooks/Guides**. This guide should be given to the Political Actors.*

As part of the documents that constitute the curriculum on energy and water for political parties and CSOs for the Southern Africa Political Parties and Dialogues (SAPP&D) Programme, this participants handbook is accompanied by a set of Modules that has Facilitators notes to guide the Trainers (DWF Expert Facilitators)on how to portray the content. The content in this Participants Handbook is mainly made up of the Key points that are listed in the set of modules. Additionally, the Participants Handbook outlines how the Political Actors can influence existing policies, how they can formulate new policies and how they can setup natural resources/water and energy committees in their political parties.

The Specific Objective of this is to:

A. Provide political actors and civil society actors with a broad understanding of sustainable clean energy and water resources management;
B. Provide political actors and civil society actors with a broad understanding of their roles in influencing policies on energy and water
C. Equip political actors with knowledge on how they can develop and implement citizen-responsive policies, using energy and water policies as case studies
D. Equip civil society actors with tools on policy advocacy and influence in the energy and water sectors (targeting Eswatini CSOs)
E. Provide a Southern Africa regional perspective on the challenges in the management of energy and water resources and tools which can assist political actors and civil society to respond to these challenges in their specific countries

MODULE 1

1. WATER AS A NATURAL RESOURCE AND ACCESS TO CLEAN WATER

Learning Outcomes

- Understand the basic science behind water as a natural resource
- Develop an awareness of the resources in your community and the basic understanding of their interdependence/connectedness
- Understand the existing global and regional goals towards access to water resources
- Develop an awareness of challenges in management of water at the national and Southern African Region

1.1 Introduction to water as a natural resource

1.1.1 Facts and figures on water

- Water is a finite resource.
- 71% of the earth surface is covered by water
- Despite the fact that 71% of the earth surface area is covered by water, there is a dire water stress globally, with about 663 million people having no access to clean water.
- 96% of global water is found in oceans, it is salty.
- Freshwater that is not salty and that can be used for domestic purposes only constitutes 2.5% of all water on earth. Freshwater is water that is found in our lakes, rivers, underground water, etc. Figure 1 shows the distribution of earth water. It shows that freshwater constitutes only 2.5% of global waters.
- Figure 2 also shows a comparison between earth, water and freshwater in terms of volume.
- A large proportion of this 2.5% is found in glaciers and ice caps.
- The remining portion that is available for human use is affected by mismanagement, including pollution.

Clean water that is suitable for human use is very scarce. It is, therefore, important to improve its management and protection measures

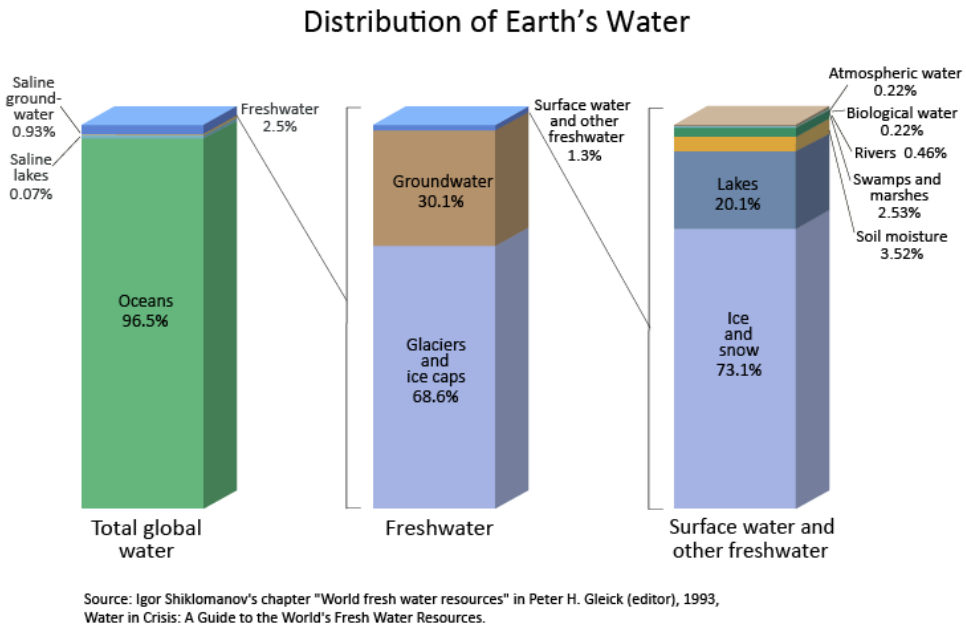


Figure 1: The amount of water distributed on earth

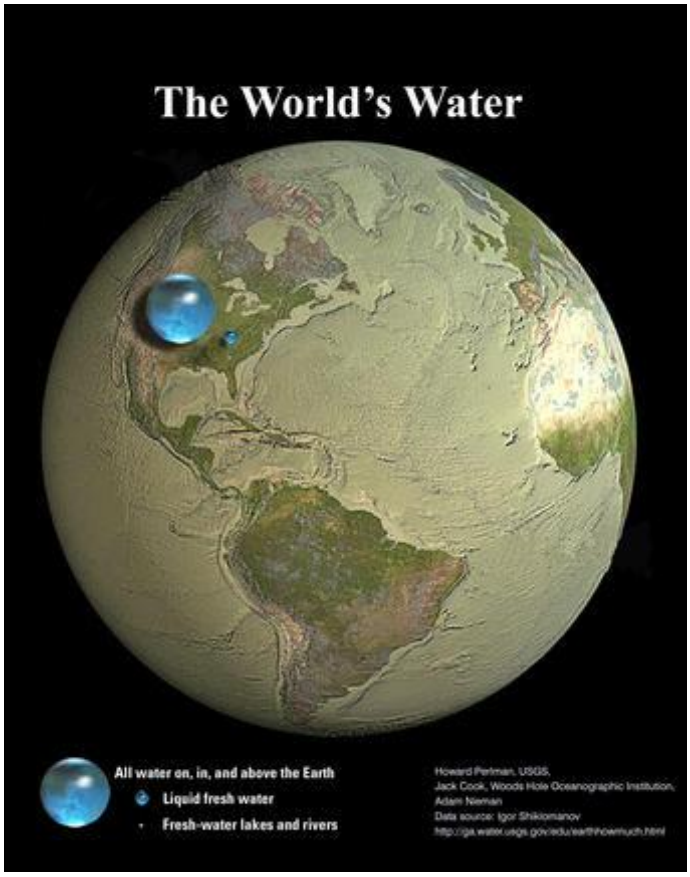


Figure 2: The proportion of the volume of fresh water in lakes and rivers.

1.1.2 Water cycle

Key points: Water cycle

Water is flowing in an endless circulation called a **water cycle** (also called a Hydrological cycle).

We all share water through this cycle globally because the water cycle allows water to flow in rivers, to ocean and back as rainfall that can happen anywhere.

Note that underground water is connected to surface water.

Over use of one affects the other, and pollution of water, affects the other

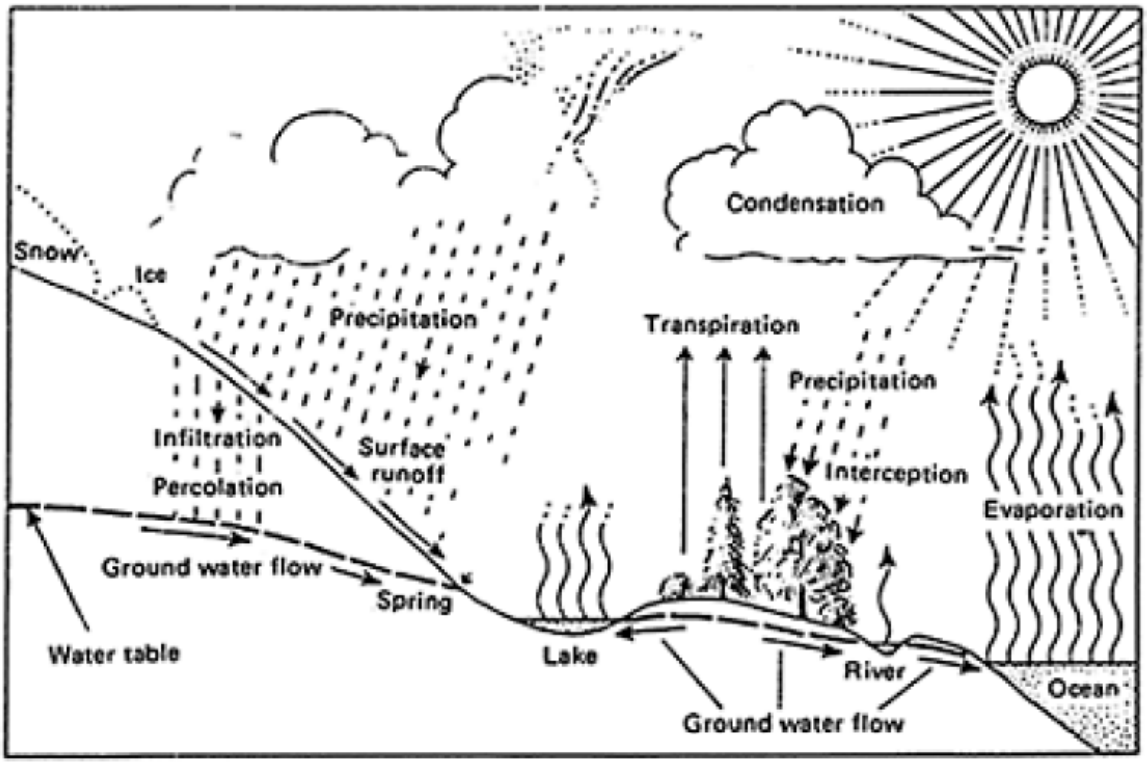
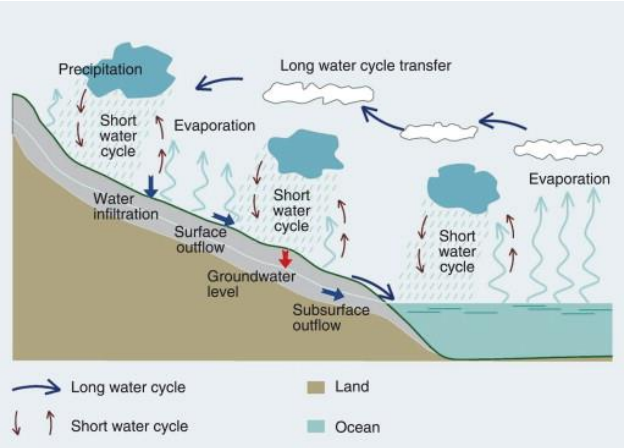


Figure *3*: A simplified water Cycle (Shaw, 1994)



Key points: Water cycle

Water does not only circulate in the Global Water Cycle which involves oceans
Can also circulate locally such as in a small catchment
Or terrestrial setting without reaching the ocean.
Water does not have to reach the ocean.

Figure 4: A short local water cycle and a long water cycle

The water cycle is connected by the following processes:

- Evaporation: the transfer of water from the liquid to the gaseous state, to form part of the atmosphere
- Condensation: Conversion of vapour back to the liquid state.
- Precipitation: The moisture that falls from the atmosphere as rain, snow, sleet or hail.
- Interception: The capture of precipitation on vegetation to eventually undergo evaporation back to the atmosphere
- Surface runoff: The water that flows on the land surface directly after precipitation following the direction of slope.
- Infiltration: The entry of water from the land surface into the soil or unsaturated zone.
- Percolation: Also called recharge: Is the further downward flow of water through the unsaturated zone into the saturated zone.
- Transpiration: The extraction of water from the subsurface by vegetation and transmission back to the atmosphere.
- Interflow: Lateral flow of water in the unsaturated zone above the water table to discharge in surface water. It refers to water that does not percolate or is not stored but flows laterally before reaching water table.
- Baseflow: The discharge of water from the saturated zone/groundwater into surface water reservoirs.

It is obvious that rain supplies water into stream and rivers, and dams. What about the water that we see flowing during rainless periods? Where does it come from?

The water that sustains stream in dry periods is groundwater discharge. It is discharged from groundwater storage.

This shows that groundwater and surface water are connected. Mismanagement of one is mismanagement of the other

1.1.3 Water as a transboundary resource

Key points: Transboundary water resources

Since we all share water through a water cycle globally, we see that water flow does not respect political boundaries.

Transboundary watercourses connect water across states,

In SADC, there are 15 transboundary water sheds.

It is important for states to cooperate in managing the transboundary resource

Cooperation among states is required in order to manage transboundary watercourse

The 1992/1996 Helsinki Convention on International waters set a platform for cooperation among states regarding formation of River Basin Organisations

This was localised by the 2000 SADC Revised Protocol

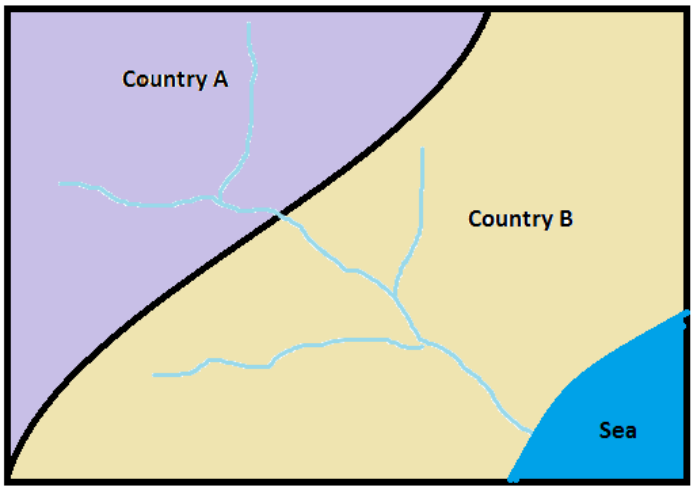


Figure 5: A schematic of a typical transboundary river

Figure *6*: Transboundary river basins of Southern Africa (Hartfield, 2010)

Key points: Transboundary water resources

The SADC Region has 15 transboundary river basins as shown on Figure 6. LIMCOM member states are **Botswana**, Mozambique, RSA and Zimbabwe, ORASECOM member states are **Botswana**, **Lesotho**, Namibia and RSA, ZAMCOM member states are **Malawi**, Mozambique, Namibia, Tanzania, **Zambia** and Zimbabwe, OKACOM member are **Angola, Botswana** and Namibia, CICOS member states are **Angola** and others while INKOMATI member states are **Eswatini**, RSA and Mozambique.

1.2 Access to clean water

1.2.1 The human right to water and sanitation

What does the human right to water entail?

Sufficient. The water supply for each person must be sufficient and continuous for personal and domestic uses. These uses ordinarily include drinking, personal sanitation, washing of clothes, food preparation, personal and household hygiene. According to the World Health Organization (WHO), between 50 and 100 litres of water per person per day are needed to ensure that most basic needs are met and few health concerns arise.

Safe. The water required for each personal or domestic use must be safe, therefore free from micro-organisms, chemical substances and radiological hazards that constitute a threat to a person's health. Measures of drinking-water safety are usually defined by national and/or local standards for drinking-water quality. The World Health Organization (WHO) Guidelines for drinking-water quality provide a basis for the development of national standards that, if properly implemented, will ensure the safety of drinking-water.

Acceptable. Water should be of an acceptable colour, odour and taste for each personal or domestic use. [...] All water facilities and services must be culturally appropriate and sensitive to gender, lifecycle and privacy requirements.

Physically accessible. Everyone has the right to a water and sanitation service that is physically accessible within, or in the immediate vicinity of the household, educational institution, workplace or health institution. According to WHO, the water source has to be within 1,000 metres of the home and collection time should not exceed 30 minutes.
Affordable. Water, and water facilities and services, must be affordable for all. The United Nations Development Programme (UNDP) suggests that water costs should not exceed 3 per cent of household income.
(Source: UN, 2010)
The same can be used to speak to the human right to sanitation. We, however, also include dignity

1.2.2 The Global goals towards access to water

Key Points: Global Goals

Botswana, Eswatini (*then Swaziland*), Lesotho, Malawi and Zambia among the other 189 UN Member states, set the global goals referred to as Millennium Development Goals whose tenue ended in 2015.

The successor to the MDGs, the Sustainable Development Goals (SDGs) were established to cover 2015 to 2030.

The SDG relevant to water is **SDG 6**

Target 6.1 aims at "universal and equitable access to safe and affordable drinking water for all by 2030".

Target 6.7 aims at "International cooperation and capacity building support to developing countries in water management".

Target 6.8 aims to "support and strengthen the participation of local communities in improving water management"

Figure 7: The sustainable Development Goals

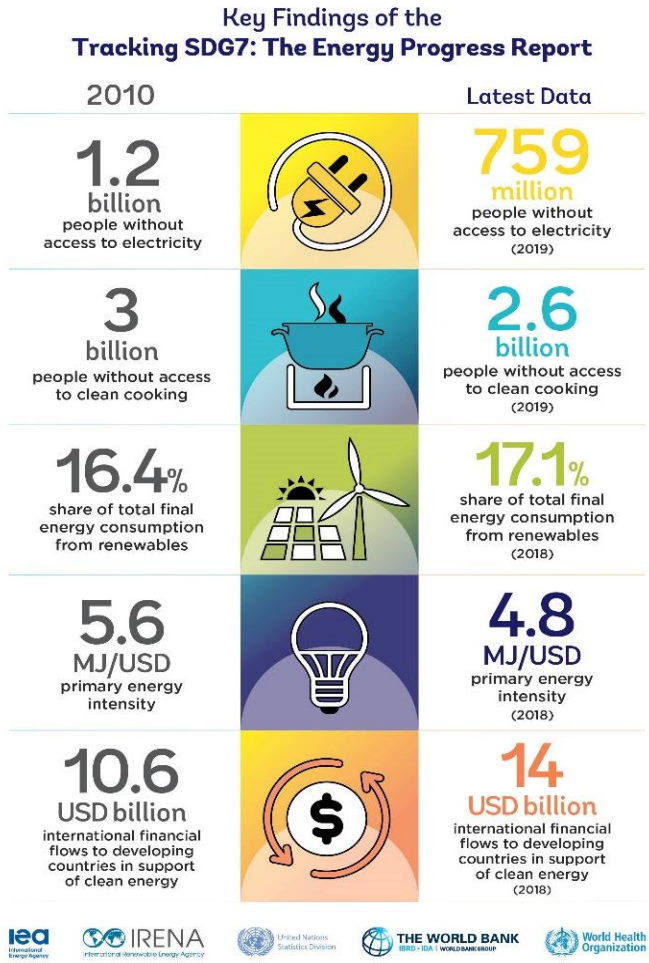


Figure 8: Progress towards achieving SDG7 (Tracking SDG &: The Energy Progress Report)

Key Points: Progress towards SGDs

Countries provide perioding reports on progress to SDGs.

2020 data shows that global proportion of populations that use safely managed drinking services is at 74%.

All world regions have had some increase in access to safely managed drinking services since 2000.

The region with highest proportion of access to clean drinking water is currently Europe and Northern America at 96%.

Although Sub-Saharan Africa has had an increased in clean drinking water as compared to 17% in 2000, it still has the least coverage at 30%.

This emphasises the tremendous need for all parties to engage to in assisting their states to achieve the set SDGs.

1.2.3 Continental goals

Key Points: Continental and Regional Access to Water and Energy

In May 2013, The Heads of African States committed their countries to strive towards "The Agenda 2063: The Africa We Want", which aims at improving water security and Renewable Clean Energy for the African Continent

This shows that African Countries have a long-term ambition to improve the lives of their citizens in access to clean water, and clean and renewable energy sources.

Countries provide perioding reports on progress towards these goals SDGs.

Reports indicated that the Southern African Region lags behind in terms of access to water and energy

It shows the tremendous need for all persons in different levels of authority, in different countries, to advocate for policies that enhance long-term access to clean water and renewable clean energy for all citizens of Africa

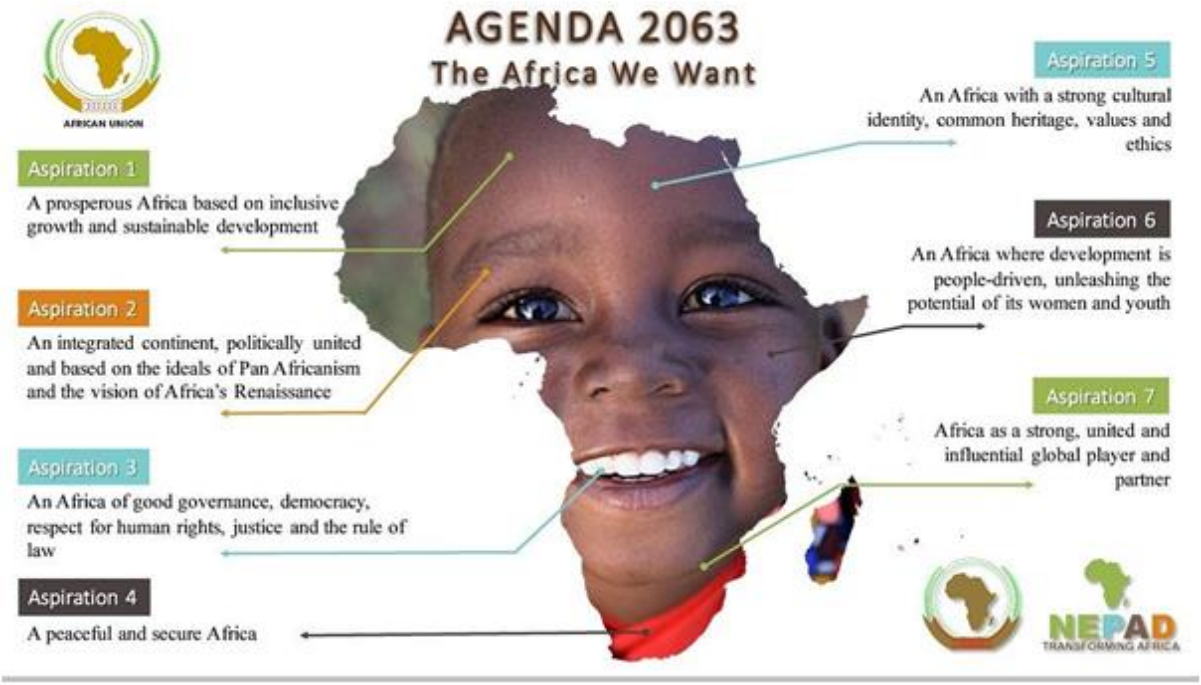


Figure *9*: The Aspirations of The African Agenda 2063: The Africa We Want.

1.3 National goals and coverage

Instruction to the Expert Facilitator: This section requires a country specific content that will be developed by the Expert Facilitators for the Participants. The Expert Facilitators are expected to fill the following information:

- The goal of the nation in as far as water and energy are concerned. In particular, the Expert Facilitators will emphasise the targets and strides of the country in towards *clean* water, *renewable* and *clean* energy.

NB: The above paragraphs should be deleted by the Expert Facilitator after filling the appropriate national information before distributing the material to the Trainees.

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1.4 Institutional arrangement in water/the levels of governance in water

The system of water governance operates at different levels within two types of boundaries: **administrative** and **hydrological**. Administrative boundaries rarely follow hydrological ones, which often provides challenges in the system of water governance. Figure 10 demonstrates the different levels of water governance.

As a policy maker, it is important to take note of this levels of water governance and their roles and responsibilities because policies have to have a scale of application.

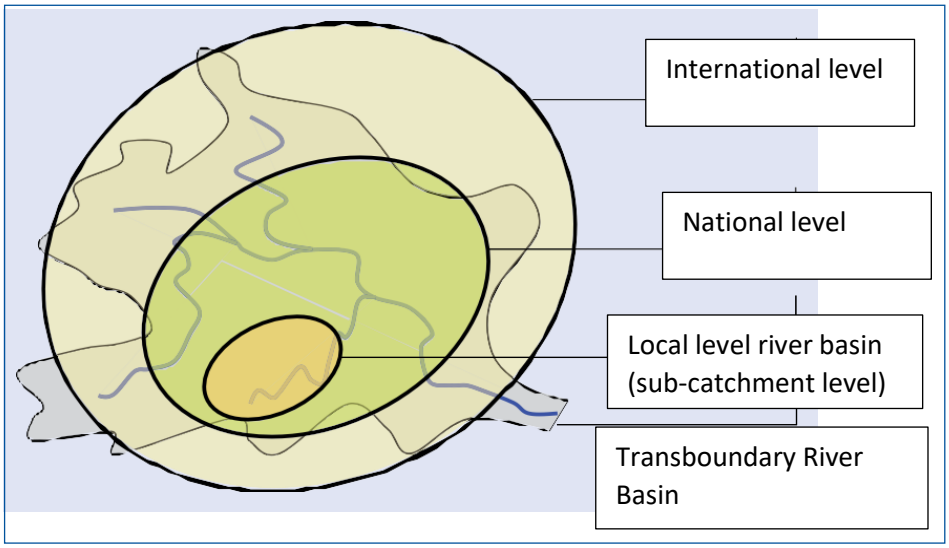

Figure *10*: Different levels of water governance

It is important to note that there are Administrative and hydrological boundaries. Administrative boundaries are man-made, or even if they are natural systems such as a river, their function as a boundary has been decided by man for administrative purposes. Think of a boundary between two states which can be in the form of a fence structure or a river. They have been decided by man but they serve as administrative boundaries. On the other hand, hydrological boundaries are demarcations of hydrological river basins. River basins often spread across different states and are, therefore, said to be transboundary.

1.4.1 Administrative levels of governance

International level

SADC is an example of an international level of water governance.

- SADC play an important role in the development of water resources frameworks through agreements between member states, such as, in the case of water, the SADC Protocol on Shared Water Courses.
- Such agreements can, for example, stipulate water quality standards, initiate large scale flood management programmes and prevent the development of infrastructure that would negatively affect downstream users. In other words, the SADC encourages cooperation among states for any water resources development occurring in a transboundary river basin.
- The SADC, like any international institution, can encourage the principle of IWRM

National level

The nations develop policies for water management within their jurisdiction. However, these policies much as they are for management of water within the state, they are developed in cognizance of the state's international obligations. In other words, they are developed in accordance with the IWRM principles. Take note of the water related legislation in your country.

Which are the water related legal instruments and institutions in your country?

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Local level

This level refers to a Local Government's area of jurisdiction. National authorities usually have the overall responsibility for the management of a country's water resources and large-scale infrastructure, such as dams and water transfer schemes. However, Local Government still plays a crucial role as a number of their regular mandates, for instance water supply, wastewater treatment, land use planning, etc., are related directly and indirectly to water resources. NB: It is important to note that the roles of local authorities may be different in your country.

What is the role of Local authorities in your country?

_____
_____
_____
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1.4.2 Hydrological levels of governance

You will remember that in section 1.1.3 (Water as a transboundary resource) we discussed the transboundary nature of water, the river basins in the SADC and River Basin Organisations. The purpose of this section is basically to emphasise governance that occurs at a River Basin Level (Transboundary river basin) and at a sub-catchment level.

Participant's own notes:

MODULE 2

2. ENERGY AS A NATURAL RESOURCE AND ACCESS TO CLEAN RENEWABLE ENERGY SOURCES

Learning Outcomes;

- Appreciation of basic energy concepts and their use on a day-to-day basis within the energy space
- Create awareness on different sources of energy, potential benefits on renewable and clean energy and challenges that come along with energy emissions
- Build knowledge on energy value chain and the role it plays in the socio-economic development
- Provide information on energy in the Southern Africa Region together with its commitments in International and Regional Agreement.

2.1 Definition of Basic Energy Concepts

Understanding Energy and its sources

Energy is the ability to perform work, it cannot be created, consumed or destroyed, it can just be transferred or converted from one form into another.

Energy Sources: Are energy carriers which can be divided into renewable and non-renewable energy forms. All energy forms are created directly or indirectly from the sun except for geothermal which comes from the Earth's mantle.

Clean energy: is energy that comes from renewable, zero emission sources that do not pollute the atmosphere when used, as well as energy saved by energy efficiency measures: Examples of clean energy are:

Solar, wind, bioenergy, geothermal, hydropower, nuclear, natural gas

Renewable Energies: come from natural sources and they are replenished at a higher rate than they are consumed. Examples include;

Solar, Wind, Biomass, Geothermal, Hydro

Non-Renewable Energies: Energy forms that cannot be replenished such as fossil fuels and radioactive heavy metals:

Peat, Gas, Coal, Nuclear Fuels, Oil

What is Renewable Energy and Energy Efficiency?

Renewable Energy (RE) is energy collected from sources which are naturally replenished on a human timescale, such as solar, wind, geothermal, hydro, ocean and biomass.

What is an example of clean energy?
Out of all energy resources, we consider **green power (solar, wind, biomass and geothermal)** as the cleanest form of energy. So, if we were looking at clean energy on a spectrum, these would be farthest from "dirty" or emissions-heavy energy.

Clean energy in the global agenda

Clean energy is at the heart of global development agenda. SDG Goal 7.a dictates that; by 2030, enhance international cooperation to facilitate **access to clean energy research and technology**, including **renewable energy, energy efficiency and advanced and cleaner fossil-fuel technology** and promote investment in energy infrastructure and **clean energy technology**.

Clean energy includes **renewable energy sources that have minimal impact on the environment** such as solar and wind power which do not emit greenhouse gases (GHGs). They also are referred to as green energy because they do not deplete fossil fuels and other natural resources.

Understanding terms used in Energy management

Energy Reserves: Are quantities of resources that are known and are legally and economically extractable with current technology.

Transmission: Transportation of electricity by means of high voltage lines and electric plant from generation station to substation

Distribution: Transport of electricity by means of electric lines, electric plant, transformers and switchgear to the final consumers

Electricity Grid: An integrated electricity transmission and distribution system

Electricity Generation Facility: electric power production plant

Isolated Grid: Mini grid not connected to the main grid

Mini-Grid: Electricity supply system providing electricity to more than one customer through a distribution network

Small Power Distributor: an entity that distributes electricity generated to end users

Small Power Producer: an entity that enters into a power purchase or feed-in tariff arrangement with main grid operator

Modern Energy Access: When a household has access to reliable and affordable clean cooking facilities, a first connection to electricity and then an increasing level of electricity consumption over time to reach the regional average

Energy Efficiency: using less energy to get the same job done

Sustainable Energy: meeting the needs of the present without compromising the ability of future generations to meet their own needs

2.2 Electricity Access

2.2.1 Global goals towards access to clean energy

Key Points: Global Goals

The SDG relevant to energy is **SDG 7**

Target 7.1 aims to achieve “access to affordable and clean energy by 2030”.

Target 7.4 focuses on improving international cooperation towards facilitating access to clean renewable energy research.

Key Points: Global Goals

Botswana, Eswatini (*then Swaziland*), Lesotho, Malawi and Zambia among the other 189 UN Member states, set the global goals referred to as Millennium Development Goals whose tenue ended in 2015.

The successor to the MDGs, the Sustainable Development Goals (SDGs) were established to cover 2015 to 2030.

The SDG relevant to water is **SDG 6** and **SDG 7**

Goal 6

Target 6.1 aims at "universal and equitable access to safe and affordable drinking water for all by 2030".

Target 6.7 aims at "International cooperation and capacity building support to developing countries in water management".

Target 6.8 aims to "support and strengthen the participation of local communities in improving water management"

Goal 7

Target 7.1 aims to achieve "access to affordable and clean energy by 2030".

Target 7.4 focuses on improving international cooperation towards facilitating access to clean renewable energy research

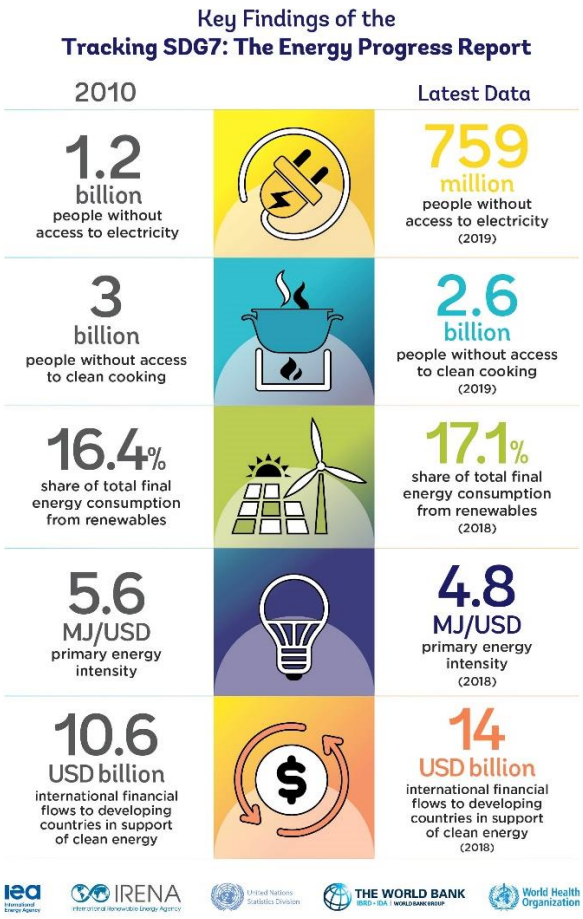


Figure *11*: Progress towards achieving SDG7 (Tracking SDG &: The Energy Progress Report)

Key Points: Progress towards SGDs

Globally, the number of people without electricity declined from 1.2 billion in 2010 to 759 million in 2019

Number of people without access to electricity increased in Sub Saharan Africa

An estimated 660 million people, most of which are in Sub Saharan Africa would still lack access in 2030

It is important for countries to scale up efforts to ensure universal access to affordable, reliable, sustainable, and modern energy by 2030

A third of the world population remained without access to clean cooking in 2019

910 million lack clean cooking in Sub Saharan Africa

Cooking smoke causes millions of deaths per year. Hence a need to develop clean energy sources.

This emphasises the tremendous need for all parties to engage to in assisting their states to achieve the set SDGs.

2.2.2 Continental goals and access to energy

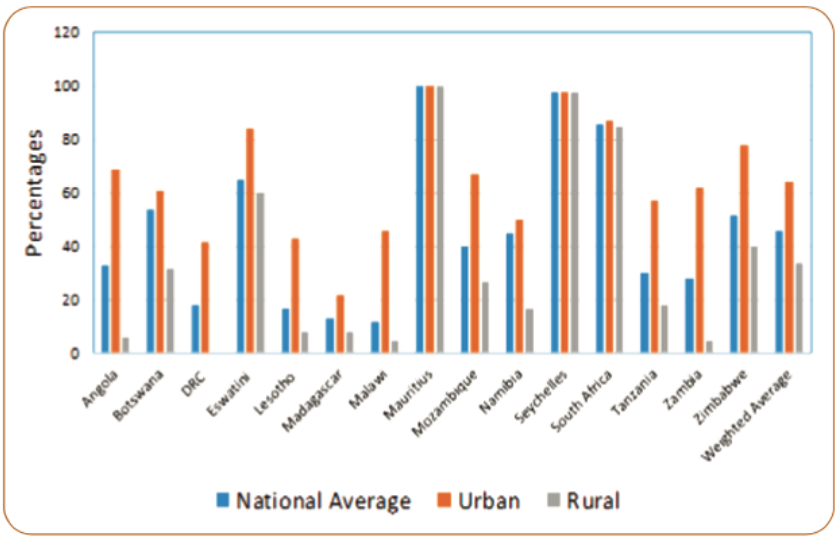
Key Points: Continental Access to Energy

"The Agenda 2063: The Africa We Want", aims at improving Renewable Clean Energy for the African Continent

Already we saw that SDG reports indicated that the Southern African Region lags behind in terms of access to clean energy

It shows the tremendous need for all persons in different levels of authority, in different countries, to advocate for policies that enhance long-term access to renewable clean energy for all citizens of Africa

2.2.3 SADC Goals and access to energy



Source RERA 2018

Figure *12*: Electricity Access (May 2018)

50% of the residents in the SADC region have access to electricity

Figure 12 shows that in rural areas is only 32% has access to electricity

It shows that electricity is skewed towards urban settlements and there is very low access in rural areas

Key Points: Continental and Regional Access to Water and Energy

In May 2013, The Heads of African States committed their countries to strive towards "The Agenda 2063: The Africa We Want", which aims at improving water security and Renewable Clean Energy for the African Continent

This shows that African Countries have a long-term ambition to improve the lives of their citizens in access to clean water, and clean and renewable energy sources.

Countries provide perioding reports on progress towards these goals SDGs.

Reports indicated that the Southern African Region lags behind in terms of access to water and energy

It shows the tremendous need for all persons in different levels of authority, in different countries, to advocate for policies that enhance long-term access to clean water and renewable clean energy for all citizens of Africa

2.2.4 National goals

Which are the energy related goals in your country?

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_____

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_____

2.3 Current state of energy production and access in the SADC Countries

2.3.1 Electricity (power production)

Some SADC member states have more power generation potential than others

Comparing the demand for power and the production, some states have excess power while others have a deficit that can be traded to other that have a deficit

To allow power trading among states, SADC has established a Southern African Power Pool (SAPP) platform

The region is in the process of building power lines that link Member States (interconnectors and transmission systems) to support the SAPP trading platform

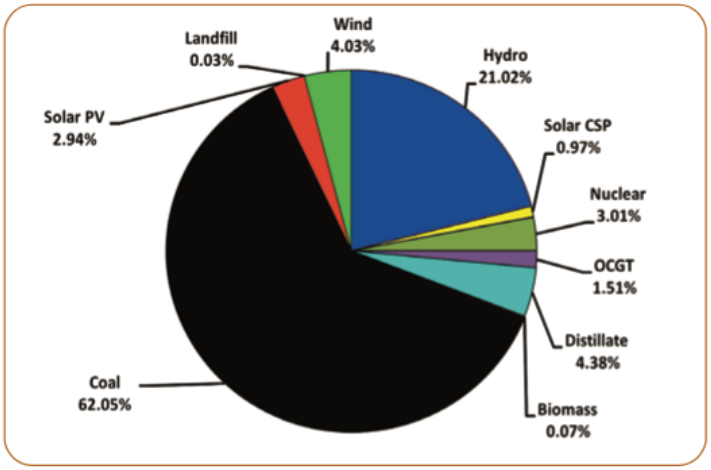
Figure 13 shows the electricity demand and supply in the SADC member states to show. In particular, the figure shows excess or deficit that each country had in 2017. This shows the importance of cooperation among states to meet the energy demands, hence the importance of the SAPP initiative by SADC. **Error! Reference source not found.** shows that

In general, the SADC region had an energy excess of 2,957MW in 2017.

Country	Utility	Installed Capacity MW	Operating Capacity MW	Current Peak Demand MW	Peak Demand plus Reserves	Capacity Excess/ Shortfall including Reserves
Angola	RNT	3129	2 500	1 869	2 149	350
Botswana	BPC	927	459	610	702	(243)
DRC	SNEL	2457	1 076	1 359	1 563	(487)
Eswatini	LEC	70	55	232	267	(212)
Lesotho	SEC	74	70	156	129	(109)
Malawi	ESCOM	352	351	326	375	(24)
Mozambique	EDM/ACB MOTORAC	2724	2 279	1 780	2 047	232
Namibia	Nampower	538	354	652	750	(396)
South Africa	Eskom	50 774	48 463	38 897	44 732	3,731
Tanzania	Tanesco	1 375	1 078	1 051	1 209	(131)
Zambia	ZESCO/CEC/LHPC	2 734	2 734	2 194	2 523	211
Zimbabwe	Zesa	2 048	1 555	1 615	1 857	(302)
Total All		**67 200**	**60 923**	**50 241**	**58 016**	**2 957**
Total Operating Members Only		62 343	**57 045**	**47 495**	**56 283**	**2 762**

Source SAPP presentation to the April 2018 SADC Energy Thematic Group meeting in Gaborone, Botswana

Figure *13*: Electricity demand and supply in 2017



Source SAPP

Figure *14*: SADC Power Generation Mix (2017)

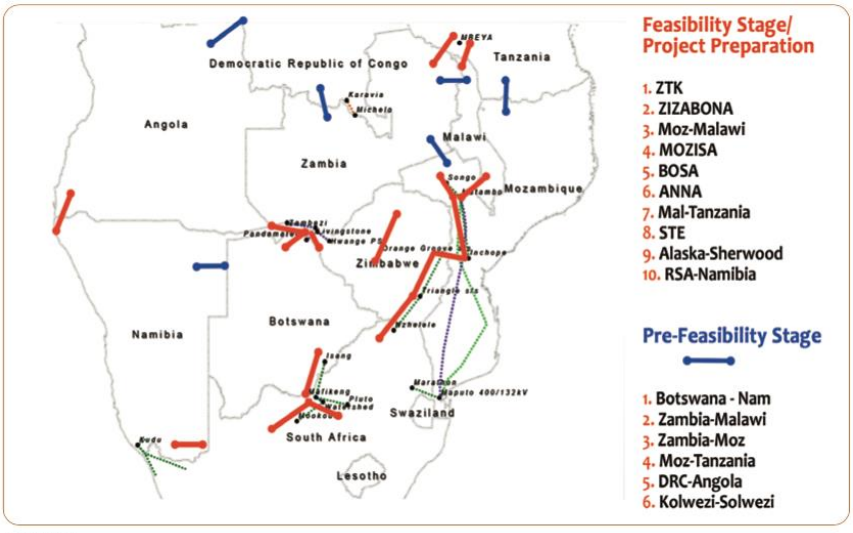
Figure 14 shows the percentages of energy sources in the power generation mix

Despite the successes by SADC to increase renewable sources of energy, such as achieving 21% from Hydropower, the unfortunate part is that power generation in the SADC is still dominated by coal, which is a no-renewable source and which is not a clean source of energy, thereby contributing to global warming

Of the power generation systems commissioned in the SADC between 2015 and 2017, 43% was hydro, 24% gas, 11% solar, 10% was wind and just 10% was from coal to meet its power requirements

However, countries still have to work towards increasing renewable clean sources of energy

2.3.2 Transmission Projects (Interconnections)



Source SAPP

Figure *15*: Planned SADC Transmission projects

To enhance power trading and transportation (transmission) within the region, SADC has embarked on a programme to strengthening existing power lines and constructing new ones. These are shown on Figure 15.

The lines will assist power trading among states

2.3.3 Renewable Energies

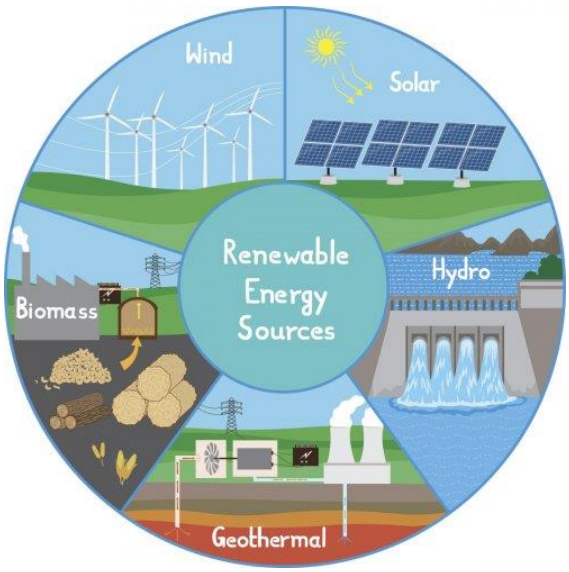


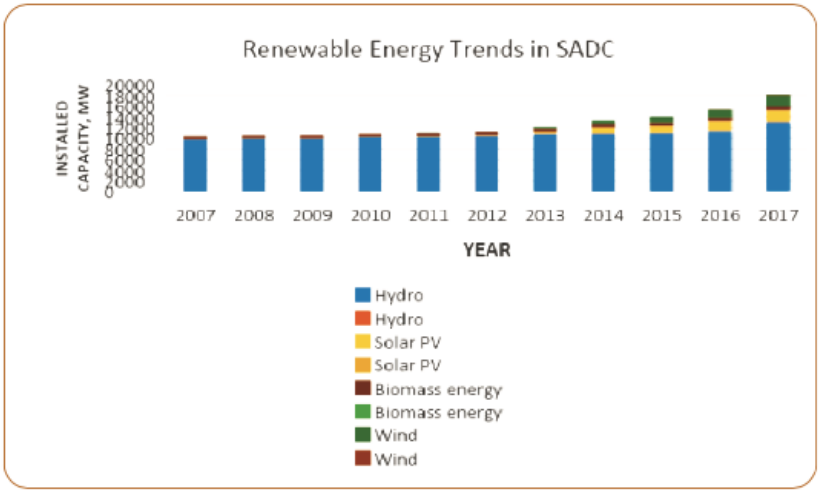
Figure *16*: Pictorial presentation of renewable energy sources

The renewable energy sources include include; solar, wind, hydro, biomass, geothermal and tidal sources (Figure 16)

The SADC region has an abundance of Renewable Energy sources and has had some increase (Figure 17 and Figure 18)

The Region has set a target itself a target of reaching a 39% of RE contribution in the energy mix by 2030

Member State are also adopting supportive policies and strategies examples include; Lesotho publishing NSDP II, Malawi developing the IPP framework, Botswana establishing the Energy Regulator and Zambia introducing the REFiT policy and the Office of Promoting Private Power Investment



Source IRENA

Figure *17*: Renewable energy trends within SADC from 2007 to 2017

RE Source	Potential	Total Installed Capacity
Hydro-power	40 874 MW	12 000 MW
Solar	20 000 TWh/year	1% generated electricity
Wind	800 TWh / year	Less than 1% wind generated
Biomass generated electricity	9 500 MW based on agriculture waste	2 500 MW generated electricity
Geothermal	4 000 MW	

1 TWh = 1 000 000 MWh
Source SADC - REEESAP 2016

Figure *18*: Renewable energy potential within SADC

2.3.4 Oil and Gas

Prices of oil and gas are volatile but generally, the price is constantly increasing
Angola, Mozambique, Tanzania, DRC, Madagascar and Namibia have Natural Gas
Angola is the only Member State that extracts oils
RSA has discovered shale gas
Botswana, Mozambique and Zimbabwe have coal bed methane
DRC and Madagascar have discovered oil deposits
SADC aims to establish to establish an Inter-State Gas Committee to promote inclusion of natural gas in the energy mix

2.3.5 Energy Efficiency (EE)

Energy Efficiency reduces energy consumption and use
SADC has established Southern African Center for Renewable Energy and Energy Efficiency (SACREEE) as a center of excellence to promote increased access to modern energy services and improved energy security
And SADC Industrial Energy Efficiency Programme (SIEEP) was formulated to support acceleration of the implementation of the SADC Industrialization Strategy and Roadmap, 2015 – 2063

The uptake of EE is very low within SADC and the following actions may help to accelerate its adoption:

a. Carrying-out energy audits
b. Benchmarking and target setting
c. Policy formulation
d. Private sector participation and
e. Awareness raising

2.3.6 Energy Efficiency Policy Options

- There is a need to develop clear policies and strategies
- Ambitious and realistic targets should be set and there should be legally binding
- Standards, regulations, tariff structures and net metering are a must.

Participant's own notes:

MODULE 3

3. POLICIES AND LAWS ON WATER AND ENERGY

Learning outcomes

- Understand the functions and powers of international legal and institutional systems
- Understand existing international and national systems and be able to conceptualise how the national systems draw from international systems
- Apply a general approach to thinking sustainably in cognisance of law and regulations as agreed or enacted, from the international to the national level

3.1 Water

3.1.1 Policies and laws on water: Managing shared watercourses – a global perspective

The UN Convention (1995) establishes a framework for the utilisation, development, conservation, management and protection of international watercourses whilst promoting optimal and sustainable utilisation thereof for present and future generations

Why the UN Convention on the Law of the Non-Navigational Uses of International Watercourses?

- The need to progressively codify and develop customary law in order to reduce the potential for interstate conflict over regulatory gaps and uncertainties
- The need to address increasing pressures on the quality and quantity of the waters in international watercourses given their importance to all nations
- The need to strengthen the law in support of the goals and principles of the UN, especially peace and security
- The need to better address, through written law, the fragmented system of basin/bilateral treaty practices given that the use of international watercourses is based in part by general principles of customary international law

(GA Res. 2669(XXV) (21 July 1971); GA Res. 49/52 (9 Dec. 1994))

The principles of equitable and reasonable utilisation (Article 5) and the prevention of significant harm (Article 7) are central to the management of international watercourse

3.1.2 Policies and laws on water: Managing shared watercourses – a regional perspective

The revised SADC Protocol on Shared Watercourses (2002) is grounded on the need to maintain a balance between national development interests of Member States and the regional interest of ensuring environmental conservation and sustainable development (SADC, 2005)

The Regional Water Policy and Regional Water Strategy provide important guidelines for the harmonisation of national water policies and laws in the region

3.1.3 Policies and laws on water: Managing shared watercourses – a basin perspective

Transboundary water cooperation as embodied in shared watercourse institutions' cooperative frameworks makes practical the revised Protocol

Stakeholder Participation in the Cubango-Okavango River Basin

In the Okavango Basin that is shared between Angola, Botswana and Namibia, the *Every River Has Its People Project* (endorsed by the Okavango River Basin Commission in 1999) has been touted as an example that best illustrates local participation in transboundary water management. Here stakeholder participation has been promoted and recognition given to national obligations on shared waters given that all three countries are, among other agreements, signatory to the SADC Protocol on Shared Watercourses (2000). The Project is aimed at developing the capacity of local communities within the basin to enable them to participate more fully in decision-making through among other things the formation of the Basin-wide Forum. The project is donor funded and implemented by a nongovernmental organisation. The Project enables stakeholders to have exchange visit and so see other parts of the basin and gain a better understanding of how the system functions (Source: Bethune, 2006 in Fatch, Manzungu and Mabiza, 2010).

3.1.4 Policies and laws on water: Managing water at a national level

IWRM-influenced water sector reforms as captured in Member State water acts and policies in the region emphasise

- improved governance through establishment of water management institutions that enable stakeholder participation; and
- the hydrological approach, hence, the basin as the unit of analysis

Overview of Zimbabwean water reforms

Water sector reforms in Zimbabwe resulted in the repeal of the Water Act of 1976 and the enactment of the Water Act [Chapter 20:24] of 1998. It was felt that the 1976 Water Act was not in line with the aspirations and objectives of contemporary Zimbabwe (Pazvakavambwa, 2002), as through the principle of priority date system (among others), inequalities in water allocation and limited stakeholder participation were perpetuated. The 1998 Act was guided by 8 principles, one of which spelt that 'Water management should involve all stakeholders and should be managed at the lowest possible level' (Latham, 2002:22). This resulted in the formation of stakeholder institutions in the shape of catchment and sub-catchment councils. The formation of the catchment and sub-catchment councils represents decentralised decision making in the management of water resources in Zimbabwe. Their establishment is provided for in Section 20(1) (a) of the Act. The functions of the catchment council as captured in sections 21(1) (c), 22 and 23 reflect a shift from centralised decision making. Catchment councils are given operational powers over water under their jurisdiction. This includes regulating and supervising the exercise of rights to and use of water. Section 20(1) (b) gives the minister powers to fix the number of representatives who constitute the catchment council. The catchment council can delegate, among other functions, the role of regulating and supervising the exercise of rights to and use of water to sub-catchment councils (Section 24(4) (a) and (b), and Section 24(5) (a) and (b) for other functions of the sub-catchment council). Various literature point to efforts that have been made in terms of enabling participation in water management (Latham, 2002; Kujinga, 2002; Swatuk, 2002). Since their formation, catchment council and sub-catchment council have experienced many problems (see Tapela, 2006). As at 2009, the agenda for sub-catchment council meetings (Shashe sub-catchment for example) came from the catchment council and were handed to councillors on the day of the meeting (Gwanda Urban Council- personal communication (February 3-2009). The sub-catchment council was reported not to have made any substantive decisions with regard to water management as all decisions were made at the catchment council (Shashe sub-catchment councillors - personal communication (February 3-2009).

As far as transboundary water management is concerned, Section 6(2) (f) provides duties of the minister in terms of transboundary water management as: 'to give effect to any international agreement, to which Zimbabwe is a party, on shared water course systems in a spirit of mutual co-operation'. The need for participation came about as a result of changes in water resources thinking worldwide. The Water Act [Chapter 20:24] is influenced by IWRM principles of which participation is one. Provisions within the Act that enable decentralised decision-making attest to this. The form of institutional structure that the Act puts forward ends with the sub-catchment council as the lowest formal structure with the ministry as the highest decision-making body within the country. The Ministry of Water Management and Development is said to be reviewing the Act. It was felt that the sub-catchment council, as the lowest legally provided for tier, was too extensive and there was need for a lower tier(s) that allows for local participation (Source: Fatch, Manzungu and Mabiza, 2010)

Participant's own notes:

4. MODULE 4: ENERGY POLICY AND LAW

Learning Outcomes:

- Understand the value of energy policy and the role it plays in development
- To Create awareness on Continental, Regional and National Laws on Energy.
- Reflect on recent energy developments with focus on energy inequality and the energy challenges
- To sensitize the political parties on the importance of reviewing energy laws to align with regional aspirations.
- Heighten political actors mandate to advocate on energy policy reform

4.1 Why Energy Policy Matters

Below are examples of applied energy strategies to improve on people's livelihoods and reduces poverty. Table 1 below highlights on defining goals, strategies, policies, and policy instruments.

Key points:

Energy is important for life on earth

There is a high energy demand in SADC, which is increased by growing population, urbanisation, industrialisation, etc.

However, energy production, transportation, and use have caused problems with the environment, national security, and economic crisis in the 21st century.

Specifically, the UNESA (2018) highlighted that SADC faces low energy access, ageing infrastructure, over-reliance on coal whose use goes contrary to global efforts to curb greenhouse gas emissions, weak energy policies, etc.

Therefore, to protect against/control these problems, it is important to develop policies to encourage environment friendly renewable energy generation, conservation strategies, and technological innovations.

Table 1:Goals, strategies, policies, and policy instruments

Term	Definition	Examples
Goal	Overarching aim or framework	Sustainable development
Strategies	Pathways to achieve the set goal	Using energy provision and use to foster sustainable development
Policies	Courses of action to implement strategies	Making markets work more effectively by: • Restructuring the energy sector • Attracting private capital • Phasing out subsidies for conventional energy supply and consumption • Internalising externalities • Strengthening regulations • Supporting energy sector innovation • Accelerating the deployment of sustainable energy technologies • Promoting energy efficiency • Building institutional and human capacity in sustainable energy • Improving international cooperation and linkages between trade and the environment
Policy instruments	Specific measures used	• Efficiency standards • Public procurement policies • Voluntary agreements • Appliance labelling • Externality taxes and incentives (such as carbon taxes and early retirement incentives for older, less efficient, more polluting energy-using devices) • Fuel switching • Obligation to buy energy from renewable sources • Obligation to supply energy from renewable sources • Systems benefit charges (otherwise known as public benefits funds) • Supporting research and development demonstration projects • Lowering the cost of new technologies for more rapid deployment

Key points:

The continent should not lose sight in building strong institutions that seek to promote renewable energy consumption and reduce supply and use of non-renewable sources of energy due to economic expansion and promotion of trade liberalisation policies. Again, there is the need to remove socio-economic and political barriers to increase production and use of renewable energy (Anthony et al 2020). **Error! Reference source not found.** and Figure 20 show the strides that have been done to improve the use of solar energy as a source of renewable energy in the Rural areas of Malawi and int eh townships of South

Figure *19*: Use of solar energy in Malawi rural areas

Figure *20*: Use of solar energy in South Africa townships

4.2 Global and Continental Overview on Energy

Key points:

The Sustainable Energy for All Report (2021) emphasised the importance of knowing where the world stands with regard to SDG 7, considering that the COVID-19 pandemic has stalled progress in developing countries.

The report emphasised that the lack of energy access will compromise the ability of developing countries to recover from the pandemic.

Based on current trends without policy changes, 2.4 billion people will still be left without access to clean cooking by 2030, about half of those remaining without access residing in Sub-Saharan Africa

There is a need to increase access to affordable, modern energy services and to fix the mix of energy sources, technologies, policies and behavioural changes that will address environmental impacts.

Key points:

SADC is committed to attain the UN SDGs 7, which advocates for Access to Energy for all.

Agenda 2063 of the African Union, as the strategic framework for transforming Africa commits the continent prioritising, among other things, inclusive social and economic development.

As access to renewable energy expands, so do the social, economic and environmental benefits, making it vital to the success of the 2030 Agenda for Sustainable Development and the Paris Agreement on Climate Change. However, realising the full potential of this sector requires careful legislation (UNEP 2016).

4.3 Glance at Southern Africa Region and Energy

Table 2 below presents the SADC Protocols/ Policies on Regional Infrastructural Development.

Key points:

The SADC community craves for a united, prosperous and integrated region.

The region has developed a common agenda consisting of policies and strategies, which are operationalised through a series of Protocols and Strategic Plans

It is worth mentioning that protocols are legally binding documents that protect the aims of the Community by providing codes of procedure and practice on various issues, as agreed by Member States.

There is a SADC Protocol on Energy (1996) which seeks to promote the harmonious development of national energy policies and matters of common interest for the balanced and equitable development of energy throughout the SADC Region

Table 2: The SADC Protocols /Policies on Regional Infrastructure Development

Name of Protocol	Summary of the Protocol/Policy
Protocol on Energy 1996	Promotes the harmonious development of national energy policies and matters of common interest for the balanced and equitable development of energy throughout the SADC Region. The Protocol clearly outlines the institutional mechanisms and financial provisions in place for implementing the Protocol. Through the Protocol, the processes of sharing of energy data and information and cooperating with non-SADC states and Organisations are clearly defined.
Protocol on Transport, Communications and Meteorology 1996	Through the Protocol, Member States agree to strategic goals and policies for an integrated network of transport, communications, and meteorology, with specific funding sources, regulatory mechanisms, environmental controls, and technical standards.
Revised Protocol on Shared Watercourses 2000	The Protocol aims to foster closer cooperation among Member States for protection, management, and use of shared watercourses in the region. Member States agree to cooperate on projects and exchange information on shared watercourses, consulting with each other and collaborating on initiatives that balance development of watercourses with conservation of the environment.
The Programme for Infrastructure Development in Africa (PIDA)	PIDA seeks to develop efficient, reliable, cost-effective and environmentally friendly infrastructure for the physical integration of the continent. This programme is running

	from 2010 to 2040 and is being implemented at the African Union level in partnership with Regional Economic Communities such as SADC. It focuses on four key development sectors namely: (a) Energy (b) Transport (c) ICT (d) Water.
The Regional Infrastructure Development Master Plan (RIDMP).	RIDMP is the Infrastructure Vision of the SADC region, running from 2012 to 2027. It focuses on six sectors namely energy, transport, ICT, water, meteorology and tourism. It is an integral part of PIDA, though tailored to suit the regional context. RIDMP consist of six sectoral plans namely: (a) The Energy Sector Plan (ESP); (b) The Transport Sector Plan; (c) The ICT Sector Plan; (d) The Water Sector Plan; (e) The Meteorology Sector Plan; and, (f) The Tourism Sector Plan.
Revised SADC Regional Indicative Strategic Development Plan (RISDP) 2015-2020,	The Regional Indicative Strategic Development Plan (RISDP) is a comprehensive development and implementation framework guiding the Regional Integration agenda of SADC.

Key points:

The SADC region still faces many challenges including slow domestication of agreed policies and legal frameworks implementation despite having a comprehensive regional integration agenda.

4.4 Outreach Actors on Energy Policy

Key points:

In order for the agreements that were made at the International Level to be effective, they have to be domesticated or transposed into national legislation which requires government oversight, allocation of funds, etc.

This is an indication that all national actors, including political actors, those in government and those in opposition, and those out-side of parliaments, as well as members of the civil society should advocate for improved access to clean renewable energy for all as agreed at the UN, AU and SADC levels.

Key Notes on Energy Policy

Designing energy policy

- Conduct Demand Outlook Survey: transition to low carbon emission
- Engage strategic planning and implementation modalities:
- Develop flexible and responsive market and regulatory frameworks
- Recognize international agreements to suit local context

Energy Policy to fit local context

- Develop clear long-term vision
- Create stable institutional arrangement
- Create stakeholders' engagement platforms
- Expand on local leadership
- Improve on political consensus

Elements of energy

Energy Policy should take consideration of 3Es

- Energy Security
- Economic growth
- Environmental Protection

Benefits of promotion of clean energy

- Made from unlimited renewable sources (sun, wind, etc.)
- Helps preserve and protect the environment for future generations
- Uses little to no water in many forms
- Doesn't damage the land
- Doesn't emit

Participant's own notes:

MODULE 5

5. INTEGRATED WATER RESOURCES MANAGEMENT AND NEXUS APPROACHES

Learning objectives

- Understand the main elements of an IWRM approach to sustainable management of water resources.
- Gain a deeper understanding of the WEF Nexus as an integrated and holistic management approach in decision-making processes within the water, energy, food and environmental sectors
- Appreciate the need for reforms to the way water is being managed.
- Understand the concepts of climate change, and related terminology
- Increase knowledge into climate change scenarios and policy implications
- Build ability to mainstream climate change into energy and water development systems

5.1 What is Integrated Water Resources Management?

Key points:

Integrated Water Resources Management (IWRM) Global Water Partnership (2011) defines IWRM as a process which promotes the coordinated development and management of water, land and related resources in order to maximise economic and social welfare in an equitable manner without compromising the sustainability of vital eco systems and the environment (Global water). IWRM is a cross sectoral policy approach, designed to replace the traditional, fragmented sectoral approach to water resources and management that has led to poor services and unsustainable resources use (GWP, 2011).

The basis of IWRM is that the various uses of water resources are interdependent. After the first water use either or both the quality or/and quantity of water are changed such that that the amount and quality that is available for the second use is now different. It becomes evident, therefore, that there is a need to adopt this multi sectoral approach called, *Integrated Water Resources Management.*

5.2 Why IWRM?

The basis of IWRM is that the various uses of water resources are interdependent. After the first water use either or both the quality or/and quantity of water are changed such that the amount and quality that is available for the second use is now different. High irrigation demands and polluted drainage flows from agriculture mean less freshwater for drinking or industrial use; contaminated municipal and industrial wastewater pollutes rivers and threatens ecosystems; if water has to be left in a river to protect fisheries and ecosystems, less can be diverted to grow crops. There are plenty more examples of the basic theme that unregulated use of scarce water resources is wasteful and inherently unsustainable.

It becomes evident, therefore, that there is a need to adopt this multi sectoral approach called, *Integrated Water Resources Management.*

5.3 Key Issues in Water Management

Water governance crisis:

- It has already been emphasised that IWRM strives for a multisectoral approach in the management of water resources.
- IWRM tries to bring everyone on board in decision making because water affects many other sectors and uses.
- IWRM fosters stakeholder participation, transparency and cost-effective local management.
- However, in most cases (most countries and communities), water management is still in the hands of top-down institutions that do not involve others.
- This "weak" water governance system has led to a situation where there is intense competition for water in many communities.

Securing water for people:

- Despite the fact that preference for water supply is often given to access for humans, access to water often affects the poor much more than the rich communities in cases where there is not enough water or enough infrastructure to support access to water to meet human needs.
- Bear in mind that the SDG6 strives for access to clean water for all by 2030.
- ***This anticipated access to water for all can be well achieved if IWRM approach is implemented***.

Securing water for food production:

- Population projections indicate that over the next 25 years another 2-3 billion people will need food.
- Water is increasingly seen as a key hindrance to food production, equivalent to, if not more crucial than land scarcity.
- Irrigated agriculture is already responsible for more than 70% of all water withdrawals.

Protecting vital ecosystems:

- Different ecosystems have a role to play in management and availability of water.
- Terrestrial ecosystems (land areas) in the upstream areas of a river basin are important because these are areas where water enters the soil to add to the amount of underground water (groundwater recharge) which support river flows in dry seasons.
- Aquatic ecosystems (water areas) are very important for harvesting such products as timber, fuel wood and medicinal plants, and they also provide wildlife habitats and spawning grounds. The ecosystems depend on water flows, seasonality and water-table fluctuations and are threatened by poor water quality.
- Land and water resources management must ensure that **vital ecosystems** are maintained and that adverse effects on other natural resources are considered and where possible, reduced when development and management decisions are made.
- ***IWRM can help to safeguard an "environmental reserve" of water corresponding with the value of ecosystems to human development***.

Gender disparities:

- It has already been emphasised that water affect everyone and every sector. So, it does affect all gender
- The representation of women in water sector institutions is still very low
- The way that water resources are managed affects women and men differently
- As custodians of family health and hygiene and providers of domestic water and food, women are the primary stakeholders in household water and sanitation.
- Yet, decisions on water supply and sanitation technologies, locations of water points and operation and maintenance systems are mostly made by men.
- ***A crucial element of the IWRM philosophy is that water users, rich and poor, male and female, are able to influence decisions that affect their daily lives.***

5.4 Water Management Principles

There are four principles that have been the basis for much of the subsequent water sector reforms. These principles were established at a meeting in Dublin in 1923. They are called the Dublin Principles of IWRM.

Principle 1: Fresh water is a finite and vulnerable resource, essential to sustain life, development and the environment.

You will remember in the first module that we said the water cycle circulates a fixed amount of water. So, fresh water is finite. This principle recognizes that water is required for many different purposes, functions and services; management therefore, has to be holistic (integrated) and involve consideration of the demands placed on the resource and the threats to it.

The integrated approach to management of water resources necessitates coordination of the range of human activities which create the demands for water, determine land uses and generate waterborne waste products. The principle also recognizes the

catchment area or river basin as the logical unit for water resources management.We need to find a way to survive and meet the essential needs for life, development and the environmental, such as vital ecosystems (5.3).

Principle 2: Water development and management should be based on a participatory approach, involving users, planners and policymakers at all levels.

Participation is about taking responsibility, recognizing the effect of sectoral actions on other water users and aquatic ecosystems and accepting the need for change to improve the efficiency of water use and allow the sustainable development of the resource. Participation does not always achieve consensus; arbitration processes or other conflict resolution mechanisms also need to be put in place.

Governments have to help create the opportunity and capacity to partici- pate, particularly among women and other marginalised social groups. It has to be recognised that simply creating participatory opportunities will do nothing for currently disadvantaged groups unless their capacity to participate is enhanced. Decentralising decision making to the lowest appropriate level is one strategy for increasing participation.

Principle 3: Women play a central part in the provision, management and safeguarding of water.

It is widely acknowledged that women play a key role in the collection and safeguarding of water for domestic and – in many cases – agricultural use, but that they have a much less influential role than men in management, problem analysis and the decision-making processes related to water resources.

In developing the full and effective participation of women at all levels of decision-making, consideration has to be given to the way different societies assign particular social, economic and cultural roles to men and women. Involving men and women in influential roles at all levels of water management can speed up the achievement of sustainability; and, managing water in an integrated and sustainable way contributes significantly to gender equity by improving the access of women and men to water and water-related services to meet their essential needs.

Principle 4: Water has an economic value in all its competing uses and should be recognised as an economic good as well as a social good.

Within this principle, it is vital to recognise first the basic right of all human beings to have access to clean water and sanitation at an affordable price.

Water has a value as an economic good as well as a social good. Many past failures in water resources management are attributable to the fact that the full value of water has not been recognized. It is important to note that value and charge are two different things and we have to distinguish clearly between them. The value of water in alternative uses is important for the rational allocation of water as a scarce resource, whether by regulatory or economic means. Charging (or not charging) for water is

applying an economic instrument to support disadvantaged groups, affect behaviour towards conservation and efficient water usage, provide incentives for demand management, ensure cost recovery and signal consumers' willingness to pay for additional investments in water services.

5.5 Implementing IWRM

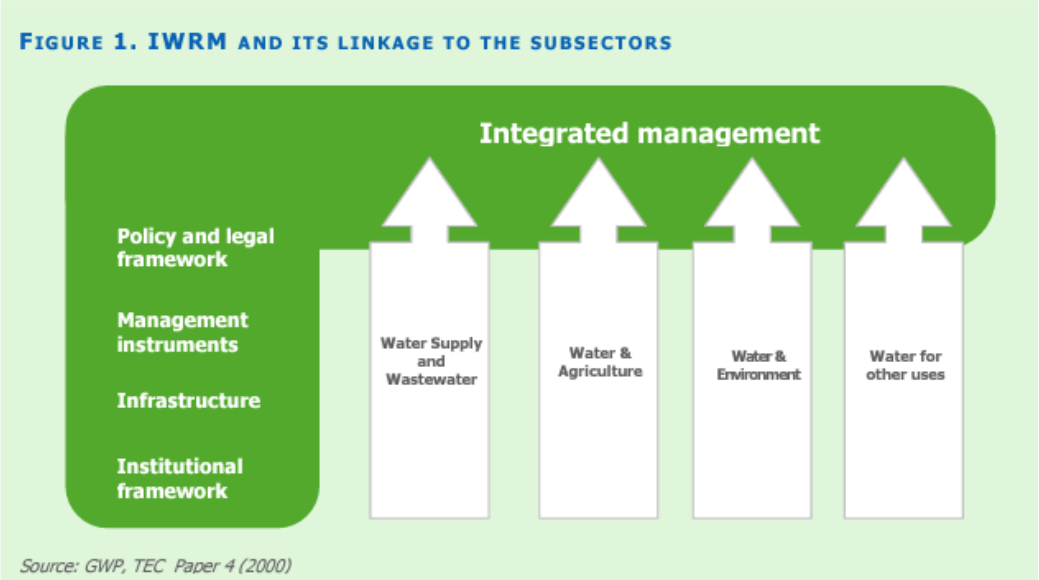
The case for IWRM is strong – many would say incontestable. The problem for most countries is the long history of sectoral development. As the Global Water Partnership puts it:

"IWRM is a challenge to conventional practices, attitudes and professional certainties. It confronts entrenched sectoral interests and requires that the water resource is managed holistically for the benefits of all. No one pretends that meeting the IWRM challenge will be easy but it is vital that a start is made now to avert the burgeoning crisis."

IWRM is, above all, a philosophy. As such it offers a guiding conceptual framework with a goal of sustainable management and development of water resources. What it does demand is that people try to change their working practices to look at the bigger picture that surrounds their actions and to realise that these do not occur independently of the actions of others. It also seeks to introduce an element of decentralised democracy into how water is managed, with its emphasis on stakeholder participation and decision making at the lowest appropriate level.

All of this implies change, which brings threats as well as opportunities. There are threats to people's power and position; and threats to their sense of themselves as professionals. IWRM requires that platforms be developed to allow very different stake- holders, often with apparently irreconcilable differences to somehow work together.

Because of the existing institutional and legislative frameworks, implementing IWRM is likely to require reform at all stages in the water planning and management cycle. An overall plan is required to envisage how the transformation can be achieved and this is likely to begin with a new water policy to reflect the principles of sustainable management of water resources. To put the policy into practice is likely to require the reform of water law and water institutions. This can be a long process and needs to involve extensive consultations with affected agencies and the public.



5.6 The Nexus Approach

5.6.1 Interlinkages between water-energy-food-ecosystems

The Nexus approach stems from the realization that water, energy, agriculture and natural ecosystems exhibit strong interlinkages (see Table 3), and that under a traditional sectoral approach, attempting to achieve resource security independently often endangers sustainability and security in one or more of the other sectors.

Table 3: *Multi-dimensional interlinkages between water, energy, food and ecosystems*

Water <-> Energy: Water plays a key role in energy production, e.g. in hydroelectric plants, for cooling thermal (fossil-fuel or nuclear) plants and in growing plants for biofuels. Conversely, energy is required to process and distribute water, to treat wastewater, to pump groundwater and to desalinate seawater.
Water <-> Food: Water is the keystone for the entire agrofood supply chain. Conversely, agricultural intensification impacts water quality.
Food <-> Energy: Energy is an essential input throughout the entire agrofood supply chain, from pumping water to processing, transporting and refrigerating food. Conflicts around land use for food production may arise in the case of biofuels or extended solar installations.
Healthy ecosystems are an essential requirement for the sustainability of all the above and are negatively affected if water, energy or food are used in an unsustainable way.

5.7 Climate change, water and energy

5.7.1 Basic concepts on climate change

Definition of key terms in Climate Change:

Weather: the prevailing conditions of the atmosphere at a particular place and time. Weather conditions are temporary and change frequently. Characteristics of weather are temperature, humidity, precipitation, cloudiness, wind, atmospheric pressure, etc.

Climate: The average weather conditions in a particular location or region at a particular time of the year. Climate is usually measured over a period of 30 years or more.

Global Warming- An increase in temperature the air. Global warming has occurred in the distant past as the result of natural causes. However, the term is most often used to refer to recent and ongoing warming caused by people's activities. Global warming leads to a bigger set of changes referred to as global climate change.

Climate change- A significant change in the Earth's climate. The Earth is currently getting warmer because people are adding heat-trapping greenhouse gases to the atmosphere. The term "global warming" refers to warmer temperatures, while "climate change" refers to the broader set of changes that go along with warmer temperatures, including changes in weather patterns, the oceans, ice and snow, and ecosystems around the world.

Emissions- The release of a substance (usually a gas when referring to the subject of climate change) into the atmosphere

Green House Gases (GHG)- Also sometimes known as "heat trapping gases," greenhouse gases are natural or manmade gases that trap heat in the atmosphere and contribute to the greenhouse effect. Greenhouse gases include water vapor, carbon dioxide, methane, nitrous oxide, and fluorinated gases.

Anthropogenic Activities-: Emissions of greenhouse gases, greenhouse gas precursors and aerosols associated with human activities is known as anthropogenic emissions. These include burning of fossil fuels for energy, deforestation, and land use changes that result in net increase in emissions.

Adaptation - Adjustment in natural or human systems to a new or changing environment is known as adaptation. Adaptation is a process by which individuals, communities and countries seek to cope with the consequences of climate change. 'Adaptation is not coping', it is about the capacity to shift strategies as conditions change and to develop systems that are resilient and sufficiently flexible to respond to change. It may be planned or autonomous. Various types of adaptation can be distinguished, including anticipatory and reactive adaptation, private and public adaptation, and autonomous and planned adaptation.

Definition of key terms in Climate Change:

Mitigation- Technological change and substitution that reduce resource inputs and emissions per unit of output. Although several social, economic and technological policies would produce an emission reduction, with respect to climate change, mitigation means implementing policies to reduce greenhouse gas emissions and enhance sinks.

Vulnerability- The degree to which a system is susceptible to, or unable to cope with, adverse effects of climate change, including climate variability and extremes. Vulnerability is a function of the character, magnitude, and rate of climate change and variation to which a system is exposed, its sensitivity, and its adaptive capacity.

Resilience- The capacity of a system, community or society potentially exposed to hazards to adapt by resisting or changing in order to reach and maintain an acceptable level of functioning and structure is known as resilience. This is determined by the degree to which the social system is capable of organizing itself to increase its capacity for learning from past disasters for better future protection and to improve risk reduction measures. The ability of a system, community or society exposed to hazards to resist, absorb, accommodate to and recover from the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions. It is the amount of change a system can undergo without changing state.

Sustainability- Development that meets the needs of the present without compromising the ability of future generations to meet their own needs. It is usually noted that this requires the reconciliation of environmental, social and economic demands - the "three pillars" of sustainability.

United Nations Framework Convention on Climate Change (UNFCCC). This convention has been ratified by a broad cross-section of both developed and developing countries. The goal of the convention is to prevent dangerous human interference in the climate system. Achieving this goal is controversial despite the broad international consensus behind the convention.

The Intergovernmental Panel on Climate Change (IPCC) is perceived as the leading international body for the assessment of climate change. In the 23 years since its founding, it has become a key framework for the exchange of scientific dialogue on climate change within the scientific community as well as across the science and policy arenas.

Figure 21 shows the climate connections.

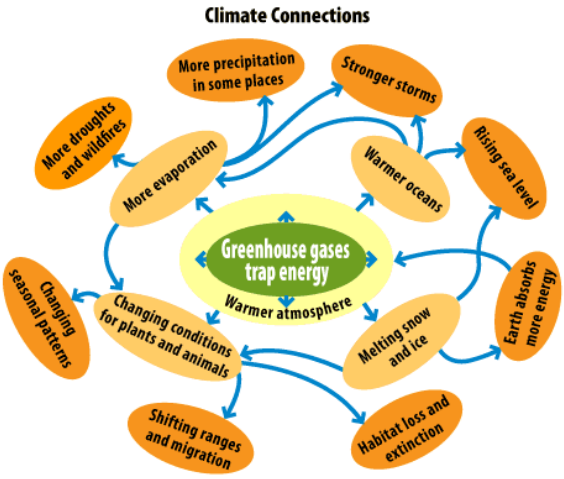
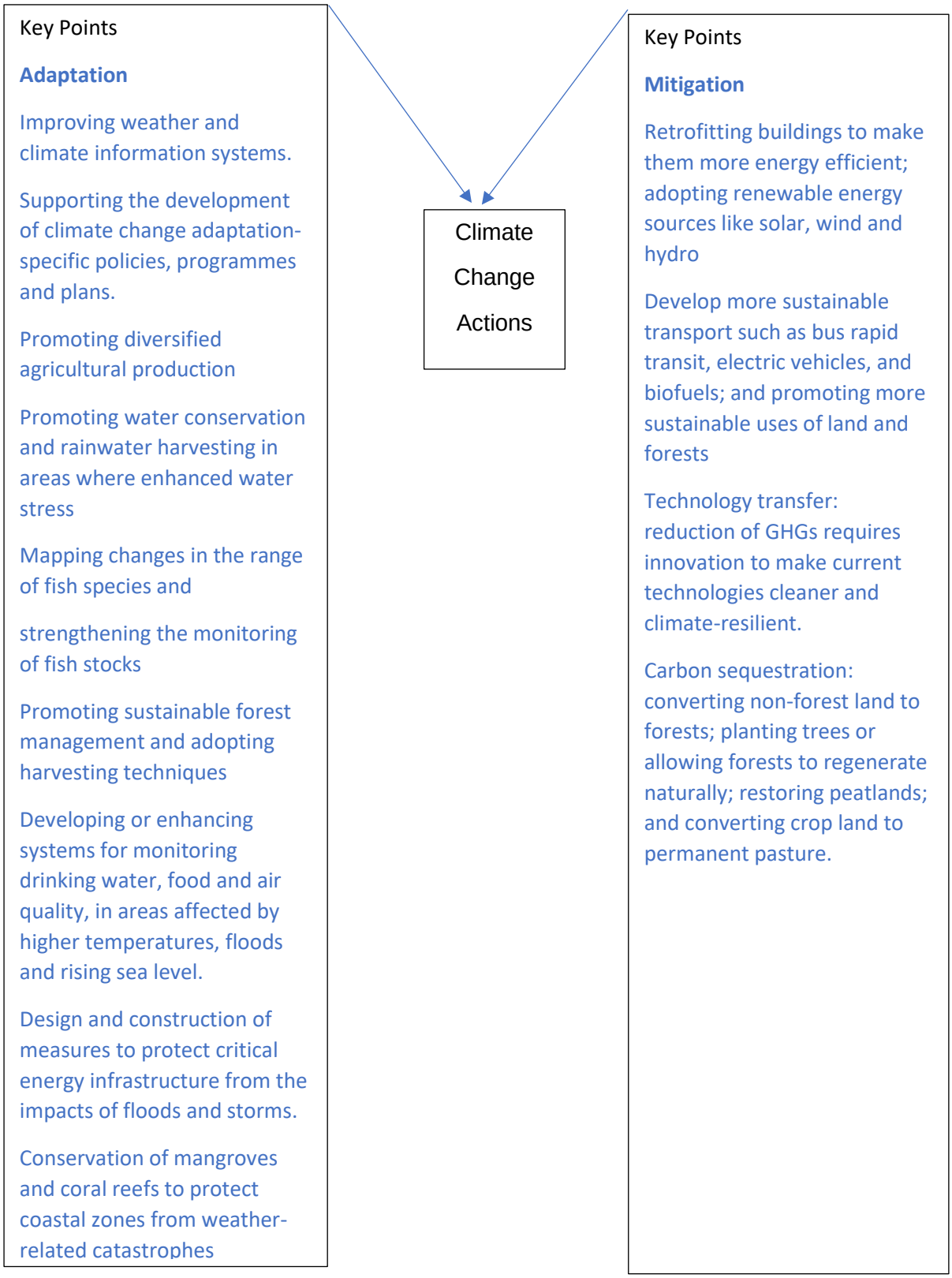


Figure *21*: The complex connections contributing to Climate


Key Points
Adaptation
Improving weather and climate information systems.
Supporting the development of climate change adaptation-specific policies, programmes and plans.
Promoting diversified agricultural production
Promoting water conservation and rainwater harvesting in areas where enhanced water stress
Mapping changes in the range of fish species and
strengthening the monitoring of fish stocks
Promoting sustainable forest management and adopting harvesting techniques
Developing or enhancing systems for monitoring drinking water, food and air quality, in areas affected by higher temperatures, floods and rising sea level.
Design and construction of measures to protect critical energy infrastructure from the impacts of floods and storms.
Conservation of mangroves and coral reefs to protect coastal zones from weather-related catastrophes
Climate Change Actions
Key Points
Mitigation
Retrofitting buildings to make them more energy efficient; adopting renewable energy sources like solar, wind and hydro
Develop more sustainable transport such as bus rapid transit, electric vehicles, and biofuels; and promoting more sustainable uses of land and forests
Technology transfer: reduction of GHGs requires innovation to make current technologies cleaner and climate-resilient.
Carbon sequestration: converting non-forest land to forests; planting trees or allowing forests to regenerate naturally; restoring peatlands; and converting crop land to permanent pasture.

5.7.2 What causes climate change

Key points:

Burning of fossil fuels such as coal related products leads to release of greenhouse gases, such as carbon dioxide, into the air

Greenhouse gases trap heat in the atmosphere

Trapping of heat causes an increase in atmospheric temperatures, called global warming

The warming of the earth affects other resources that are linked to climate (as shown Figure 22) such as water, land and plants, etc.

Human activities (anthropogenic activities) are mainly responsible for climate change.

Humans are increasingly influencing the climate and the earth's temperature by burning fossil fuels, cutting down forests and farming livestock. This adds enormous amounts of greenhouse gases to those naturally occurring in the atmosphere, increasing the greenhouse effect.

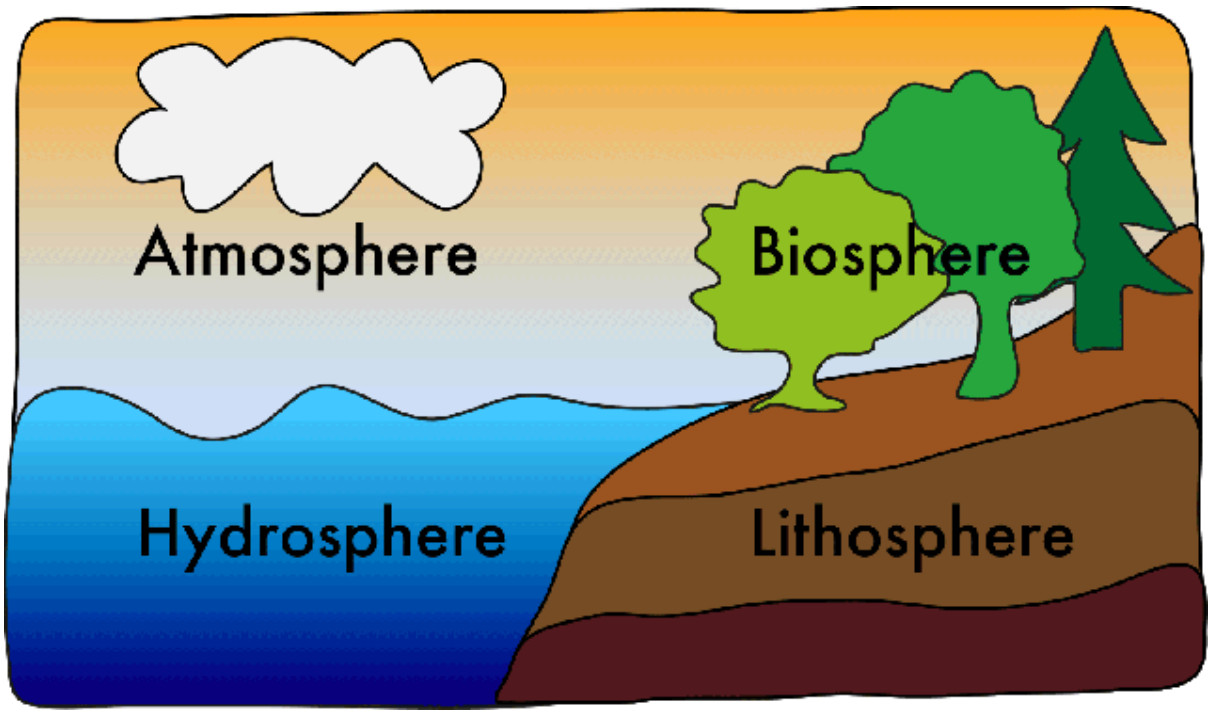


Figure 22: *The Earth Systems*

Atmosphere- Blanket of air surrounding the earth-oxygen, carbon dioxide, nitrogen etc

Hydrosphere- Water in oceans/seas, rivers and rainfall

Lithosphere- Crust of the earth-rocks/ boulders, cliffs

Biosphere- All life on earth- Human, plants, animals, fish, insects

5.7.3 Climate change Impacts and effects on water resources

The vulnerabilities of water resources to climate change are listed on Figure 23.

Figure 24, Figure 25, and Figure 26 present some of the impacts of climate change that were recently observed in some Southern African countries.

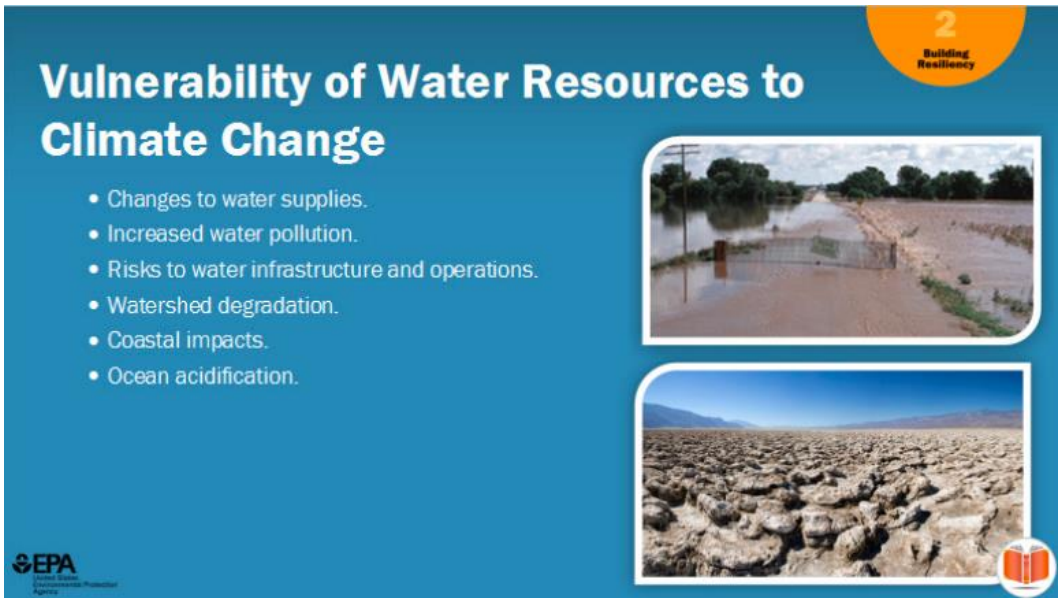


Figure *23*: *Vulnerability of Water Resources to Climate Change. Source: https://www.epa.gov*

Figure *24*: Floods in Mozambique (2013)

Figure *25*: Hailstorm Lesotho (2018)

Figure *26*: Drought in South Africa (2018)

5.7.4 Climate change and energy

Key points:

While there is plenty of potential for clean renewable energy sources (Figure 27) in the SADC regions, there is low access, mainly as a result of lack of appropriate infrastructure to harness it.

As a result, the use of some non-renewable sources of energy have caused an increase in greenhouse gas emissions.

This is projected to continue, driven primarily by economic growth and the rising population.

Temperature increase, increasing number and severity of extreme weather events and changing precipitation patterns will affect energy production and delivery.

Climate change impacts on energy will eventually lead to:

- Droughts, drying up of hydropower reservoirs
- Heavy floods cause siltation and clogging of hydro power plants
- Strong winds and heavy snows cause destruction of energy infrastructure
- Weather variation reduces predictability probability;
- Extreme cold or hot conditions increases energy consumption

Figure *27*: Renewable energy (solar and wind)

5.7.5 Why should you be involved in addressing climate change?

The costs of climate change are already being felt today and if measures are not taken as of now, tomorrow's 's population will suffer terrible results in the future. The climate crisis is real and it's impacting people around the world today and Southern Africa is no exception to these impacts. From our well-being to our wallets, we're seeing the effects of a world transformed by rising temperatures and changing climate patterns, and the outlook is about as far from getting us relaxing.

When we pollute the atmosphere by using dirty energy sources like coal, and gas, we end up with dirty weather. Climate change poses a huge threat to something people need above all

else; water. We need it for drinking and of course, also for growing food. Farmers around the world depend on a stable climate to grow their crops and put food on our plates. But as climate change leads to more droughts, floods, and extreme weather, we see harvests wither or wash away.

Again, we should note that extreme weather linked to climate change also has huge economic outcome. The warmer it gets, the bigger the hit to the economy. Hot weather, flooding and other extreme weather events damage infrastructure, put heavy burdens on electrical supplies and disrupt how we travel and commute. The economy is also threatened by climate change including sectors such as; Tourism, Agriculture, Rangelands, Forestry, Energy, Transport and many others posing a potential economic loss to the country's GDP.

Without knowledge and understanding of the social, economic and environmental impacts of climate change, how can we expect people to be ready to deal with the consequences and help find the solutions? Climate change is one of the greatest problems facing us today and it is imperative that communities learn not just the science, but also its impacts. The creativity of young people is invaluable in the search for innovative solutions to climate change. Starting today, now, we need to change our lifestyles and our attitudes. We need to produce, transport, consume, regulate, govern and think differently.

Public participation can play an important part in efforts to achieve climate neutrality. Proposed measures can be undertaken and will include:

- Periodic education and training of communities on climate change
- Access to information through various platforms; media fora and others
- Consultations
- Participation in projects implementation
- Lobby for financial assistance
- Establish Networks and partnership
- Practice smart approaches to agriculture
- Best water management practices
- Pollution remediation on energy sources and use transportation
- Biological conservation .....and much more!!!

The climate challenge is large and complex. But it is very likely that many people, working from many angles, can help address climate change and its consequences.

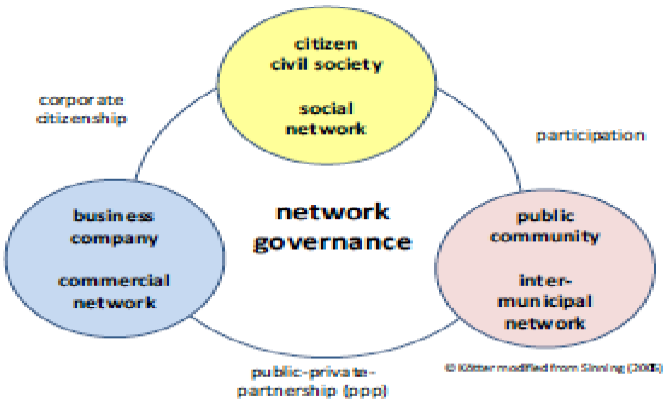


Figure *28*: Network Governance and Stakeholder Participation on Climate Change Source:

Participant's own notes:

MODULE 6

6. THE GOVERNANCE OF WATER RESOURCES MANAGEMENT

Learning Objectives

- Understand the role of governance in achieving sustainable management of water resources and access to water for all
- Understand the principles of good governance and stakeholder engagement

6.1 What is water governance?

The oxford dictionary defines governance as the art or manner of exercising control or authority over the actions of subjects and systems of regulations.

water resources governance, therefore, refers to the system through which decisions on water resources management are made and enforced. This is explained in more detail in the following sections.

6.2 Good governance in water resources management

6.2.1 Definition of good governance

The Organization for Economic Co-operation and Development's (OECD) definition of good governance has been chosen for the purpose of this document:

"Good governance is participatory, consensus oriented, accountable, transparent, responsive, effective and efficient, equitable and inclusive and follows the rule of law. It assures that corruption is minimized, the views of minorities are considered and that the voices of the most vulnerable in society are heard in decision-making."

As with IWRM, good governance can best be expressed through a number of principles, such as social equity, transparency and accountability. The theory is that governance improves as these principles increasingly form the basis of the overall binding rules for policy implementation.

In fact, the IWRM principles are easier to apply if a good governance framework is in place at all administrative and hydrological levels (1.4).

6.2.2 Principles of good governance

As stipulated above, the principles of good governance are Social inclusion, Transparency and Accountability. Figure 29 shows the principles of good governance and how they can lead to good governance if they are applied and how they can lead to bad governance if they are not applied.

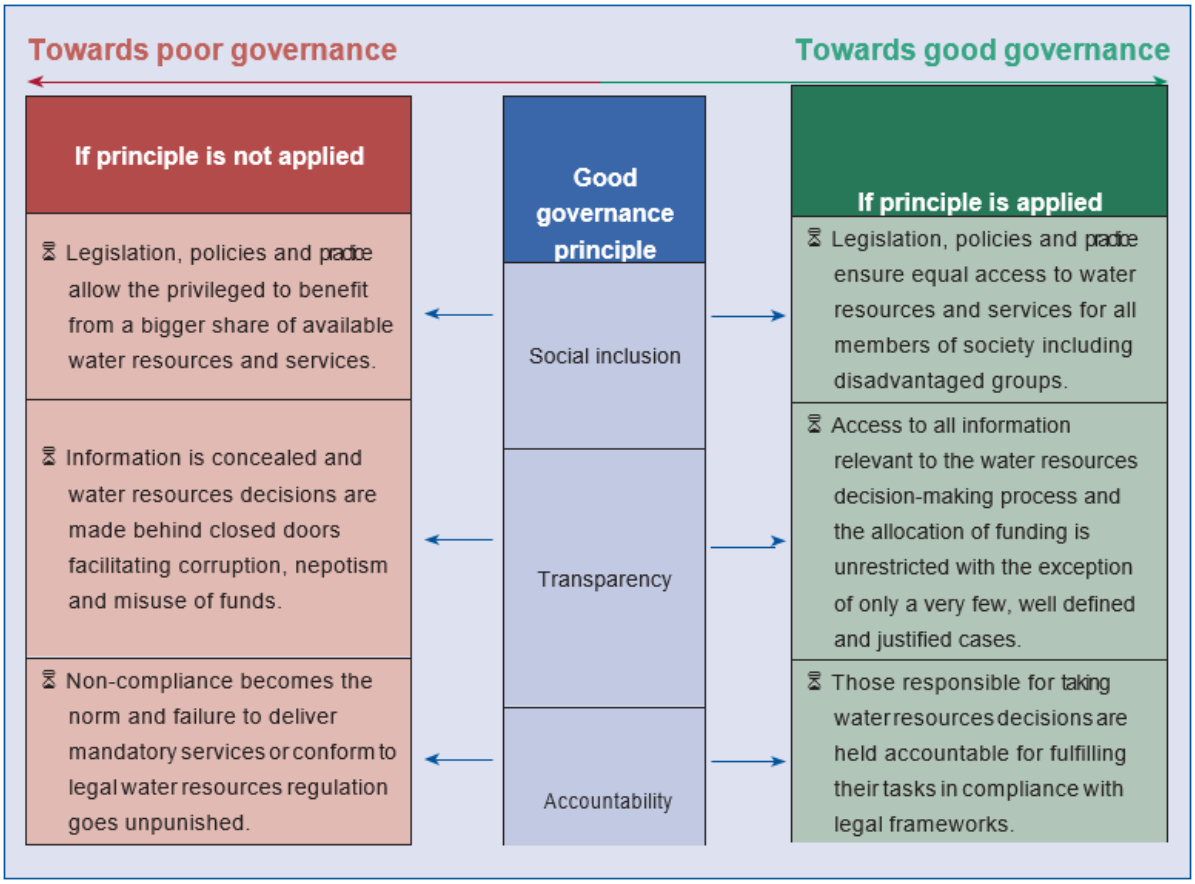


Figure *29*: The principles of social inclusion, transparency and accountability and their role in 'good' or 'poor' governance.

6.3 Stakeholder participation in decision making

The benefits of bringing all stakeholders on board are manifold and improve the likelihood of 'doing things right'. This is because a comprehensive stakeholder involvement can:

- help complete the compilation and understanding of data and other information on local water resources and their uses;
- provide a deeper understanding of local issues and contribute to identifying future priorities;
- draw attention to different or even opposing interests of stakeholders and help address conflicts
- before they escalate into major clashes;
- bring in more ideas, resources and capacities to share the responsibilities for managing water resources;
- create a sense of ownership within the local community for water resources management and development; and
- strengthen awareness on the true value of water for a sound livelihood

Participant's own notes:

MODULE 7

7. PUBLIC POLICY DEVELOPMENT

Learning Objectives

- Understand the role of policy in sustainable development
- Formulate a policy and be able to identify, and give reference, to the relevant higher-level legal instruments
- Identify stakeholders and develop strategies for their engagement
- Be able to implement the existing energy and energy policies.
- Apply the appropriate tools for policy formulation

6.1 Introduction to Public Policy

Key points:

What is public policy?

- Public policy is what the government actually decides or chooses to do, or NOT to do.
- Public Policies are goal oriented
- Public policy is the outcome of the government's collective actions.
- Public policy is made as the means to solve a particular problem or concern in a society through a course of action.
- It also involves a decision by the government not to take any action on a particular issue.
- A policy entails making a choice among alternatives
- It puts the spotlight to the public and its problems
- It is a mechanism for developing socio-economic system that enables society to lead a better life
- It assists in maintaining the delivery of the goods and services.

6.2 Public Policy Formulation

Key points:

In developing a policy, there has to be a balance between wide range of competing interests and the desired outcome.

Policy Cycle

Policy development is a process which is often defined through a Policy Cycle as shown on Figure 30

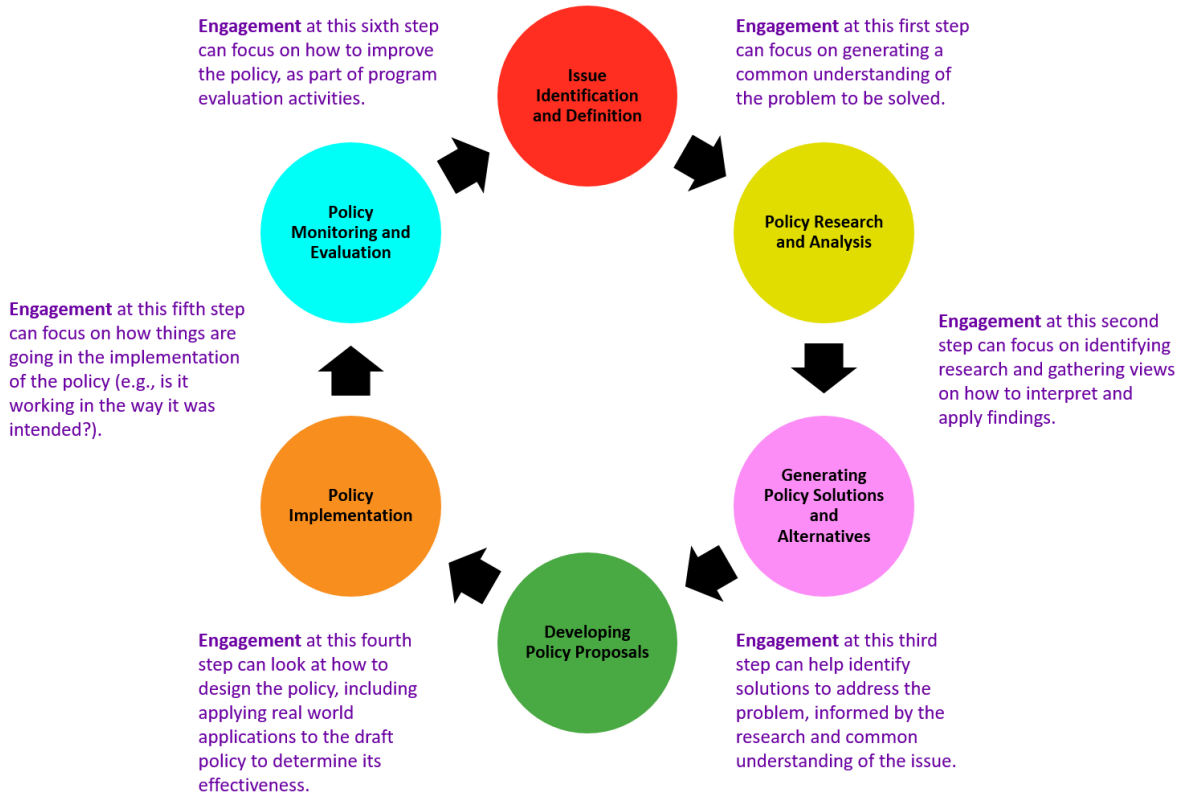


Figure *30*: The Policy Cycle

A policy cycle generally includes the following stages:

a. Identification of policy problems, through demands for government action

Identification of a societal problem and its placement on the policy agenda is a starting point in policy formulation process. There are many societal problems, but only a small number will be given official attention by legislators and executives, hence will constitute policy agenda. Decisions need to be made on what, whether and how to proceed. This will involve discussions about the issue, the information needed, the key actors to be consulted and the policy options that may be available.

b. Agenda setting or focusing the attention of public officials on specific public problems

Agenda setting is the first phase, the issue-sorting stage, during which some concerns rise to the attention of policy makers while others receive minimal attention or are neglected completely. The importance of this phase lies in the fact that there are thousands of issues that might occupy the attention of policy makers, but in practice only a handful actually do gain their consideration.

Key points:

A problem is identified

The problem is studied

Options are prepared for a solution

The options are studied

An option is chosen

The option is implemented

The problem is solved

c. Formulation of policy proposals, their initiation and development by the policy planning organisations, executive, legislative and interest groups

This step defines the structure of the policy. What goals need to be achieved? Will there be additional implications? What will the costs be? How will key stakeholders react to these effects? It involves reviews of the available evidence, and discussions with key stakeholders and opinion formers. It will also include some initial analysis of the issue in question, of the options for action, and of the merits of alternative courses of action.

d. • Adoption and legitimation of policies through the political actions of the government, interest groups, and political parties

When making decision on the policy measures to be adopted, policymakers will assess the likely effectiveness of the options available (including the 'do nothing' option), the financial costs and benefits of taking action, and the political implications of taking action. Once the appropriate approval is granted, then a policy can be adopted.

e. Implementation of policies through bureaucracies, public expenditure and activities of executive agencies

Implementation refers to translation of new laws and programmes into practice. Establishing that the correct partners have the resources and knowledge to implement the policy. For successful implementation, there should be an institution (Public officers) mandated to turn the objectives into operational framework and should be held accountable for actions. This could involve creating an external organisation to carry out actions. Policy means nothing if there is no proper implementation so monitoring is necessary to ensure correct policy implementation.

f. Evaluation and analysis of policy implementation and impact

This step assesses the effectiveness and success of the policy. Did any unpredicted effects occur? These assessments can be quantitative and/or qualitative. It involves reviewing the effectiveness, the dependability, the cost, the intended and unintended consequences, and other relevant features of the policy measure in question. This step studies how the policy might be improved, or provides additional support for its continuation. Additionally, the policy can be terminated if deemed redundant, accomplished, or ineffective.

6.3What can the Political Actors do to influence Public Policy implementation?

- The political parties can **develop committees that are responsible for natural resources public policy influence**. It is very important for the political actors to strive towards evidence-informed policymaking. This committee can be established by members in the political party who are experts in the fields related to natural resources management. Alternatively, in order to achieve that, the committee may also be tasked with the responsibility to approach the technocrats for advice on natural resource management. This committee may be responsible for pushing these policies from their party perspectives.
- To **identify the problems** that are relevant to water and energy from the communities. These include; lack of access, bad water quality and degradation, issue of allocation, tariffs on water, transboundary issues-*how to engage other states in infrastructure development of water resources.*
- Once the problems have been identified, the PAs can work in collaboration with technical people to **analyse the issues to understand what the causes** are and **how the problems can be solved**.
- To **place the issues on the public space** so that they can lobby for them. These issues will be factual because they were identified with an oversight of the technocrats in the field.
- Once these factual issues have been identified (these based on data and expertise support), **they can be used to build their manifestos and their lobbying campaigns**. Through this approach, their campaigns will be based on facts. This goes for those that are in parliament and those that are in government, even those that are outside of parliament.
- Through the same approach, the **political actors that are outside of parliament can take the government to task** based on facts that are evidence based.

- They can push for the establishment of institutions that manage water and energy, their financing and the implementation of their policies.
- Once the policy gets implemented, there is a need to track the policy implementation to ensure that the policy is being implemented according to what is intended. This role can be played by those in government and those outside of government.
- They undertake monitoring and evaluation (M&E): If there are challenges with implementation, there is a need to go back a refine improve or change the approach.
- States have international obligations that include treaties, conventions, development goals (e.g. SDGs), etc. So, it is the responsibility of the political actors, in particular those that are in opposition to put the government to task and evaluate budget allocations and government plans to ensure that they are in line with the international obligations that the state is a signatory to.
- It is necessary for the states to develop policies that improve water resources management, alternative water sources, conjunctive uses of water, water harvesting, re-use-reduce-and-recycle, etc., in order to relieve the water supply institutions thereby improving access to water for all.
- In as far as access to energy is concerned, develop policies that provide incentives for people who utilise clean energy sources such as solar energy, including subsidies on purchase of such products. As we saw in Module 4 section Error! Reference source not found. where solar energy is installed in Malawi rural areas (Error! Reference source not found.) and in the township of South Africa (Error! Reference source not found.).

Participant's own notes:

References

Global Water Partnership (2011). What is IWRM? Available at: https://www.gwp.org/en/GWP-CEE/about/why/what-is-iwrm/. (Accessed: 28th November 2021)