NaDEET
Learning & living for a sustainable future

TEACH for ESD

ENVIRONMENTAL KNOWLEDGE

Environmental Concepts

The Global Environmental Crisis

Namibia's Environmental Challenges

TEACH FOR ESD TOOLKIT GUIDE 1

Teach for ESD - Toolkit Guide 1

ENVIRONMENTAL KNOWLEDGE

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OVERVIEW

Regardless of our background and the subjects we teach, if we want to implement Education for Sustainable Development (ESD), we need to have a good foundation of **environmental knowledge**. In other words, we need to become **ecologically literate**. This includes having a clear understanding of different environmental terms and concepts, such as biodiversity and our Earth's climate system. This gives us the basis that we need to learn about the causes, impacts and solutions to the **environmental crisis,** which is an **interconnected, multi-dimensional wicked problem** on a global scale. Lastly, we can focus on exploring climate change, land-use change, pollution, water scarcity and biodiversity loss from a local perspective.

TABLE OF CONTENTS

ENVIRONMENTAL CONCEPTS

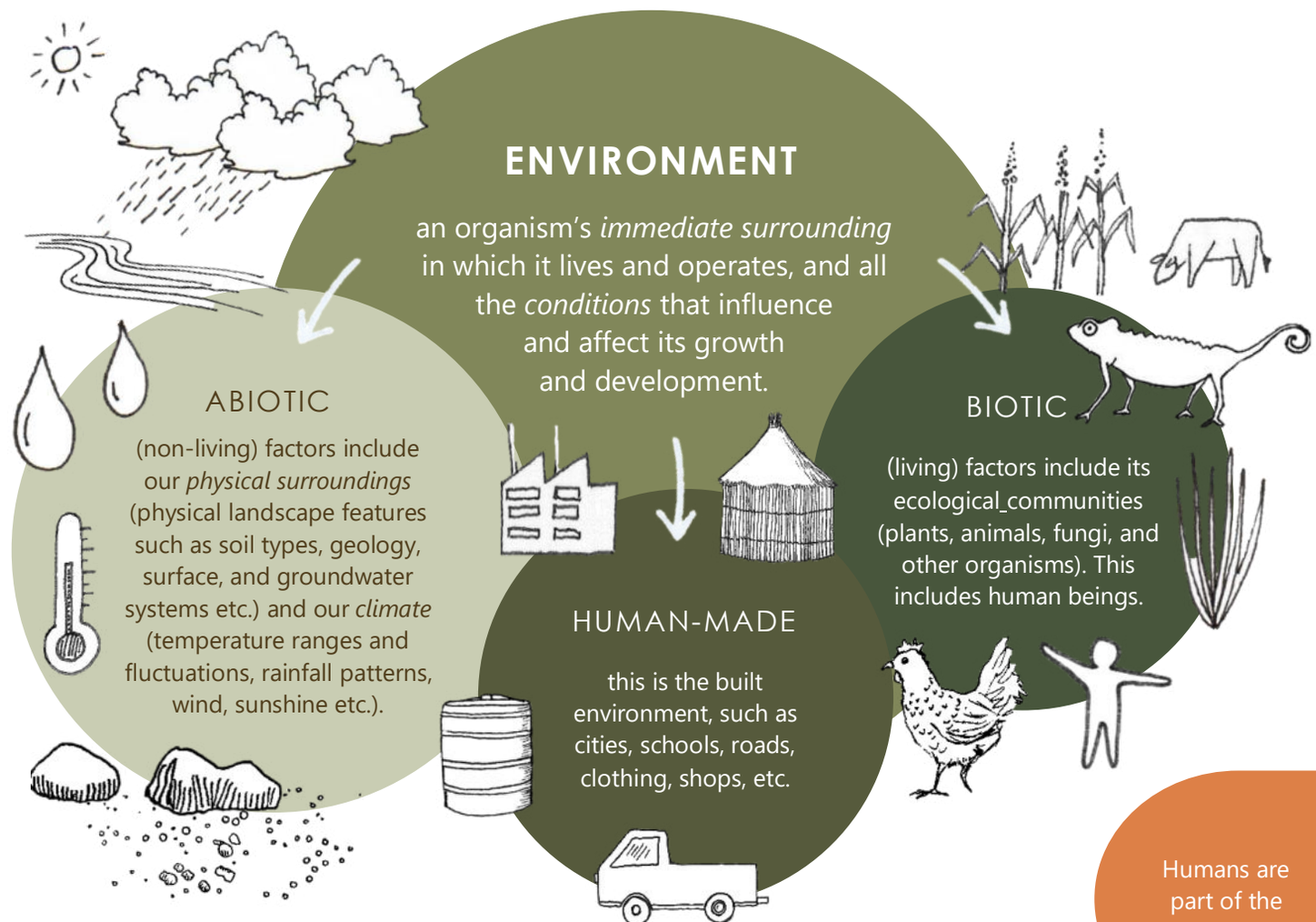
In this first section we look at environmental terms and concepts, at the global scale and in the context of Namibia's fascinating environment. These terms and concepts are important to understand for us to become **eco-literate**, and to recognise that if we harm the environment, we harm ourselves.

ECO-LITERACY

An in-depth appreciation for and understanding of how ecological systems function on Earth, to create sustainable human communities.

WHAT IS THE ENVIRONMENT?

The term environment might be simple, but it can encompass many different layers and is extremely complex - and exciting to explore. In simple terms, the word *environment* means 'surroundings' and can be used in various contexts, for example, in education we talk about 'the school environment'. So, what do we mean when we talk about the "natural environment?", "protecting the environment?" or "teaching about the environment"?



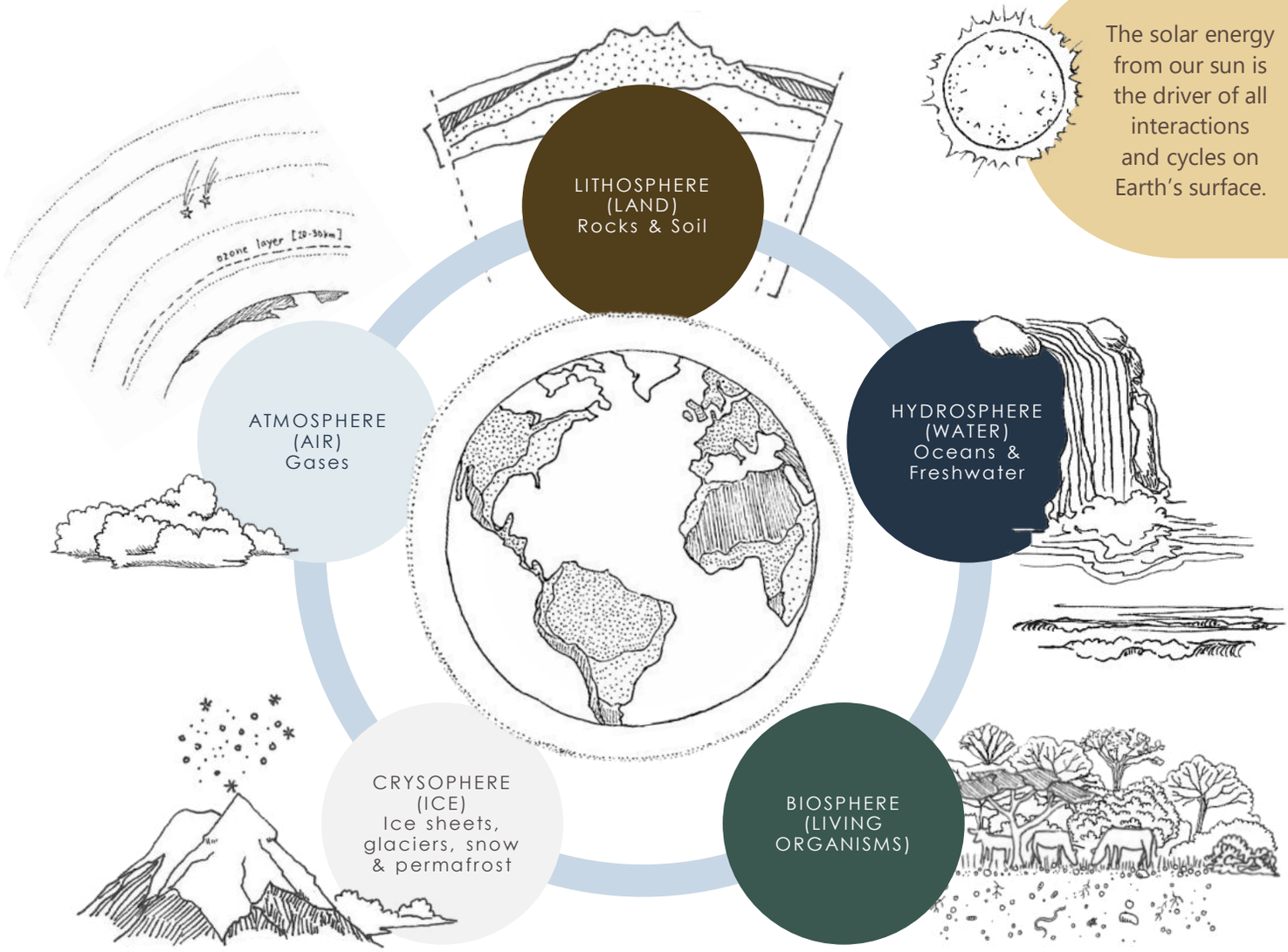
Humans are part of the environment!

RESOURCE CHECK

To learn more about the term environment watch the video ***Basic Concepts of Ecology and Environment***.

THE EARTH AS A SYSTEM

Let us start with the "bigger picture", by looking at our home planet, Planet Earth the only place where life as we know it, can exist. Our planet works like a large complex ecosystem, an **Earth System**: it is composed of living and non-living components that *interact* with one another. We can look at the Earth System as being composed of four non-living spheres and one living sphere:



The solar energy from our sun is the driver of all interactions and cycles on Earth's surface.

RESOURCE CHECK

To understand Earth's spheres in the context of Namibia, read **Chapter 2.1 – 2.4** in the Namibian book ***Environmental Awareness for Sustainable Development***.

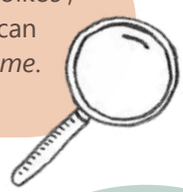
"(T)he different spheres of the planet and how they work and interact … are important to understand because if one does not appreciate how the planet 'works' to keep humanity alive, then one will not appreciate why it is so important to utilise it responsibly."

ENVIRONMENTAL AWARENESS FOR SUSTAINABLE DEVELOPMENT – A RESOURCE BOOK FOR NAMIBIA

ECOLOGY

Ecology is a field within the natural sciences that studies ecological systems (ecosystems): the *interactions* between living organisms with each other and their non-living environment. These interactions can be studied at different levels of organisation:

The term 'eco' comes from the Greek word 'oikos', which means 'house' or 'home'. Ecology can therefore be translated as the *study of home*.

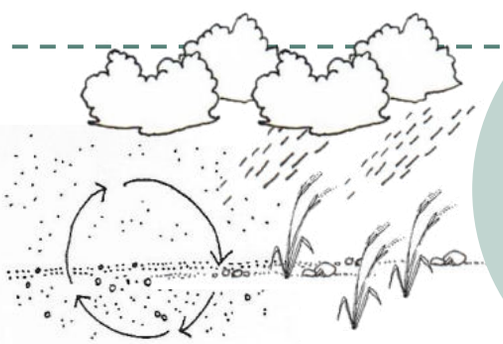


BIOSPHERE

Earth's self-regulating *zone of life*. It is the sum of all biomes and ecosystems of the world.

BIOME

A large geographical area that entails a *collection of ecosystems* that share similar *climates*, plants, and animals.

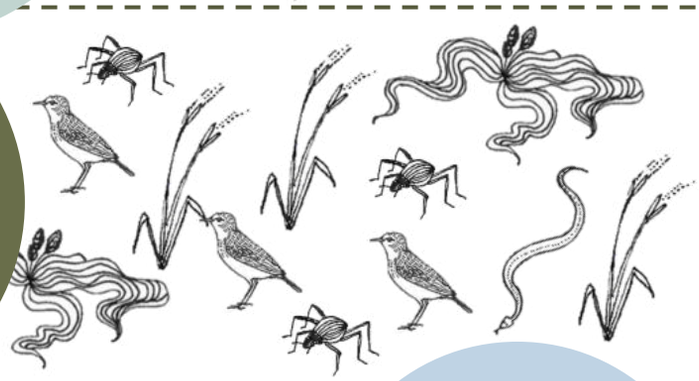


ECOSYSTEM

The *interaction* among *living organisms* as well as their interaction with the *non-living e*nvironment.

COMMUNITY

A group of populations of two or more *different* species occupying the same geographical area at the same time.



POPULATION

The *number* of organisms of the *same species* that live in a particular *geographic area* at the *same time*.

SPECIES

A group of organisms consisting of *similar individuals* capable of *producing fertile offspring*.

ORGANISM

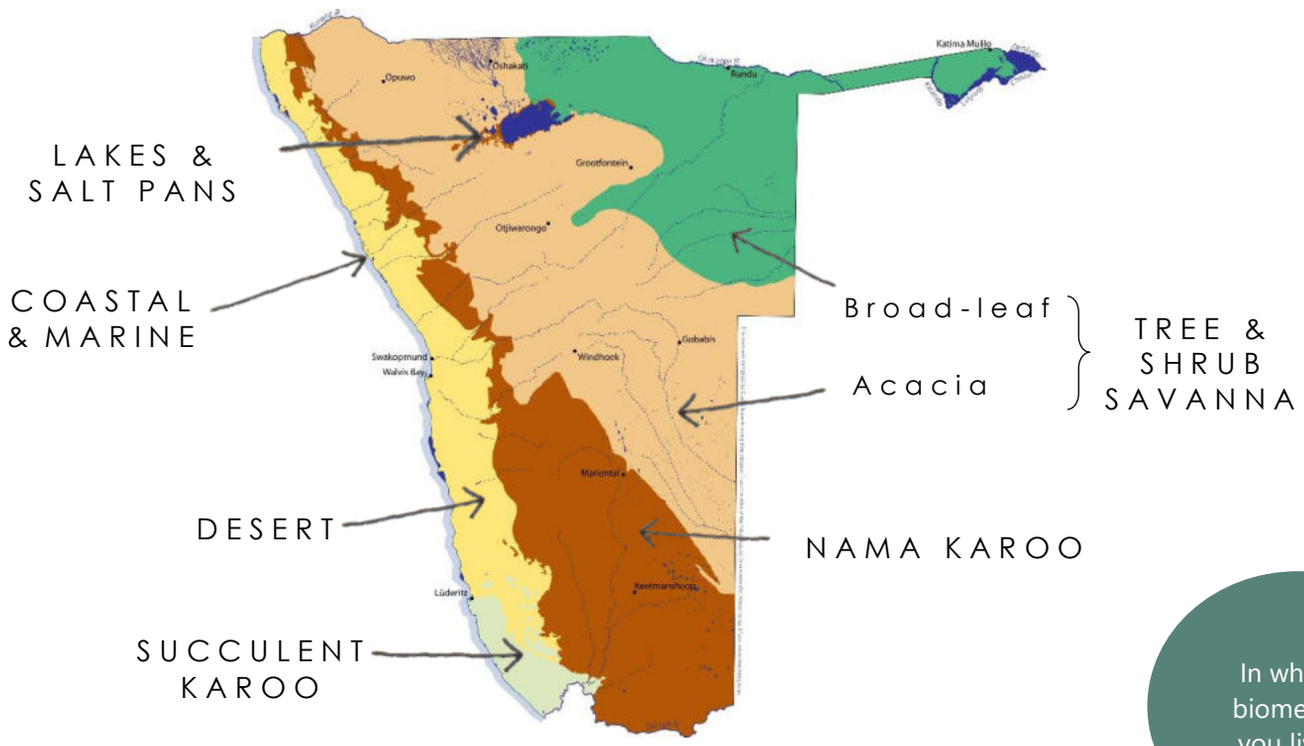
One living individual of a species.

RESOURCE CHECK

Watch the ecology videos ***Introduction to Ecology*** and ***Key Terms in Ecology***.

NAMIBIA'S BIOMES

Namibia has six different biomes in total: four terrestrial and two aquatic biomes can be further divided into different vegetation types - Namibia has 29 different vegetation types.



MAP OF NAMIBIA'S BIOMES

In which biome do you live?

RESOURCE CHECK

To learn more about Namibia's biomes and vegetation types, read **Chapter 2.5** in ***Environmental Awareness for Sustainable Development.***

COASTAL & MARINE BIOME

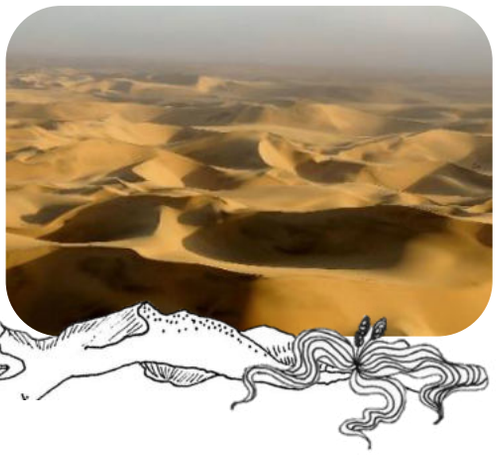
This biome covers the western coast of Namibia. The cold Benguela current that runs north along the coastline is responsible for our cold, nutrient-rich upwelling system. This accounts for our shores being one of the richest fishing grounds in the world! Our coastlines are characterised mainly by sandy beaches, but also include other habitats such as rocky shores and estuaries. The entire coast of Namibia is protected by a network of parks including the Dorob National Park.

RESOURCE CHECK

Learn more about our marine biome by reading *EduVenture's* ***Ocean Literacy*** teachers guide and the book ***Namibia's Coast***.

DESERT BIOME

This biome dominates the terrestrial parts of the Namibian coastline and extends inland. Here, coastal fog is the main source of water for most species, as annual rainfall is extremely low. Ephemeral rivers, sand dunes and gravel plains are unique features providing habitat to many species. The Namib Sand Sea is a UNESCO Heritage Site since 2013 – it contains some of the highest dunes in the world.



SUCCULENT KAROO

This small biome is found in the south-western corner of Namibia, extending into South Africa. It is dominated by succulent shrubs and dwarf shrubs. It boasts the greatest plant diversity in Namibia! The Tsau//Khaeb National Park is one of two **biodiversity hotspots** found in Namibia.

BIODIVERSITY HOTSPOT

A region with exceptional levels of *plant endemism*, experiencing high levels of *habitat loss*.

NAMA KAROO

Found in the south-eastern part of Namibia, this biome is a thin strip extending to the north-western corner. Dwarf shrubs dominate this biome, which experiences a harsh daily and seasonal temperature variation and annual rainfall of 100-200 mm. One of Namibia's main geological features, the Fish River Canyon, spans across the Succulent Karoo and Nama Karoo. It is the second largest canyon in the world!

Within the Nama Karoo and several other biomes, Namibia has a unique geological feature called **inselbergs**. These inselbergs have their own unique features and are attractive to visit.

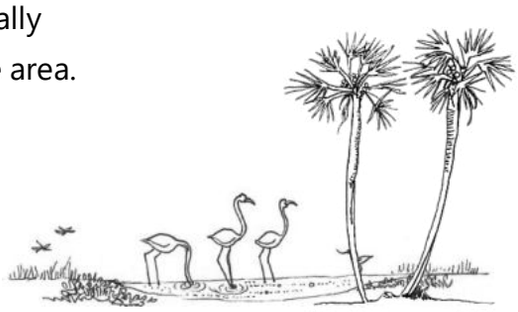
BRANDBERG
Also known as the Dâures, Namibia's highest *massif* is 2573m high.

SPITZKOPPE
Located near Usakos, the large Spitzkoppe is 1728m high.

INSELBERG
An "island" "mountain" that is isolated from the plains around it.

LAKES AND SALT PANS

This biome includes both lakes and salt pans. We have two natural lake systems in Namibia: Lake Liambezi in Zambezi and the Omadhiya Lake Complex in Oshana. While Etosha is the largest salt pan, there are thousands of other salt pans scattered throughout Namibia. The lakes and pans provide important areas for birds and other animals, especially after rainfall. Etosha National Park is one of Namibia's most iconic features with the Etosha pan in the centre surrounded by savanna biomes. Lake Otjikoto and Lake Guinas, technically 'sinkholes', give a glimpse of the underground water system in the area.



RESOURCE CHECK

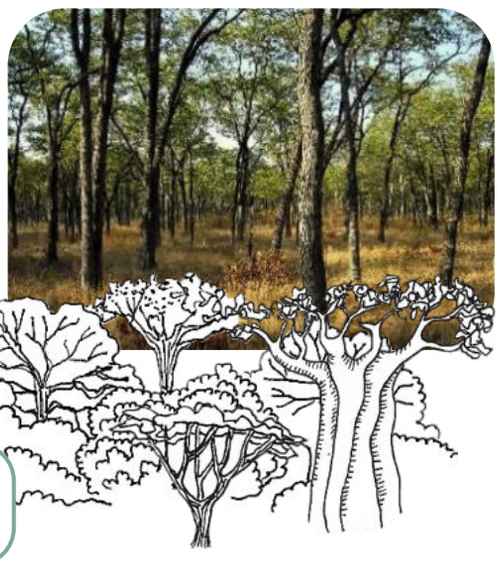
Use the booklet ***Wetlands of Namibia*** to learn more about the importance of these freshwater systems.

TREE & SHRUB SAVANNA

This biome occupies the north-eastern half of Namibia, but depending on the type of soil, amount of annual rainfall and altitude, it can be split into two sub-biomes: *acacia savanna* and *broad-leafed savanna*.

The **acacia savanna** is dominated by acacias, such as camel thorn, and a wide variety of grass species. It supports large populations of herbivores, livestock and large predators. The acacia savanna receives 250 – 400 mm of rain annually. Daan Viljoen Game Reserve, large portions of central Namibia and the vegetated Kalahari are in this biome. It includes major urban areas such as Windhoek, Otjiwarongo and Opuwo.

The **broad-leafed savanna** is characterized by deciduous tree species such as mopane, Zambezi teak and wild seringa. These forests support large mammals, such as elephants, hippopotamus, and buffalo. The broad-leaf savanna receives 450 - 700 mm of rain annually. The area is special for its wood production and subsistence farming. This biome can be visited along the Zambezi and Okavango Rivers. Other interesting features are the Popa Falls and the Waterberg Plateau Park.



RESOURCE CHECK

See the ***Namibia's National Parks Brochures*** in **Toolkit 3.9** to explore beautiful destinations within our country's biomes.

BIODIVERSITY

Biodiversity is vital to sustainability, but why?

When ecosystems are more biodiverse, they can develop a larger variety of *relationships*, *functions,* and *processes*, and they are more *resilient* and adaptable to changes. We obtain benefits from biodiversity, at all levels – the genetic, species and ecosystem level. Let us explore these in more detail.

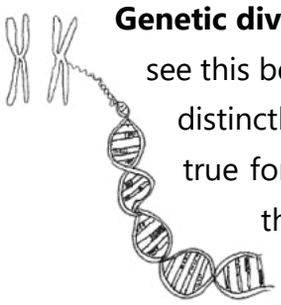
BIODIVERSITY
(Biological Diversity)

The biological variety and variability of life on Earth. It includes all the different types of living organisms, within an area (known as species diversity), as well as the genetic variation among species, and different types of ecosystems.

RESOURCE CHECK

Read **pg. 67** in ***Environmental Awareness for Sustainable Development*** and watch the video ***Why is biodiversity so important?***

GENETIC DIVERSITY



Genetic diversity is the biological variation that occurs *within* a species. We can see this best among our own species, *Homo sapiens*: every human individual is distinctly different, in appearance, personality, talents etc. The same is true for other species. Species are better able to adapt to changes in their environment, if their population has a large genetic diversity.

SPECIES DIVERSITY

Species diversity is simply the different types of species found within an area. This includes multicellular plants, animals, fungi, and unicellular microorganisms such as bacteria. Species are identified, organised, and named according to the taxonomic system.

TAXONOMY

the science of classifying, describing, and naming (of) species or groups, according to certain criteria.

Scientists have identified about **1.7 million** species but estimate that there are probably around **13 million** species on Earth!

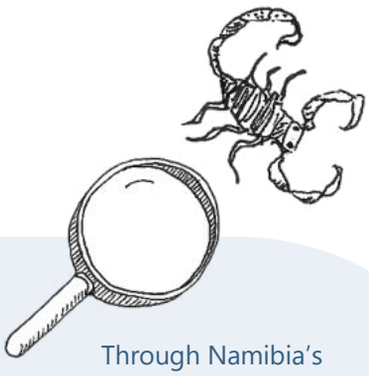
All species are classified into the following groups:

Kingdom
Phylum
Class
Order
Family
Genus
Species

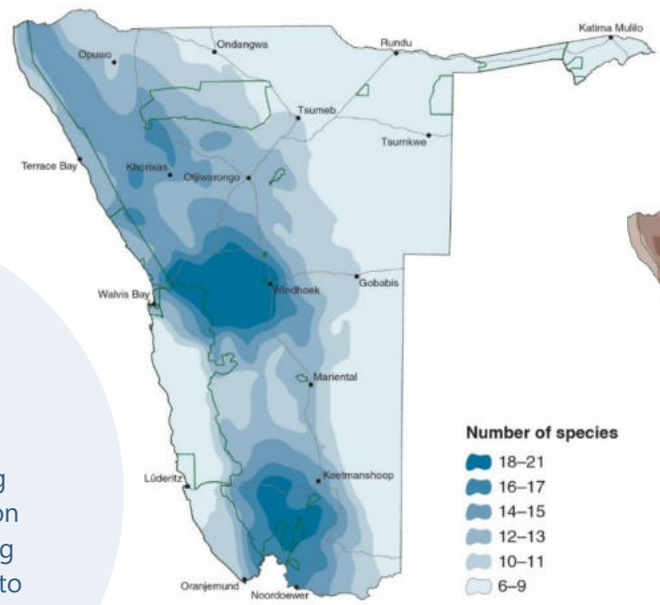
We can also look at **patterns of species diversity** and **endemism** for different groups within a geographical area. For example, Namibia has many species of scorpions which mostly occur in rocky arid areas in southern and western Namibia. Some of these species occur throughout southern Africa, however a significant number of scorpion species **can only be found in Namibia**!

ENDEMISM

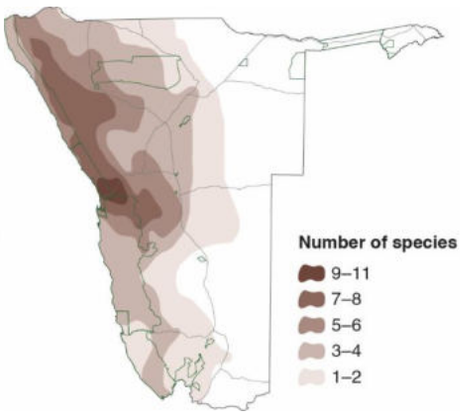
When a species is *unique to a defined geographical area* and is usually restricted to that area.



Through Namibia's various research institutes, partnerships and projects, scientists study our country's natural environment. Gathering and sharing scientific information is key for stakeholders, including decision-makers and educators to protect our most important species and ecosystems.



SCORPION DIVERSITY



SCORPION ENDEMISM

Adapted from ATLAS OF NAMIBIA: ITS LAND, WATER AND LIFE

RESOURCE CHECK

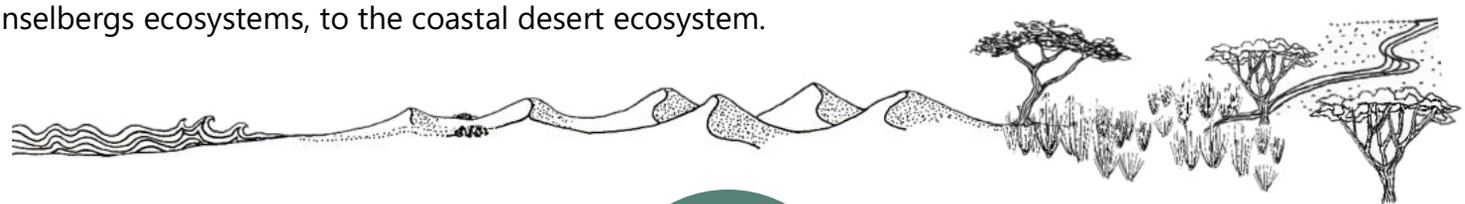
A very informative online database for Namibian-specific research articles, maps and other resources is the **Environmental Information Services – Namibia** (EIS).

RESOURCE CHECK

Read **Chapter 6** and **7** for facts and figures on plant and animal biodiversity in the ***Atlas of Namibia: its land, water and life***.

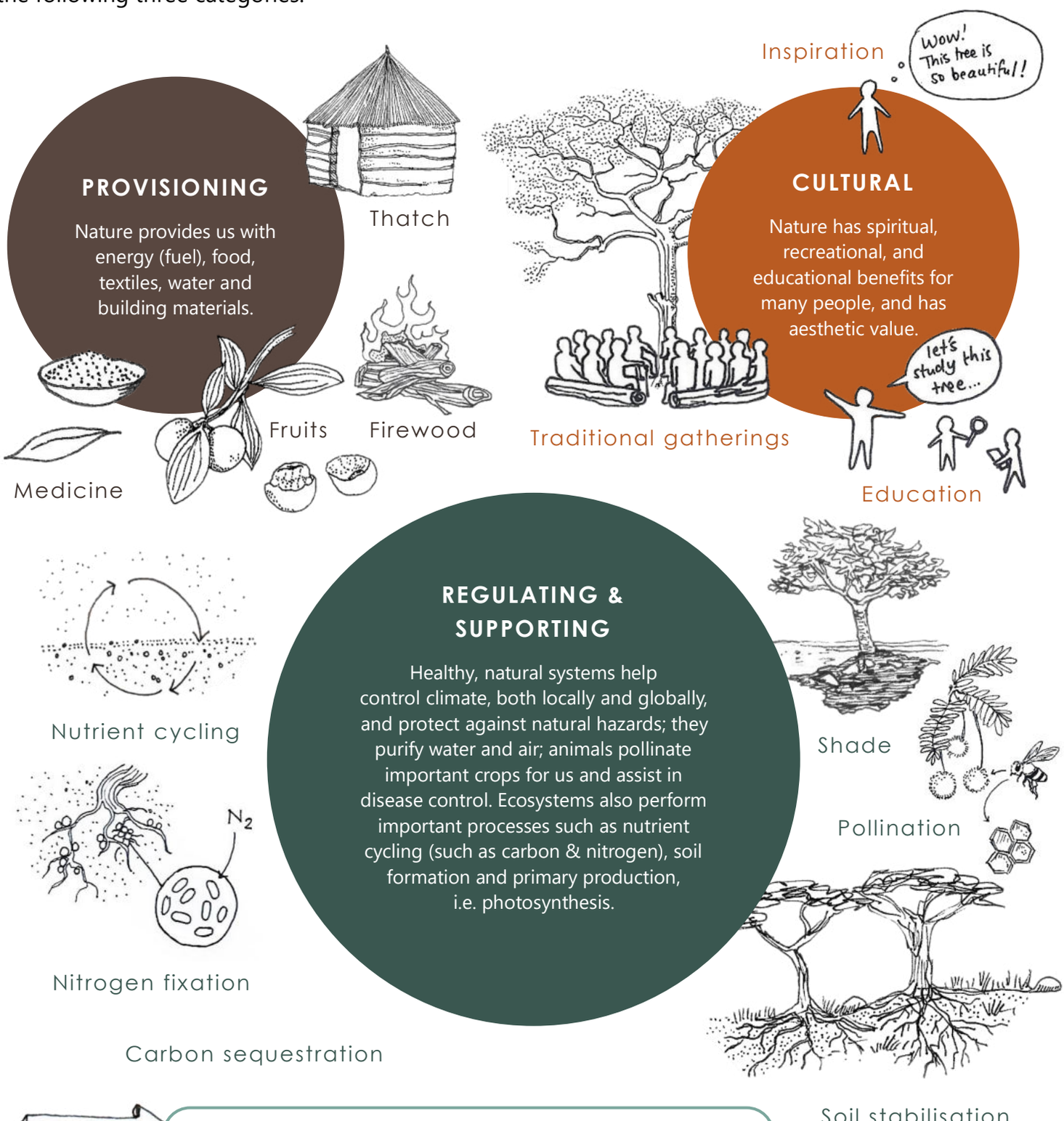
ECOSYSTEM DIVERSITY

Ecosystem diversity refers to the different types of ecosystems found within a given area. For example, in the Kunene region of northwestern Namibia we have ephemeral (dry) river ecosystems, dotted with freshwater springs, that cut past acacia dominated tree-and-shrub savanna ecosystems and along granite inselbergs ecosystems, to the coastal desert ecosystem.



ECOSYSTEM SERVICES

The concept of **ecosystem services** allows us to identify the many ways in which we depend on healthy and resilient ecosystems. Life on earth, as we know it, is only possible if these natural systems function properly. Most of us do not take note of these life-giving services. We can group ecosystem services into the following three categories:



RESOURCE CHECK

Watch the video ***Why Nature Counts*** and then read **Chapter 3.1** in ***Environmental Awareness for Sustainable Development***.

CLIMATE AT A GLOBAL SCALE

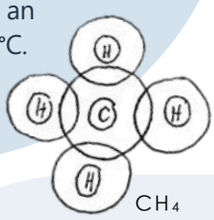
The Earth's climate is created, regulated, and maintained at a global scale by processes and interactions within the five spheres. Some of the main factors that have regulated and maintained the stable climate of the last 10 000 years are:

THE ALBEDO EFFECT

Albedo is the amount of light that a surface reflects. Light-coloured surfaces reflect more light than dark-coloured surfaces. The polar ice sheets, glaciers and snow have a high albedo, and therefore reflect a significant amount of solar energy (light).

THE NATURAL GREENHOUSE EFFECT

Without the atmosphere, Earth would be frozen, with an average of - 18°C. The layer of gases surrounding our planet traps the heat from the sun's incoming radiation and thereby increases the Earth's surface temperature to an average of 15 °C.



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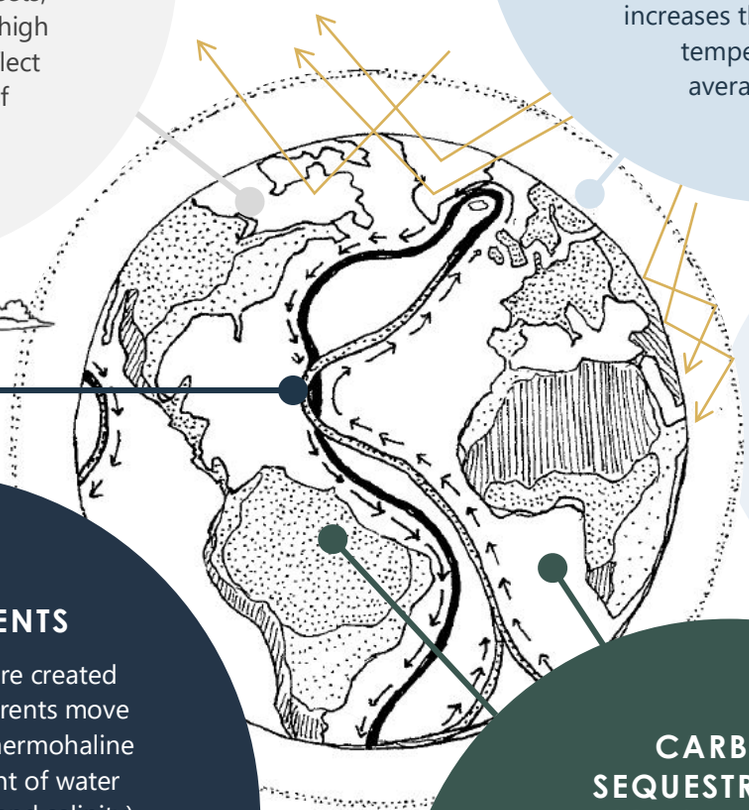
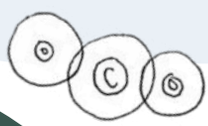


Gases in the atmosphere, such as carbon dioxide (CO_2) and methane (CH_4), that trap a lot of heat are called **greenhouse** gases.



CO_2

OCEAN CURRENTS

Surface ocean currents are created by winds. Deep ocean currents move about the globe via the thermohaline circulation (the movement of water due to both temperature and salinity) also known as the ocean conveyer belt. These ocean currents move cold and warm water around the globe, creating and maintaining local climates as they have been for the last 10 000 years.

CARBON SEQUESTRATION
(Carbon Sinks)

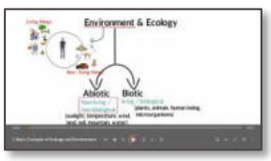
The process of capturing and storing atmospheric carbon dioxide. Plants, algae (e.g. kelp) and cyanobacteria sequester carbon through the process of photosynthesis. This helps to balance the amount of carbon dioxide (an important greenhouse gas) in the atmosphere.

RESOURCE CHECK

Watch the videos ***Ocean currents and circulation*** and ***What are Carbon Sinks?***

RESOURCES ON ENVIRONMENTAL CONCEPTS

Junior Primary JP | Senior Primary SP | Junior Secondary JS | Senior Secondary SS | Teacher T



JS SS T

Basic Concepts of Ecology and Environment

VIDEO: This video explains the terms environment and ecosystem; and the difference between the two. Through the explanations you will learn the basic concepts.

AUTHOR: UPSC, Amit Sengupta

Link: https://www.youtube.com/watch?v=fxVGiq1kggg

JS SS T

Environmental Awareness for Sustainable Development - a Resource Book for Namibia

BOOK: Chapter 2 gives an overview of Namibia's entire environment (section 2.5 looks at the biosphere). Chapter 3 takes a look at the various ecosystem services we receive from our country's natural environment.

AUTHOR: S. Gerrad, P. Heyns, M. Pfaffenthaler & G. Schneider (2017)

Link:https://www.thinknamibia.org.na/images/projects/enviro/Environmental_awareness_for_sustainable_development.pdf

JS SS T

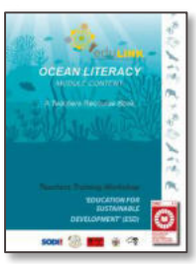
Ecology videos

VIDEO: The video *Introduction to Ecology* speaks on the various concepts and components that define ecology. It presents the ecological building blocks, interconnected in their nature. Key Ecological Terms gives brief explanations and definitions of commonly used ecological terms.

AUTHOR: Teachers Pet (2015); Fuse School Global Education (2016)

Link 1: https://www.youtube.com/watch?v=GlnFylwdYH4

Link 2: https://www.youtube.com/watch?v=E6WAQpRulhA&t=16s



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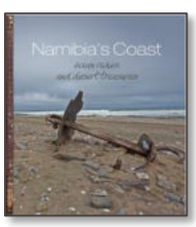
Ocean Literacy Module Content: A Teacher's Resource Book

MANUAL: This comprehensive guide for teachers outlines the principles of ocean literacy and goes on to provide educational information and material on ocean related topics and issues.

AUTHOR: EduLink (2020)



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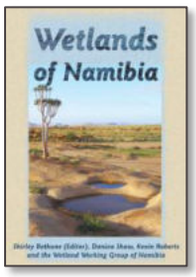
Namibia's Coast

BOOK: This book provides in-depth information on Namibia's marine and coastal environment. It provides facts and figures on the unique coastal climate, the geology and living organisms. Lastly it looks at the history of people and human activity at the coast.

AUTHOR: T. Roberton, A. Jarvis, J. Mendelsohn & R. Swart (2012)

Link: https://the-eis.com/elibrary/sites/default/files/downloads/literature/Namibias_coast_1.pdf



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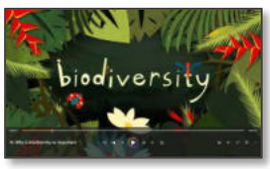
Wetlands of Namibia

BOOKLET: This booklet describes the state of wetlands and types of wetlands in Namibia, and the role they play as a natural resource. It also explores pressures on the wetlands and management thereof.
AUTHOR: S. Bethune, D. Shaw, K. Roberts and Wetland Working Group of Namibia (2004)



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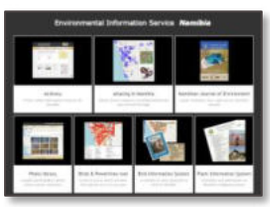
Why is Biodiversity So Important

VIDEO: In this video, Kim Preshoff differentiates between the three types of biodiversity (ecosystems, genetic and species), explaining how environmental resilience comes from their interconnectedness.
AUTHOR: TED Ed (2015)
Link: https://www.youtube.com/watch?v=GK_vRtHJZu4&t=17s



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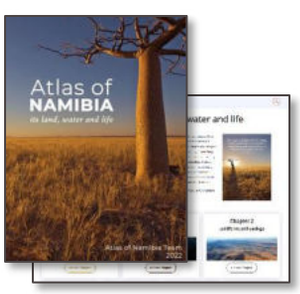
Environmental Information Service (EIS) Namibia

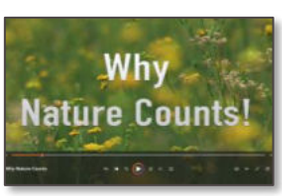
WEBSITE: This website provides a wealth of environmental information in Namibia. It is a citizen science tool as well as being a source of data, photographs and a portal with links to sites on specific topic areas.
AUTHOR: Environmental Information Service
Link: http://www.the-eis.com/



JS SS T

Atlas of Namibia: Its land, water and life

BOOK & WEBSITE: This book provides facts and figures on Namibia's geology, climate, water resources, plant and animal biodiversity, as well as information on our country's demographics. The book is also available as a website.
AUTHOR: Atlas of Namibia Team (2022)
Link: https://atlasofnamibia.online/



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Why Nature Counts

VIDEO: A country so dependent on its natural resources, this video shows the relationship between Namibia's natural resources and their "contribution" to the country; addressing the importance of nature.
AUTHOR: Chris Oberholster (2017)
Link: https://www.youtube.com/watch?v=t-SMK7xb3iE

JS SS T

Climate Videos

VIDEO: The video *Ocean currents and circulation* explains how deep water currents operate and distribute warm and cold water across the globe through the ocean conveyor belt. The video *What are carbon sinks?* explains artificial and natural carbon sinks.
AUTHOR: Geography Lessons (2021); ACCIONA (2017)
Link 1: https://www.youtube.com/watch?v=C0ck2njRe9Y
Link 2: https://www.youtube.com/watch?v=OoW2PlvMpZs

THE GLOBAL ENVIRONMENTAL CRISIS

While scientists have known and warned about global warming since the 1970s, leaders worldwide have only too recently recognised and acknowledged that we are currently facing a global **environmental crisis.** We have a double, interlinked, human-induced crisis of **climate change** and rapid **biodiversity loss**. To address the crisis, we first need to understand these two large, **wicked problems**, how they affect each other and their severe impacts. We then also need to know the root causes of these problems, so that we can effectively address the crisis from all angles.

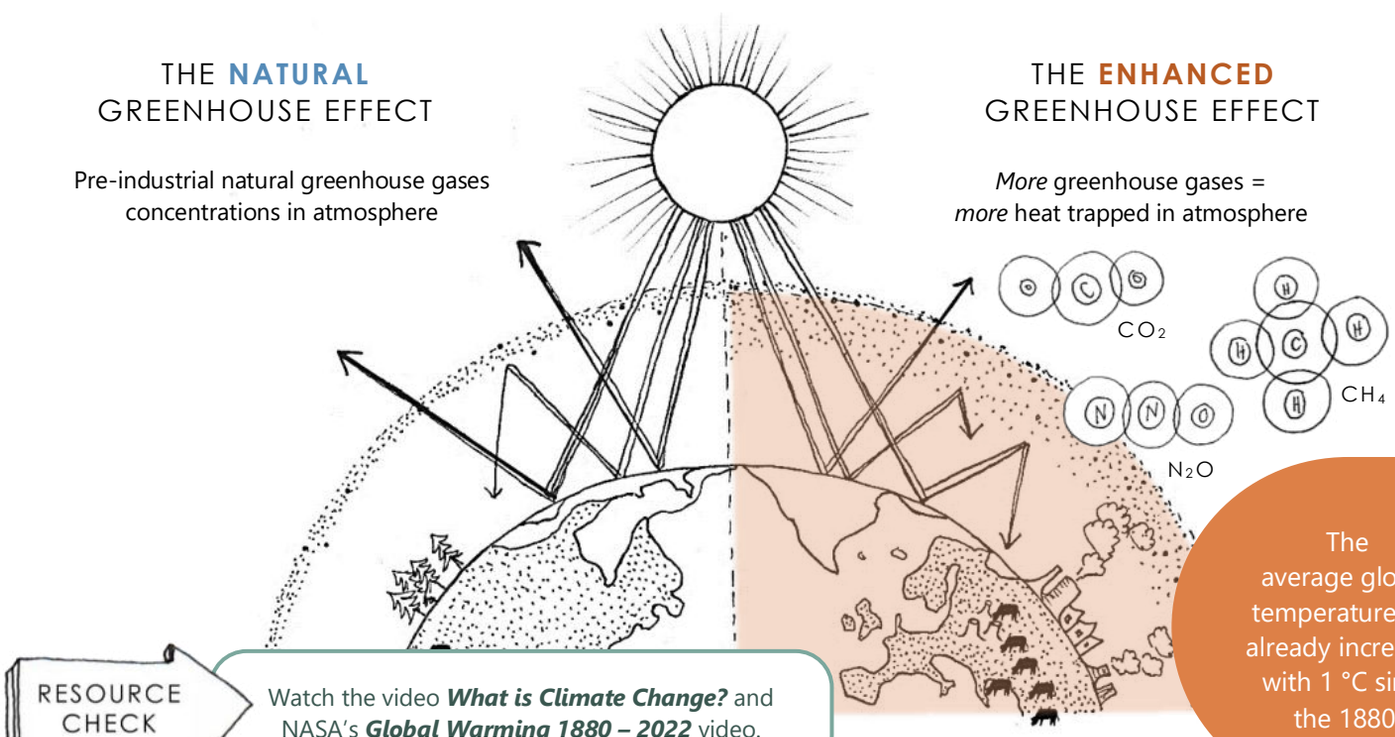
"Today we face the double, interlinked emergencies of human-induced climate change and the loss of biodiversity, threatening the well-being of current and future generations."

LIVING PLANET REPORT 2022

CLIMATE CHANGE

GLOBAL WARMING

During the **Industrial Revolution** of the 1880s, human beings started burning fossil fuels (coal, oil, and natural gas) which led to a dramatic increase of carbon dioxide (CO_2) being released into the atmosphere. During the **Green Revolution** or **Third Agricultural Revolution** of the 20th century, the widespread use of chemical fertilizers and pesticides resulted in the release of methane (CH_4) and nitrous oxide (N_2O), two additional greenhouse gases, into the atmosphere. The increase in large-scale livestock production of ruminant animals (such as beef, goats, and sheep) further resulted in an increase of methane emissions. This increase in greenhouse gases in the atmosphere has resulted in the natural greenhouse effect to become enhanced, causing global warming. Global warming has resulted in climate change.



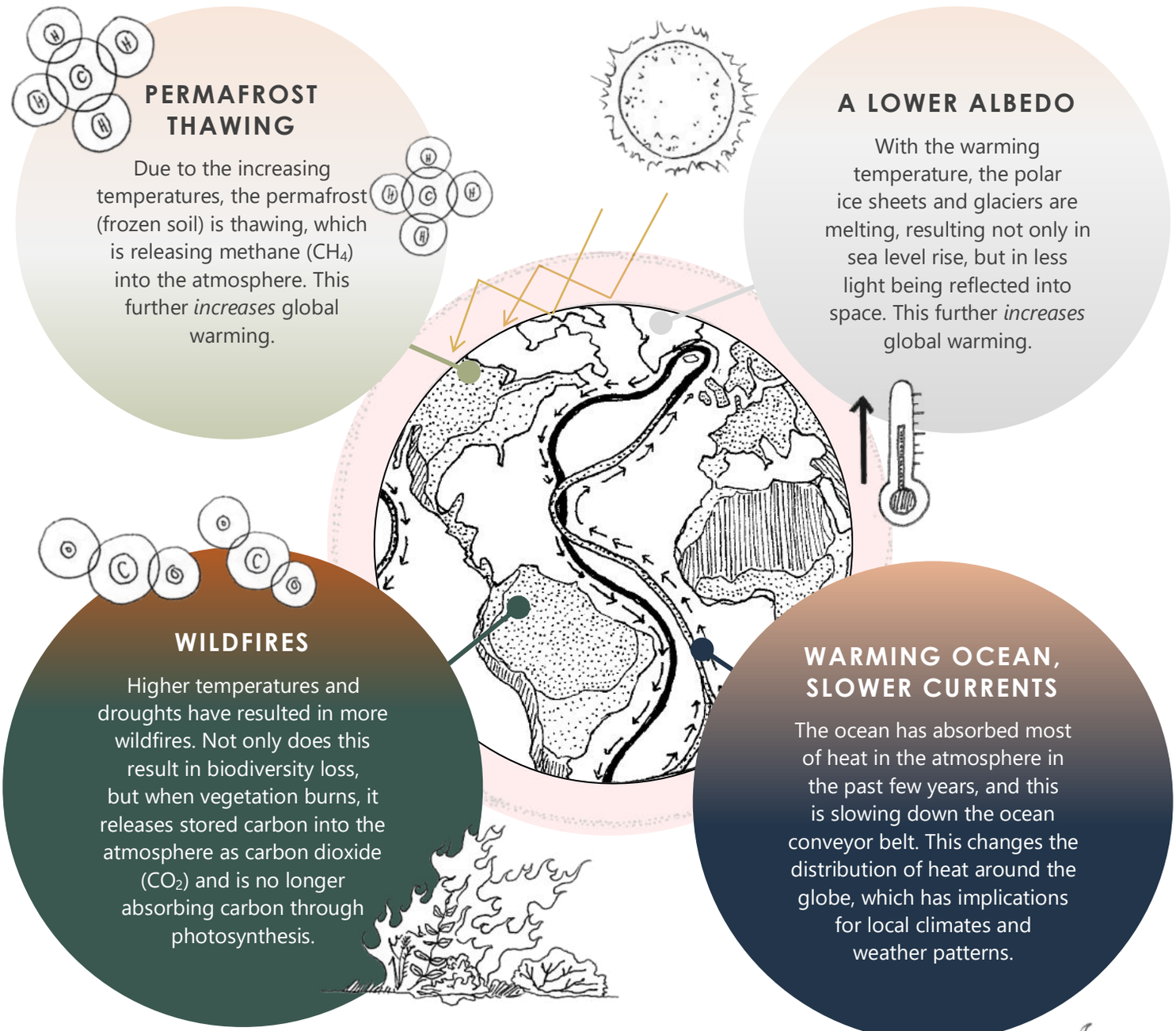
The average global temperature has already increased with 1 °C since the 1880.

RESOURCE CHECK

Watch the video ***What is Climate Change?*** and NASA's ***Global Warming 1880 – 2022*** video.

HOTHOUSE EARTH

Unfortunately, as a global community, we have not yet been able to lower our greenhouse gas emissions and our average global temperature is still increasing! The danger of this continued global warming is that it is changing those processes and systems that have kept our climate stable for the last 10 000 years - and that instead, they might now further increase global warming:



PERMAFROST THAWING

Due to the increasing temperatures, the permafrost (frozen soil) is thawing, which is releasing methane (CH_4) into the atmosphere. This further *increases* global warming.

A LOWER ALBEDO

With the warming temperature, the polar ice sheets and glaciers are melting, resulting not only in sea level rise, but in less light being reflected into space. This further *increases* global warming.

WILDFIRES

Higher temperatures and droughts have resulted in more wildfires. Not only does this result in biodiversity loss, but when vegetation burns, it releases stored carbon into the atmosphere as carbon dioxide (CO_2) and is no longer absorbing carbon through photosynthesis.

WARMING OCEAN, SLOWER CURRENTS

The ocean has absorbed most of heat in the atmosphere in the past few years, and this is slowing down the ocean conveyor belt. This changes the distribution of heat around the globe, which has implications for local climates and weather patterns.

Scientists fear that if global average temperature increases beyond 1.5°C, we could potentially push the Earth into an entirely new state – a **hothouse earth** state.

RESOURCE CHECK

To learn more about the hothouse earth state, watch the PBS NewsHour video report '***Hothouse Earth***'.

BIODIVERSITY LOSS

Not only are we facing a climate crisis, but also a biodiversity crisis! These are interlinked: climate change is one of the main drivers of biodiversity loss, and the loss of biodiversity means a loss of ecosystem services, such as climate regulation and carbon sequestration.

As a result of human activities during the last century, we are now causing the **sixth-mass extinction** event in the history of life on earth. There are many reasons for the mass extinction. The main drivers of biodiversity loss are:

BIODIVERSITY LOSS

A decrease in biodiversity within a species, an ecosystem, or the Earth as a whole.

Between 1970 and 2018 we have lost an average 69% of all wildlife populations across the globe!

LIVING PLANET REPORT 2022

HABITAT LOSS

through land use change, mainly from industrial agriculture, urbanisation, and mining.

INVASIVE ALIEN SPECIES

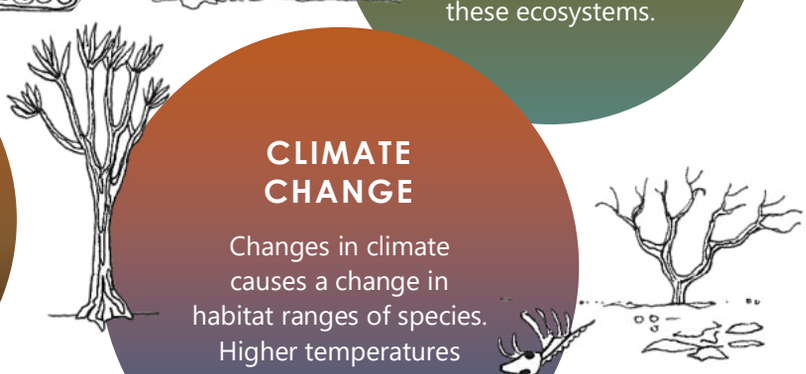
Without their natural enemies, alien species take over native ecosystems.

POLLUTION

Water, air, and land pollution all negatively affect the organisms that live in these ecosystems.

OVER-EXPLOITATION

Over-exploitation includes poaching, over-fishing, deforestation.



CLIMATE CHANGE

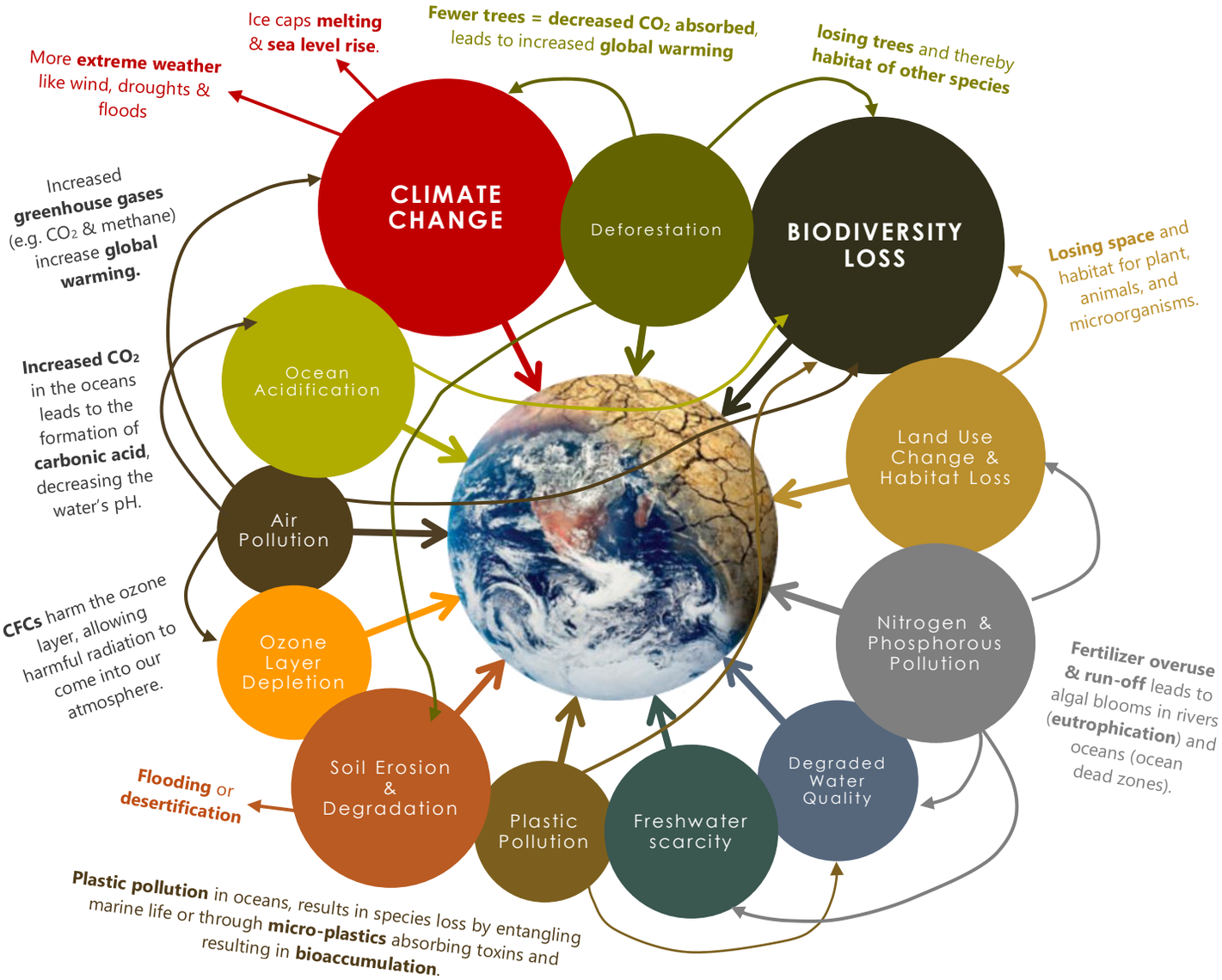
Changes in climate causes a change in habitat ranges of species. Higher temperatures cause more wildfires.

RESOURCE CHECK

First watch the video ***Why are thousand species facing extinction?*** then read and study the graphs in the *WWF & ZSL's* ***Living Planet Report 2022*** and watch the video ***Untangled: Biodiversity Loss***.

WICKED PROBLEMS

Both climate change and biodiversity loss are further entangled and interconnected with other environmental problems! This is a **wicked web** of environmental problems!



The environmental crisis is a **wicked problem:** difficult or near impossible to solve, where there is no single solution and where one solution might cause another problem. However, if we don't try to solve these problems, they will only get worse. To solve this wicked environmental web, we must be able to understand how all environmental problems are interlinked – at all levels (social, economic, political and biophysical).

RESOURCE CHECK

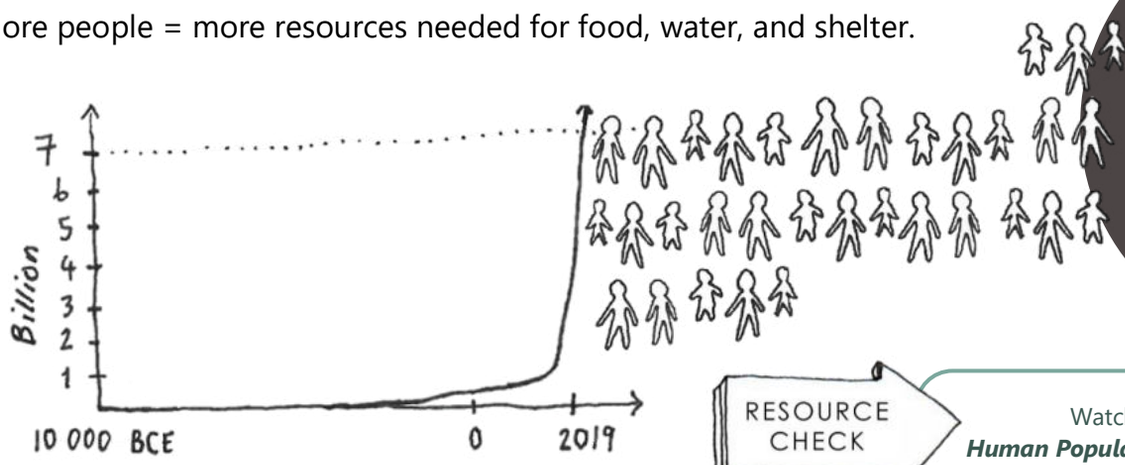
First watch the video ***Wicked Problems***. Then, understand each of these environmental problems better by watching the videos in the **Environmental Problems Videos** folder and reading the *Heinrich Böll Stiftung's* **Atlases** on coal, soil, ocean, meat, pesticide, insects, and plastic.

WHAT IS CAUSING THE ENVIRONMENTAL CRISIS?

We may easily be able to identify the cause of a local environmental problem. For example, deforestation is caused by cutting down trees. This is true, but to understand the environmental crisis, we need to explore further to find the deep, underlying root causes. We must ask further probing questions such as: *who* is cutting down trees and *why*? Let's explore some of these root causes in more detail.

EXPONENTIAL HUMAN POPULATION GROWTH

One of the main reasons we currently face this global environmental crisis is due to the **exponential human population growth** of the past few decades. More people = more resources needed for food, water, and shelter.



The world population reached **8 billion** in 2023 and is projected to reach 9 billion by 2036.

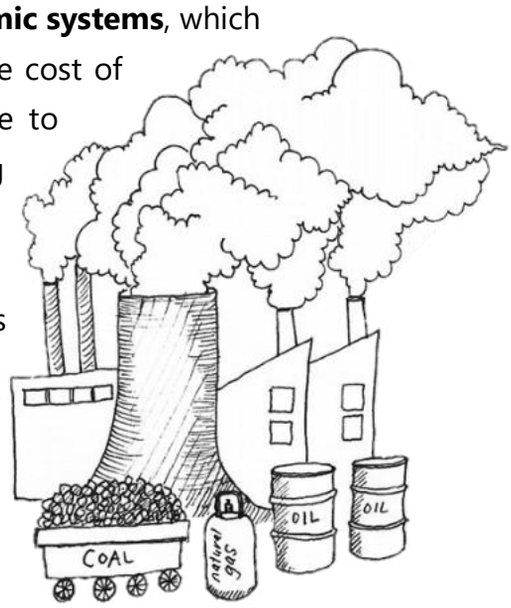
OUR WORLD IN DATA

RESOURCE CHECK

Watch the video ***Human Population Through Time***.

FOSSIL-FUEL BASED ECONOMIES

The environmental crisis is also fueled by our fossil-fuel based **economic systems**, which is based on competition and accumulating **short-term profits** at the cost of negative long-term social and environmental impacts. One example to illustrate this is Big Oil – the world's largest oil companies - profiting from the extraction of non-renewable oil reserves. Locally, job opportunities may be created, but nevertheless the extraction process will destroy natural habitats and threaten ecosystem services (such as water purification, flood protection etc.). On a global scale, once the fossil fuels are burned the carbon emissions will increase, thereby contributing to global warming and climate change. This **degradation** and **overexploitation** of communal natural resources is known as *the tragedy of the commons*.



RESOURCE CHECK

Watch the video ***What is the tragedy of the commons?*** Then read about how the fossil fuel coal has transformed economies and societies over the last two centuries on **pg. 12** of ***The Coal Atlas.***

EXTREME INCOME INEQUALITY

The profits made through the overexploitation of resources has resulted in **extreme income inequality**. Currently, the *wealthiest 20%* of the world *consume 80% of global resources*. As we know from our own context in Namibia, wealth distribution is also not equal *within* countries. Namibia has one of the highest income inequalities in the world!

RESOURCE CHECK

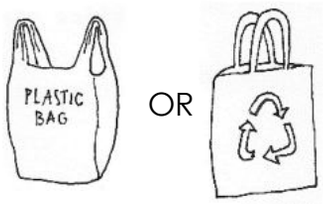
Watch the video ***Can we have green equality?*** To understand the impact of global inequality read ***The Rich, the Poor & the Future of the Earth***.

RESOURCE INTENSE MODERN LIFESTYLES

Through globalisation, many people have adopted resource-intense modern lifestyles, while others remain dependent on the natural resources around them. The **environmental impact** of our lifestyles is tightly connected to the exponential growth of consumerism, the overexploitation of natural resources and unsustainable levels of pollution. Our daily actions (by choice or lack of options) either help combat or exacerbate environmental problems. These actions include what we eat and what fuel source we use to cook it, how we travel, what we buy and who we buy from (local vs imported)?

Do you know where your food is grown?

How do you choose to carry items home from the shop?



Everyone is faced with these decisions on some level within their own context (rural vs urban; rich vs poor).

RESOURCE CHECK

To learn how meat consumption affects the planet read **pgs. 20, 34** and **52** of ***The Meat Atlas***.

POOR GOVERNANCE, IGNORANCE & APATHY

To a large extent, poor political will and poor governance have led to inaction to address the environmental crisis and its root causes. This has further created space for greed and corruption to abuse and worsen the situation. It can be argued that poor governance has led to insufficient education about the environmental crisis creating ignorance (not knowing) whilst those that are aware may feel powerless which ultimately can lead to apathy (not caring and unresponsive).

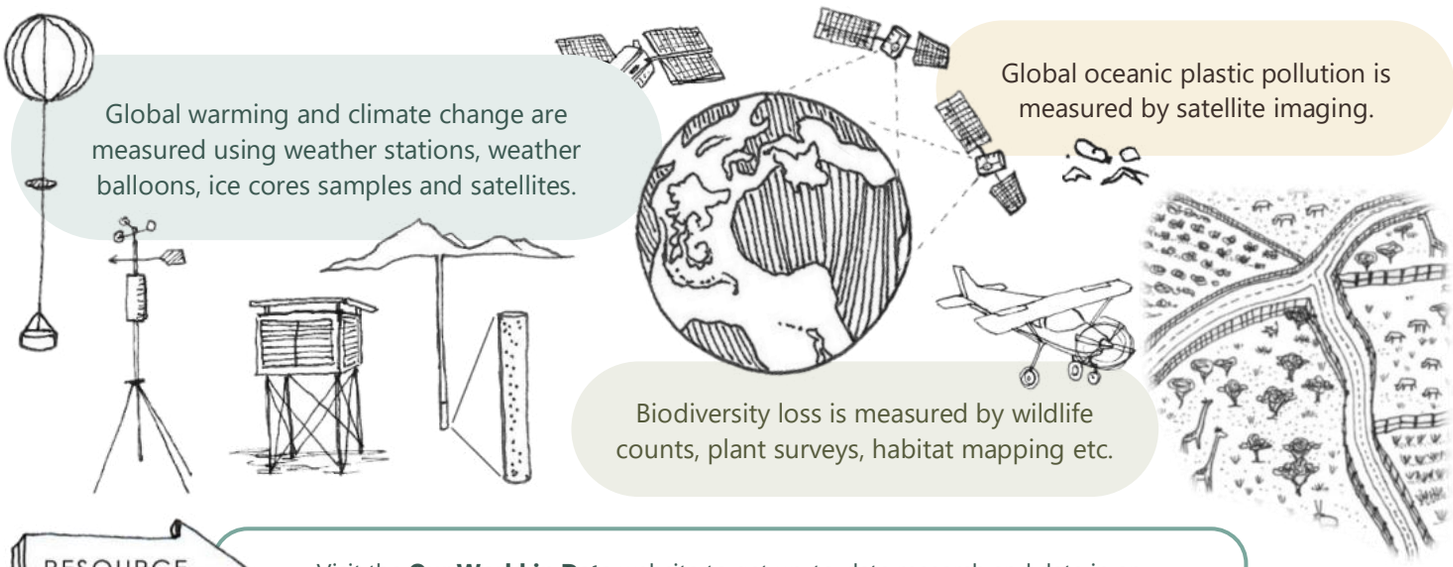
As the environmental crisis keeps getting worse. We need to rethink our responses, because what we have been doing so far is not working.

MEASURING OUR ENVIRONMENTAL IMPACT

It is important that we have good tools to measure and report on the environmental crisis to monitor and evaluate our progress. Scientific research plays a vital role in measuring, understanding, and identifying ways in which to overcome this environmental crisis. Communicating scientific knowledge to the public in an easy-to-understand way is just as important.

HOW DO SCIENTISTS MEASURE THE ENVIRONMENTAL CRISIS?

A multi-disciplinary approach and a variety of different instruments and metrics are used to measure and track environmental problems, here are a few examples:



Global warming and climate change are measured using weather stations, weather balloons, ice cores samples and satellites.

Global oceanic plastic pollution is measured by satellite imaging.

Biodiversity loss is measured by wildlife counts, plant surveys, habitat mapping etc.

RESOURCE CHECK

Visit the **Our World in Data** website to get up-to-date research and data in an easy to understand format about topics such as population, consumption, and access.

CARRYING CAPACITY & ECOLOGICAL FOOTPRINT

One example of analysing and communicating the impact of human beings on the environment, is with the concepts of **carrying capacity** and **ecological footprint**. Scientists warn that we are about to exceed the planet's carrying capacity, because our average lifestyle is unsustainable and uses too many resources. This is measured by calculating the ecological footprint. The **Global Footprint Network** is an international organisation that provides the biggest database on our ecological footprints worldwide. It also offers individuals and organisations the ability to calculate our own ecological impact with the online footprint calculator.

CARRYING CAPACITY

The maximum number of individuals from a species that an environment can support with its resources, *indefinitely*.

ECOLOGICAL FOOTPRINT

A method promoted by the Global Footprint Network to measure the quantity of nature it takes to support people and their economies.

How many Earths would we need
if the world's population lived like people in...

U.S.A.	5.0	
GERMANY	2.9	
CHINA	2.3	
NAMIBIA	**1.7**	
MALAWI	0.6	
WORLD	**1.7**	

*It is important to note that these represent the *average* ecological footprint per country. The ecological footprint can differ greatly between individuals *within* a country!

Global Footprint Network
Advancing the Science of Sustainability

Adapted from data source: Global Footprint Network's Open Data Platform (2021).

"There can be no Plan B because there is no PLANET B."

FORMER UN SECRETARY-GENERAL BAN KI-MOON

RESOURCE CHECK

Calculate *your* ecological footprint with the **Global Footprint Calculator** and find out how *you* can reduce your environmental impact!

ENVIRONMENTAL AND SUSTAINABILITY REPORTS

Use the internet to search for sustainability reports from local companies or organisations.

Communicating environmental impact has become more common and in some business communities standard practice, as consumers are beginning to hold businesses more accountable for their environmental footprint. Environmental reports, such as the annual climate change reports, provide vital information to help shape responses on local, national, and international levels. Many Namibian stakeholders release environmental monitoring reports including the national governments.

The **State of the Environment Report** is an essential tool for tracking and measuring Namibia's progress towards sustainable development and reaching the national environmental goals that form part of our policies and strategies.

RESOURCE CHECK

Read Namibia's ***Second National Integrated State of the Environment Report*** from 2021, which is our country's way of tracking our response to environmental issues.

RESPONDING TO THE ENVIRONMENTAL CRISIS

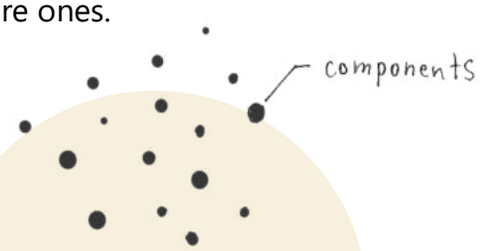
The global response to climate change, biodiversity loss and many other environmental problems has been slow. However, in recent years the severity of the crisis is being increasingly recognised and international organisations, governments, non-profit organizations, and civil society are focusing their efforts in addressing this crisis. In the next section we will explore specific challenges and responses in Namibia. Let us first look at two approaches to addressing the environmental crisis.

SYSTEMS THINKING

Systems thinking (or synthesis) is the ability and skill to recognise and understand **complex systems** and forms an important part of eco-literacy. It helps us to recognise that our human social systems (including economic and political systems) are part of – and not separate from - ecological systems: our biosphere consists of many interconnected socio-ecological systems. It helps us to understand wicked problems and how environmental problems and social problems are interlinked, e.g. poverty and poaching. Using a systems approach to planning, decision-making and education is crucial to addressing our existing environmental crisis and hopefully preventing future ones.

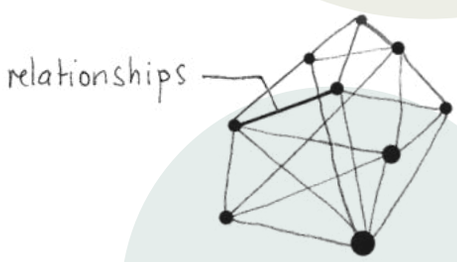
COMPLEX SYSTEM

There is not yet one single definition of a complex system, for our purpose here we define it as: a system composed of many components (parts) that interact with one another, within and between different levels of organisation. Relationships among these parts are self-organised, adaptable, and unpredictable.



ANALYTICAL THINKING
(ANALYSIS)

Studies a system by splitting something into its different components and studying these separately to understand the whole system.



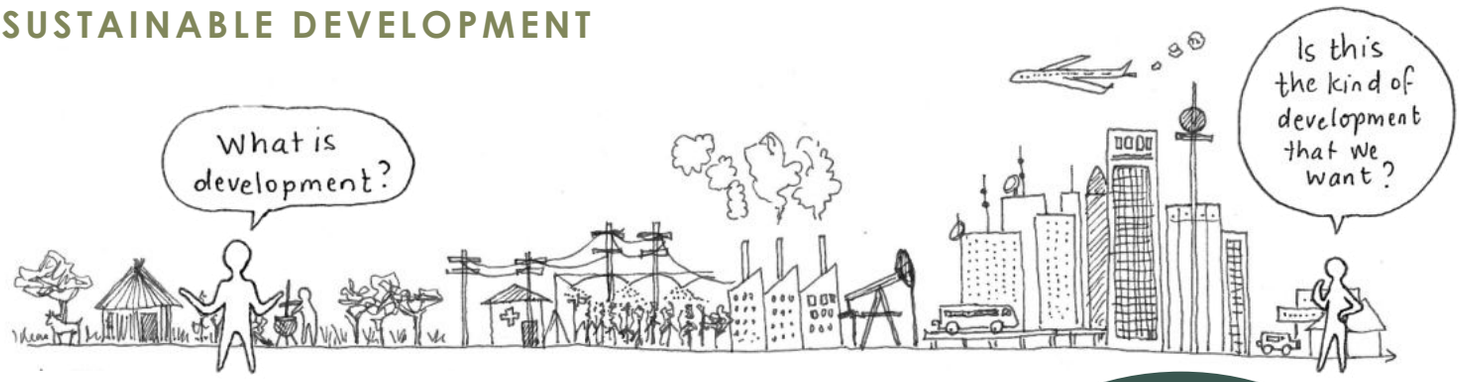
SYSTEMS THINKING
(SYNTHESIS)

Studies **complex systems** by recognizing and understanding the **relationships** (interactions) between components, to understand the whole system.

Watch the following two videos: ***What is a Complex System?*** and ***Systems Thinking*** to gain a better understanding of these concepts.

Watch the video ***Feedback Loops: How nature gets its rhythms*** to understand how the organisation and diversity within ecosystems help them be more resilient to change.

SUSTAINABLE DEVELOPMENT



Sustainable Development was first defined by the World Commission on Environment and Development in 1987 but has only become more widely used in the past 20 years. Sustainable development recognises that our society and economy are interwoven with the environment. It aims to identify processes and integrate strategies that can be used to achieve development that is not solely focussed on money, but also considers the welfare of people and our planet.

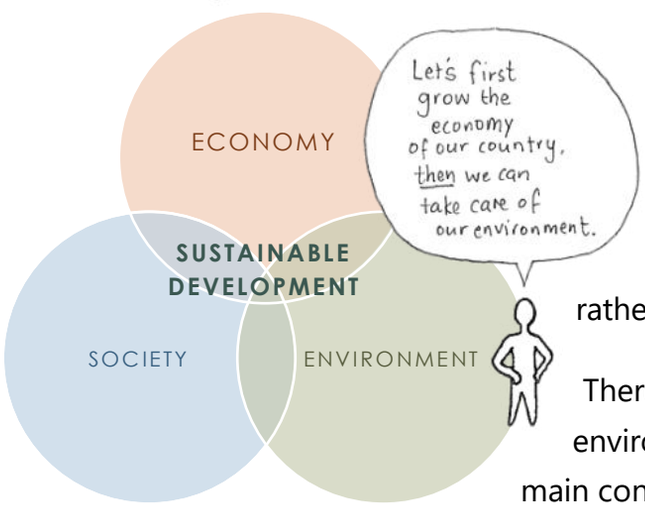
SUSTAINABLE DEVELOPMENT

Development that meets the needs of the present without compromising the ability of future generations to meet their own needs.

BRUNDTLAND REPORT (1987)

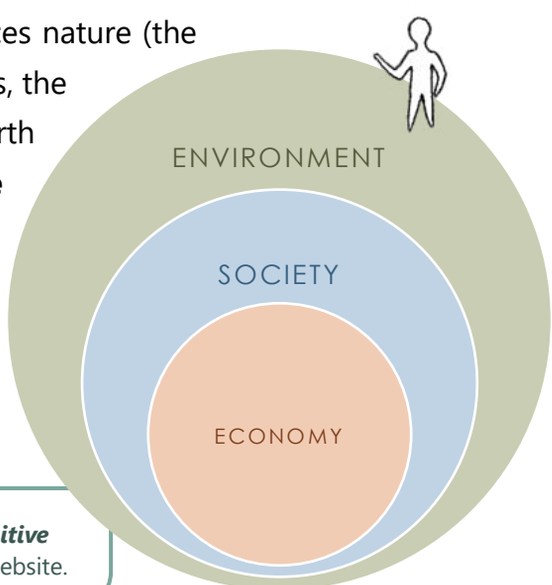
RESOURCE CHECK

For a brief explanation of the term, watch the video ***What is Sustainable Development?***



The initial depiction of this concept is a circle diagram where the three all intersect. However, this depiction has too often resulted in a trade-off between the areas rather than a collaboration.

There is a shift that places nature (the environment) as the basis, the main context of all life on Earth followed by its people and then the economy. This **Nature Positive View** of sustainable development emphasises that all life and human activities rely on a *healthy environment* (ecosystem services) to be successful and therefore sustainable. As ESD practitioners we are seeking to teach for a *true balance* between all aspects that are needed for a prosperous and healthy planet.



RESOURCE CHECK

Read the information sheet ***The Definition of Nature Positive*** and learn more about this initiative on the *Nature Positive* website.

RESOURCES FOR THE GLOBAL ENVIRONMENTAL CRISIS

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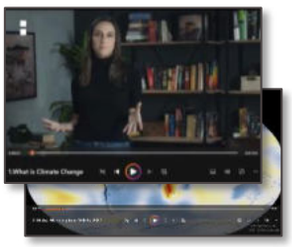

SS T

Climate Change videos

VIDEO: The video *What is Climate Change* explains what climate change is, what its causes, impacts and solutions are. The *video Global Warming from 1880-2022* shows a map of the Earth and how the average global temperatures have changed from the Industrial Revolution to today.
AUTHOR: AL Jazeera English (2020); NASA Climate Change (2023)
Link 1: https://www.youtube.com/watch?v=dcBXmj1nMTQ
Link 2: https://www.youtube.com/watch?v=LwRTw_7NNJs

SS T

Hot House Earth

VIDEO: This video explains the threat of 'hot house earth', a state our Earth might soon experience if we do not reign in global warming. It is based on a recent study 'Trajectories of the Earth System in the Anthropocene" by Steffen et. al (2018).
AUTHOR: PBS News Hour (2021)
Link: https://www.youtube.com/watch?v=1kzQob3LfDg

JS SS T

Why are thousands of species facing extinction?

VIDEO: This video introduces the concepts of extinction, the 6th mass extinction and briefly outlines the main drivers of biodiversity loss.
AUTHOR: BBC News (2019)
Link: https://www.youtube.com/watch?v=nho73BtDQtE

T

WWF Living Planet Report 2022 – Building a Nature-Positive Society

REPORT SUMMARY: An analysis and mapping of the current state of biodiversity on a global level, including how the earth and humans are affected by the loss of biodiversity.
AUTHOR: WWF & Zoological Society of London (ZSL) (2022)
Link: https://wwflpr.awsassets.panda.org/downloads/lpr_2022_full_report.pdf

JS SS T

Untangled: Biodiversity Loss

VIDEO: This video explains the importance of biodiversity, provides the statistics on the threats facing biodiversity and how this is interlinked with the climate crisis.
AUTHOR: WWF (2022)
Link: https://www.youtube.com/watch?v=KM0EZP5ijbA

SS
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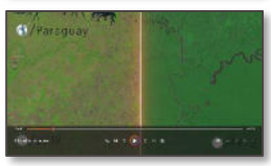
Wicked Problems

VIDEO: This video provides examples of wicked problems and their properties e.g. they are unstructured, open-ended, interconnected, systemic, and interdependent. Systems thinking is required to solve them.
AUTHOR: Systems Innovation (2019)
Link: https://www.youtube.com/watch?v=Ldza3txPNTA



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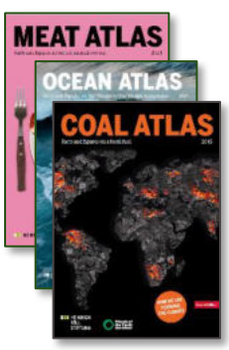
Environmental Problem Videos

VIDEO: These eight videos illustrate some of the major global environmental issues that form part of the "wicked web of environmental problems":

1. *Land-use change*
   AUTHOR: ESERO Germany (2022)
   Link: https://www.youtube.com/watch?v=ch_W691Ykh0
2. *How we can keep plastics out of our ocean*
   AUTHOR: National Geographic (2016)
   Link: https://www.youtube.com/watch?v=HQTUWK7CM-Y
3. *What really happens to the plastic you throw away?*
   AUTHOR: TED Ed (2015)
   Link: https://www.youtube.com/watch?v=_6xlNyWPpB8
4. *How microplastics affect your health*
   AUTHOR: UN Environment Programme (2019)
   Link: https://www.youtube.com/watch?v=aiEBEGKQp_I
5. *Are we heading towards a water crisis?*
   AUTHOR: BBC News (2019)
   Link: https://www.youtube.com/watch?v=lrst59O9Q1Q
6. *Air, Water and Land Pollution*
   AUTHOR: Next Generations Science (2023)
   Link: https://www.youtube.com/watch?v=J3Df0-ZJ_WA
7. *Whatever happened to the hole in the ozone layer?*
   AUTHOR: TED-Ed (2018)
   Link: https://www.youtube.com/watch?v=5wVJeq4mLL0
8. *What is Ocean Acidification?*
   AUTHOR: University of Plymouth (2019)
   Link: https://www.youtube.com/watch?v=mQ10xBl8XMQ&t



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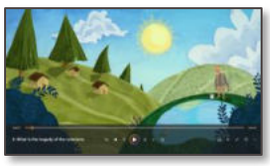
Heinrich Böll Environmental Atlases

BOOKLET: These booklets (Coal, Soil, Plastic, Insect, Meat and Pesticide Atlas) provide in-depth facts, statistics and case studies across the globe. The historic, geographic, economic, social, and political aspects are presented. The atlases include the
AUTHOR: Heinrich Böll Foundation & Friends of the Earth International (2015, 2015, 2019, 2020, 2020, 2023)
Link: https://eu.boell.org/en/tags/atlas?_wrapper_format=html&page=0%2C0

JS SS T

Human Population through Time

VIDEO: This time lapse shows human population growth over the past 200 000 years, when our species first appeared on earth.
AUTHOR: American Museum of Natural History (2015)
Link: https://www.youtube.com/watch?v=PUwmA3Q0_OE



JS SS T

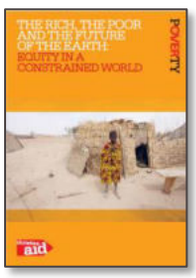
What is the Tragedy of the Commons?

VIDEO: This animated video explains what happens when many individuals share a limited resource. It presents how unsustainable practices by humans, driven by the desire to sustain themselves on an individual basis, rather than thinking of the collective leads to collapse of natural resources.
AUTHOR: TED Ed (2017)
Link: https://www.youtube.com/watch?v=CxC161GvMPc&t=2s

SS T

Can we have Green Equality?

VIDEO: This video explores the connection between equality and sustainability. It asks how humanity can practice sustainability whilst tackling the issue of equality for all in a rapidly growing world population.
AUTHOR: GROW, Oxfam (2012)
Link: https://www.youtube.com/watch?v=9U1COenXMfI



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The Rich, the Poor and the Future of the Earth

BOOKLET: This booklet explores the interconnectedness of socio-economic disparities, the state of the natural world and the future of the planet. Through analysis, this report suggests sustainable development models that take into consideration the environmental and humanitarian crisis.
AUTHORS: Christian Aid (2012)
Link: https://reliefweb.int/report/world/rich-poor-and-future-earth-equity-constrained-world

T

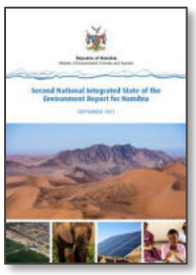
Our World in Data

WEBSITE: A site dedicated to the collection and presentation of data across different fields and sectors. For the purposes of furthering your knowledge and understanding of human's impact on the earth as well as how the world has changed over time, explore this site's graphic representations.
Author: Global Change Data Lab
Link: https://ourworldindata.org/

JS SS T

Global Footprint Network

WEBSITE: This site allows you to measure your own footprint. The Global Footprint Network aims to change how the world uses its natural resources through providing data, insight and tools to guide better decision making.
AUTHOR: Global Footprint Network
Link: https://www.footprintcalculator.org/
Link: https://www.footprintnetwork.org/



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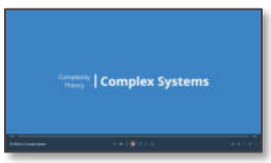
Second National Integrated State of the Environment Report for Namibia

REPORT: This 2021 report presents Namibia's progress towards environmental protection and reaching our national environmental goals. The report also links indicators to the SDGs.
AUTHOR: Ministry of Environment, Forestry and Tourism (2021)
Link: https://sdacnamibia.org/sites/default/files/Namibia%20final%20ISOER.pdf



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What is a Complex System

VIDEO: This animated video looks to define a complex system. It shows how complex systems are multidimensional and interconnected in nature through a series of examples.
AUTHOR: Systems Innovation (2017)
Link: https://www.youtube.com/watch?v=vp8v2Udd_PM&t=1s

T

Systems Thinking

VIDEO: This animated video begins by explaining different types of analysis. By unpacking these strategies of problem solving, it shows the benefit to the systems thinking methodology.
AUTHOR: Systems Innovation (2015)
Link: https://www.youtube.com/watch?v=Miy9uQcwo3U&t=46s

SS
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Feedback Loops: How Nature Gets its Rhythms

VIDEO: This animated video briefly explains a feedback loop. It looks at how these interlinked systems help to build resilience and function as an interdependent unit in our natural world.
AUTHOR: Ted ED (2014)
Link: https://www.youtube.com/watch?v=inVZoI1AkC8&t=15s

SP
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SS
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What is Sustainable Development?

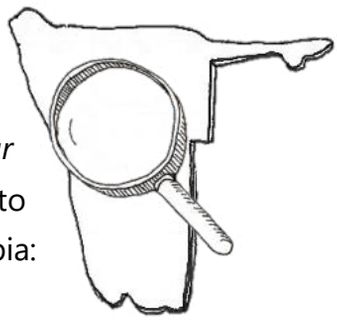
VIDEO: This short animation video explains the traditional view of the concept of sustainable development and its three main pillars of society, economy, and environment.
AUTHOR: United Nations Association of Norway, UNICEF (2017)
Link: https://www.youtube.com/watch?v=7V8oFI4GYMY

T

The Definition of Nature Positive

INFORMATION SHEET & WEBSITE: The information sheet provides a short definition of the Nature Positive concept, how it was developed, how it can be measured and applied. The website provides for information on the goals and the partner organisations involved in achieving the Nature Positive goal.
AUTHOR: Nature Positive Forum (2023)
Link: https://www.naturepositive.org/

NAMIBIA'S ENVIRONMENTAL CHALLENGES



Having a thorough understanding of the global environmental crisis is essential for ESD educators – it is the 'big picture'. However, these environmental problems affect every country differently – how do they impact Namibia? How do they threaten *our* ecosystem services? Adjusting our focus from 'global' to 'local', here we delve into some (by no means all) of the main environmental issues that are relevant to Namibia:

- **CLIMATE CHANGE**
- **LAND USE CHANGE**
- **POLLUTION**
- **WATER SCARCITY**
- **BIODIVERSITY LOSS**

As we look at the challenges of each environmental issue, we need to examine the underlying socio-economic influence, interconnectedness of the issues – the wicked problems - and recognise that our responses must address these as part of the solution. Responses are diverse such as policy, education, advocacy, local actions, and financing.

RESOURCE CHECK

For an in-depth overview on Namibia's environmental challenges and responses, refer to the ***Second National Integrated State of the Environment Report*** in the previous section.

CLIMATE CHANGE IN NAMIBIA

Due to Namibia being a semi-arid country, it is acknowledged as one of the countries most vulnerable to the impacts of climate change. A global temperature increase of 1.5°C is predicted to impact Namibia in many ways, including longer and more regular heat waves.

RESOURCE CHECK

Watch the video ***Namibia is Heating Up: What global warming of 2°C means for this climate change hotspot*** and read the infographic ***Namibia is Heating Up: What does global warming of 1.5°C mean for us?*** For more in-depth background information read the manual.

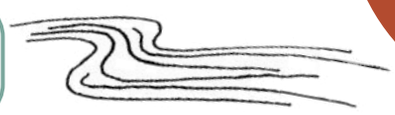
A change in climate for our country's already **extreme weather** patterns will have severe implications on the environment, population, and the economy. Even though Namibia is one of the lowest greenhouse emitters globally, our CO_2 emissions have gradually increased since Independence.

In 2019, Namibia produced **1.67 t** of CO_2 emissions/ person. The world average was **4.72 t**.

OUR WORLD IN DATA

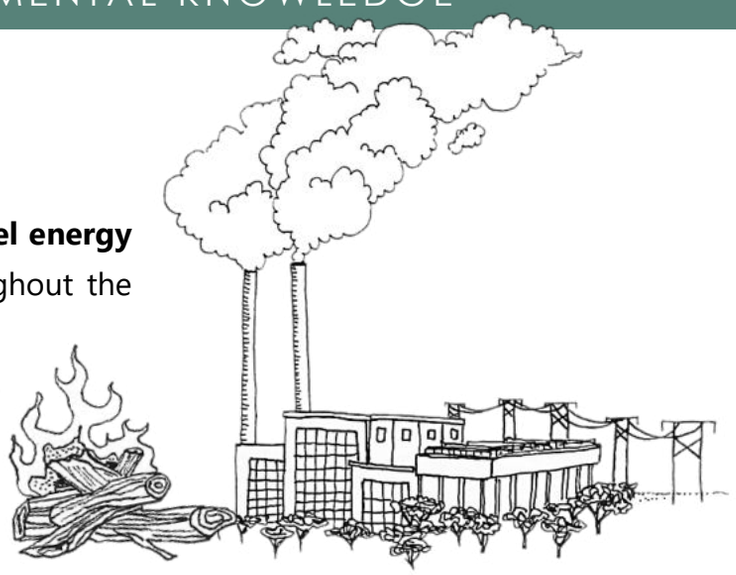
RESOURCE CHECK

For more resources on climate change in Namibia, see **Toolkit 3.1**.



CHALLENGES

ENERGY SECURITY



Namibia heavily relies on **non-renewable fossil fuel energy** to produce electricity, in transportation and throughout the industrial sectors. Many rural communities are still left without modern forms of energy, such as electricity, and collect firewood for cooking, contributing to **deforestation**.

ECONOMIC DEVELOPMENT

Namibia depends on its natural resources for development and economic growth. The impacts of climate change already affect many of these sectors, which in turn has begun to have a ripple effect throughout the economy. This may stunt economic growth, thereby putting further pressure on generating the finances for sustainable responses to climate change on a national level, but also by local businesses and private individuals.

FOOD PRODUCTION & WATER RESOURCES

Drought is a well-known occurrence in Namibia; however, these droughts will *increase* and become more *severe* with the impacts of climate change. Our vulnerability to the lack of rainfall directly impacts communities nationwide, ensuing in the loss of crops, livestock and wildlife. Without a shift in food production systems, farmers will be ill-equipped to cope with climate change impacts in the years to come, which threatens all of our food security.

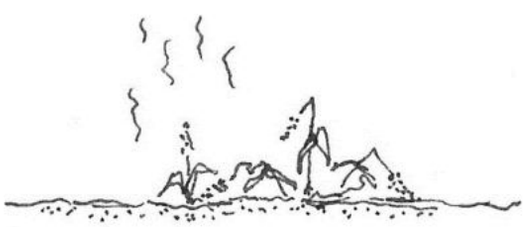
RESOURCE CHECK

Watch the video ***Emergency livelihood support to drought-affected communities in Namibia*** to learn about the potential of hydroponic green livestock fodder. Also watch the videos from *Think Namibia* about ***Climate Change*** and ***Climate Smart Agriculture*** in **Toolkit 3.1**.

EDUCATION

Communities across the country often lack access to climate change education, which is crucial to making sustainable resource-use decisions on the ground level. In addition, many political and investment decisions are made without taking climate change into consideration, questioning the comprehension of the issue in higher decision-making levels as well.

How well do you understand climate change? What about your family, friends, and neighbours?



RESPONSES

Namibia's responses to the climate crisis are aimed towards mitigating (reducing) greenhouse gases and/or towards adapting to the effects of climate change.

RESOURCE CHECK

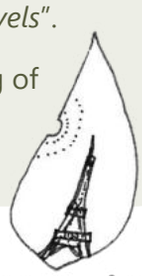
Watch the 30-minute documentary from the Ministry of Environment, Forestry and Tourism on ***Namibia's National Response to Climate Change*** to learn about the country's actions.

POLICY

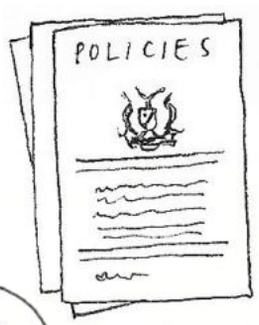
In 1992, the global community took policy action to address climate change with the establishment of the international treaty, the **United Nations Framework Convention on Climate Change (UNFCCC)**.

The treaty's main goal is to hold "*the increase in the global average temperature to well below 2°C above pre-industrial levels" and "limit the temperature increase to 1.5°C above pre-industrial levels*".

Despite good intention, the agreement had insufficient binding commitments *until* the signing of the **2015 Paris Agreement** at the UN Climate Change Conference of the Parties (COP21).



From the initial national commitment in 1995 when Namibia signed the United Nations' Framework Convention on Climate Change (UNFCCC), there have been consistent political steps taken to address climate change, beginning with the founding of the **Namibian National Climate Change Committee** (NCCC). This includes the **National Climate Change Policy** (2011) and its Strategy and Action Plan (2013-2020), which aim to develop the adaptive capacity of the Namibian population. The Namibian government actively participates in the annual COP meetings to seek international support and investment in climate change mitigation and adaptation measures.



RESOURCE CHECK

To learn more, review the ***National Climate Change Strategy & Action Plan***.

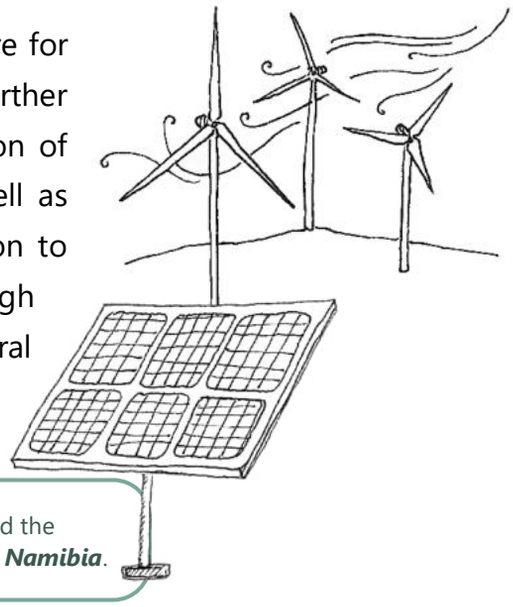
RESOURCE CHECK

Read the comprehensive report ***Namibia's Climate Change Adaptation Communication to the UNFCCC*** for up-to-date information regarding Namibia's goals and needs to address climate change.

RESOURCE CHECK

Watch the video report ***Focus on COP28: Achieving Namibia's low carbon emissions target***.

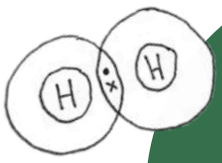
ENERGY SECTOR



Response from the energy sector has been multi-pronged. The Centre for Renewable Energy and Energy Efficiency (CREEE) was established to further Namibia's development in these fields. Initiatives include construction of large **solar electricity parks** that feed into the national grid, as well as initiatives to encourage installation of household systems. In addition to solar, **wind farms** have been built in the windy area of Lüderitz. Although wide-spread electric vehicle use will still take some time, there are several e-vehicles driving around in Windhoek traffic.

RESOURCE CHECK

To get a deeper understanding of Namibia's energy sector and the potential for renewable energy, refer to the book ***REEE- Powering Namibia***.



GREEN HYDROGEN

Hydrogen produced by the electrolysis of water, using renewable electricity.

Recently there has been significant developments in the **green hydrogen** sector including the establishment of the Namibia Green Hydrogen Council. The production of "green" hydrogen is based on using renewable energy sources to produce hydrogen.

RESOURCE CHECK

Read the comic ***Talking About Green Hydrogen*** and visit the **GH2 Namibia** website to learn more about this new development.

FINANCING FOR SUSTAINABLE LIVELIHOODS

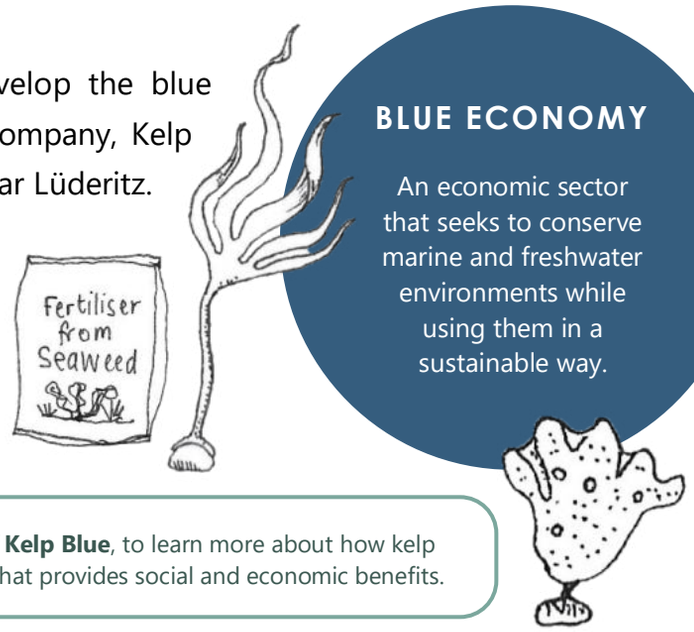
Investment in climate resilient agriculture has been one of the focal areas of national government. This has been made possible through the **UN Green Climate Fund** managed by the Environmental Investment Fund (EIF) of Namibia. The multi-stakeholder project, "Namibia Integrated Landscape Approach for Enhancing Livelihoods and Environmental Governance to eradicate poverty" (NILALEG) aims to strengthen integrated landscape management to maintain forests, biodiversity and promote nature-based livelihoods. Various other **green schemes** in rural areas have aimed to integrate climate resilience in their project design and to improve rangeland and ecosystem management practices.

RESOURCE CHECK

Visit the **Environmental Investment Fund (EIF)** website to see how international funding is being directed to improving sustainable livelihoods.

BLUE ECONOMY

Namibia's vast coastline has the potential to develop the blue economy to benefit people and the planet. One company, Kelp Blue, is planting and farming marine kelp forests near Lüderitz. Kelp is a large brown seaweed that absorbs significant amounts of CO_2 and when harvested and processed, kelp is a beneficial natural fertilizer. The kelp forests are also an oasis for marine biodiversity.



RESOURCE CHECK

Watch the video and visit the website of **Kelp Blue**, to learn more about how kelp farming in Namibia is a climate solution that provides social and economic benefits.

EDUCATION & ADVOCACY

Climate change education has been an important component for the NGO sector in Namibia. The Think Namibia project was focused directly on **raising environmental awareness** and developed many resources using multiple forms of media including videos, podcasts, posters, and books. These valuable resources can be used to educate secondary school learners and the general public. An earlier capacity building initiative under the Africa Adaptation Programme focused on building Climate Change Ambassadors and developed a set of **region-specific resources** for communities.

RESOURCE CHECK

See the *Think Namibia* Resources in **Toolkit 3.1** and Toolkit **3.6**. The ***Let's Act to Adapt*** set of educational booklets present climate predictions and adaptations for the different regions in Namibia.

Advocacy for environmental justice, especially **climate justice**, is currently only a small part of civil society's response to climate change. Youth are organising themselves as they see the immediate threat of inaction. At the National Youth Climate Change Summit they issued a statement calling for increased attention to building capacity and opportunities.

RESOURCE CHECK

Read the ***National Youth Climate Change Statement 2023*** that was released in July 2023 at the National Youth Climate Change Summit.

RESOURCES ON CLIMATE CHANGE IN NAMIBIA

Junior Primary JP | Senior Primary SP | Junior Secondary JS | Senior Secondary SS | Teacher T

JS SS T

Namibia is heating up: What global warming of 2°C means for this climate change hotspot

VIDEO: This video explains the effects of a global temperature rise of 2 degrees Celsius would be on the different areas in Namibia.
AUTHOR: Climate and Development Knowledge Network (2021)
Link: https://www.youtube.com/watch?v=QseqNRRW8qE

JS SS T

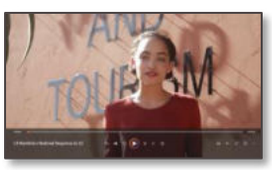
Namibia is heating up: What does global warming of 1.5°C mean for us?

INFOGRAPHIC & MANUAL: This infographic and manual outline what the effects of a global temperature rise of 1.5 degrees Celsius would be on Namibia and the response at a policy level. The infographic is available in English and Oshiwambo.
AUTHOR: Climate and Development Knowledge Network (2019)
Link 1: https://cdkn.org/sites/default/files/files/CDKN-Namibia-Map-without-cow-web-ready_v2.pdf
Link 2: https://cdkn.org/sites/default/files/files/CDKN-Namibia-Map-Oshiwambo-WEB.pdf
Link 3: https://drfn.org.na/storage/app/media/Manual_Namibia%20is%20heating%20up.pdf

JS SS T

Emergency livelihood support to drought-affected communities in Namibia

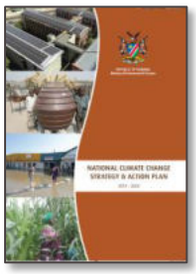
VIDEO: This video shows the devasting effects of drought on Namibia's environment and communities. It also explains actions that are being taken to respond to the issue including hydroponic fodder.
AUTHOR: United Nations Namibia (2021)
Link: https://www.youtube.com/watch?v=8_DvsuC7WDo



JS SS T

Namibia's National Response to Climate Change

VIDEO: This short film puts the Climate Change crisis into the Namibian context and the ways the country is addressing the challenges. This is a great summary of the country's steps towards sustainable development.
AUTHOR: Ministry of Environment, Forestry and Tourism (2021)
Link: https://www.youtube.com/watch?v=AEanlS4C1_0



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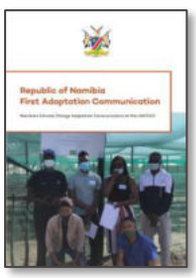
National Climate Change Strategy and Action Plan

POLICY: Read through the main points of this policy and for an informative summary on national climate change strategy, look through the List of figures (page 8) and read the Forward (page 7) and Preface (page 8).

AUTHOR: Ministry of Environment and Tourism (2013)

Link:https://www.meft.gov.na/files/files/National%20Climate%20Change%20Strategy%20&%20Action%20Plan%202013%20-%202020.pdf



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Namibia's Climate Change Adaptation Communication to the UNFCCC

REPORT: This comprehensive report gives an overview of the country's adaptation plans, successes and sectors requiring funding to combat climate change.

AUTHOR: Ministry of Environment, Forestry and Tourism (2021)

Link: https://unfccc.int/sites/default/files/resource/namibia-adaptation-communication-to-the-unfccc.pdf

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Focus on COP28: Achieving Namibia's low carbon emissions target

VIDEO: Interviews with several high level government officials reflecting on the success of the COP28 for Namibia provide a good understanding of the country's position in international climate change negotiations.

AUTHOR: CNBC Africa (2023)

Link: https://www.youtube.com/watch?v=stTpqM9FH3c

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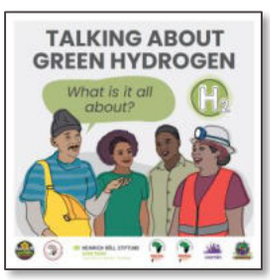
REEE – Powering Namibia

BOOK: This book illustrates, at a conceptual level, how renewable energy, energy storage and efficient technologies can "drive Namibia's development and create local value." For overview see pg 7-10.

AUTHOR: D. von Oertzen (2015)

Link: https://www.kas.de/documents/252038/253252/7_dokument_dok_pdf_42216_2.pdf/090ad1a9-5743-0995-8b9a-63427d017817?version=1.0&t=1539652150694



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Talking About Green Hydrogen

COMIC: This comic explains in a simple-to-understand way what green hydrogen is and how it can help address climate change as a renewable form of energy.

AUTHOR: Earthlife Africa, Economic Justice Network of FOCCISA, Heinrich Böll Foundation [Cape Town], MACUA, WAMUA & WoMin African Alliance (2023)

Link: https://za.boell.org/sites/default/files/2023-04/h2-what-is-it-all-about-press_web-1.pdf

T

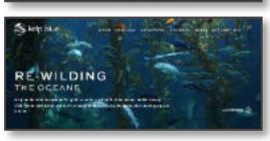
GH2 Namibia

WEBSITE: The Namibia Green Hydrogen Council website provides several resources, news update and strategies in the new green hydrogen sector.
AUTHOR: Namibia Green Hydrogen Council (2022)
Link: https://gh2namibia.com/

T

Environmental Investment Fund of Namibia (EIF)

WEBSITE: As an umbrella body for non-governmental organisations in the environmental field, this website provides many resources and links to partner projects.
AUTHOR: EIF (2020)
Link: https://www.eif.org.na/



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Kelp Blue

VIDEO & WEBSITE: The website of the innovative Kelp Blue company outlines their commitment to sustainability. They were awarded for this with the Zayed Sustainability Prize (2023).
AUTHOR: Zayed Sustainability Prize, Kelp Blue (2023)
Link 1: https://www.youtube.com/watch?v=ec4vgj8ByYQ
Link 2: https://kelp.blue/

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Let's Act to Adapt: Dealing with Climate Change

BOOKLETS: These booklets, split into regional clusters, are informative resource toolkits to be used by communities (natural resource users) as a step towards making sustainable decisions.
AUTHOR: Integrated Environmental Consultants Namibia (2011)
Link: https://the-eis.com/elibrary/search-results?a=Integrated%20Environmental%20Consultants%20Namibia%20%28IECN%29%20%28119774%29

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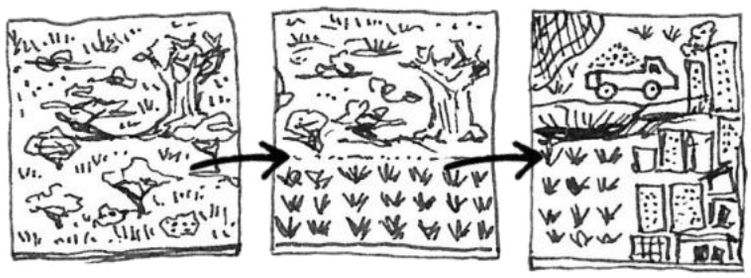
National Youth Climate Change Statement 2023

DOCUMENT: This statement was the culmination of a multi-day youth stakeholder engagement and gives a voice to young people in the Climate Change discussion.
AUTHOR: National Youth Climate Change Summit (2023)

LAND USE CHANGE IN NAMIBIA

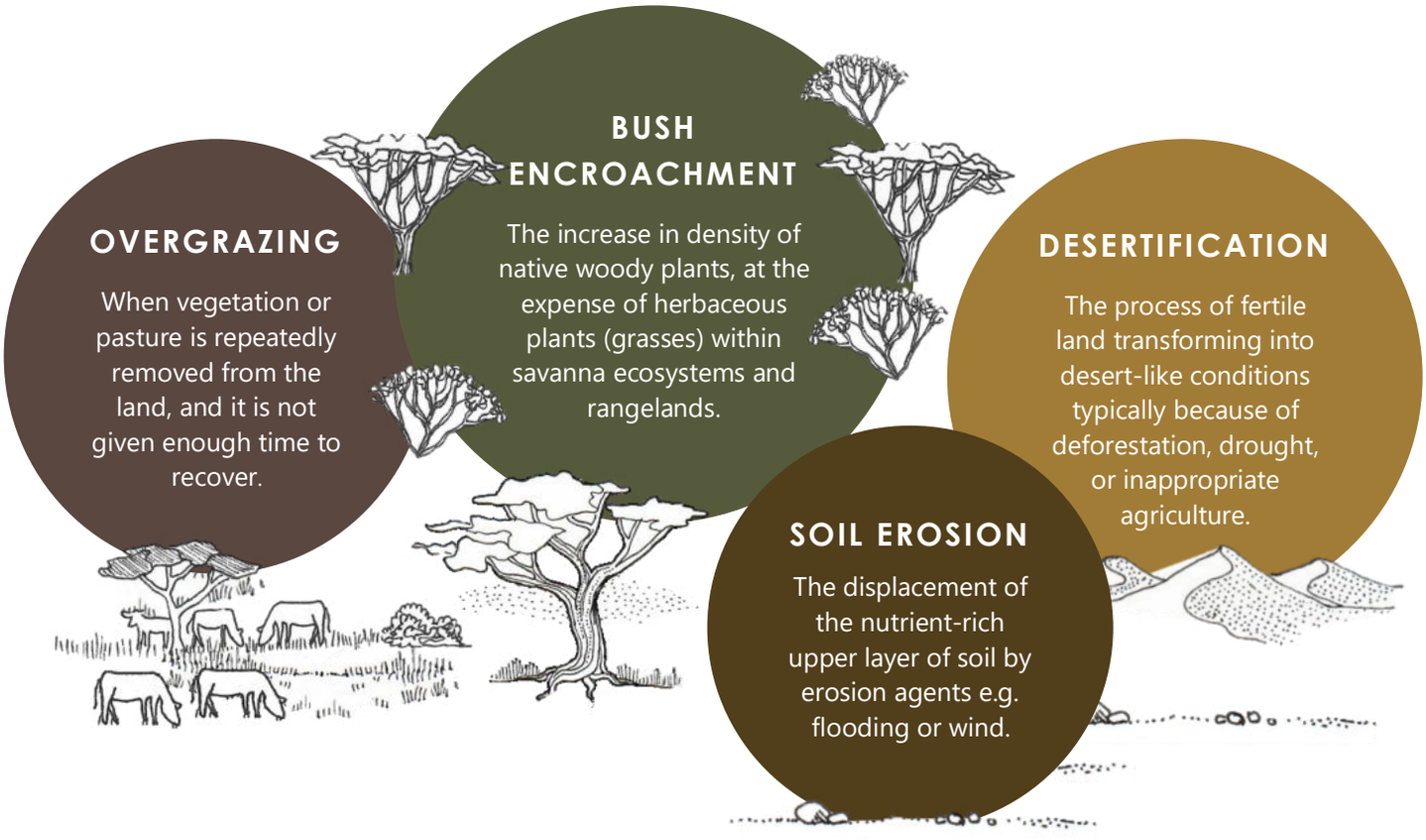


The term 'land use' refers to how an area of land is used by humans. **Land use change** is the process whereby an area of land is converted from one use to another – including the transformation of natural areas into 'useful' human areas, e.g. savanna grasslands being replaced by croplands or urban settlement. In Namibia, some of the main land use changes are due to **agriculture, wood harvesting, mining** and **urbanisation**. As we transform natural areas, we are losing their biodiversity and the ecosystem services they provide.

CHALLENGES

UNSUSTAINABLE AGRICULTURAL PRACTICES

In Namibia, much of the land use change has been in the form of **natural land converted** to agricultural land – both crop and livestock. To clear land for agriculture, many trees are cut down causing deforestation and habitat loss. Poor livestock management in vast areas has led to overgrazing, bush encroachment, soil erosion and desertification.



RESOURCE CHECK

Watch *Think Namibia's* video and read their factsheet on ***Land Degradation*** in **Toolkit 3.1**.

WOOD HARVESTING

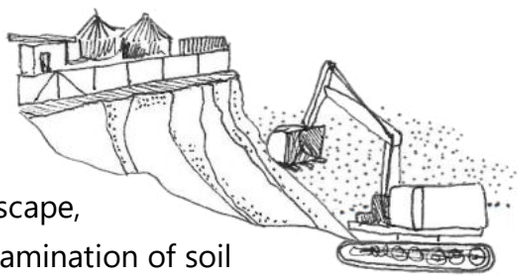
"In 1990 Namibia had 8.8 million hectares of forest cover. In 2020 this is now down to 6.6 (hectares). So Namibia has lost a quarter of its forest cover."

DR CLEMENS VON DODERER (HSF)

Wood remains the main energy source for about 60% of Namibian households. In the Zambezi region particularly, 80% of all dwellings are made from wood and 96% of people there depend on wood for fuel. In addition to land clearing for agriculture, there is also a **significant increase in clear cutting** of old forests for commercial timber export - all contributing to deforestation.

RESOURCE CHECK

Refer to the *Think Namibia* resources on ***Sustainable Forest Management*** in **Toolkit 3.1**.



MINING

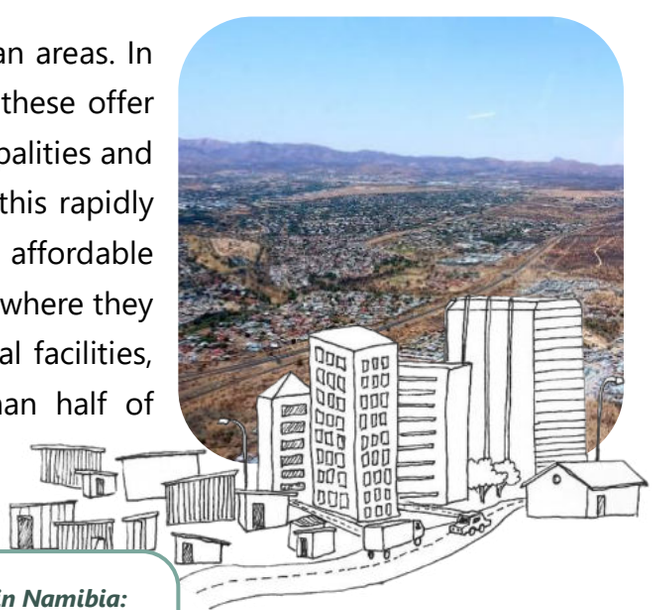
Namibia's mining sector is a heavily regulated industry; however, its environmental impacts include permanent scarring of the landscape, intense water usage, high volumes of wastewater and potential contamination of soil and water sources. Much of Namibia's mining activity takes place within national parks. Due to the boom in the construction industry, there is also a significant increase in **sand-mining** nationwide. Sand is a non-renewable resource and its mining is mostly unregulated, resulting in several significant environmental concerns including hazardous open pits and soil erosion in the middle of residential areas.

RESOURCE CHECK

For a more in-depth understanding of sand mining read **pgs. 15-18** in ***Depleting Natural Capital*** and **pgs. 10-14** to read about timber troubles**.**

URBANISATION

Urbanisation is the movement of people from rural to urban areas. In Namibia, many people move to larger towns and cities as these offer more job opportunities and access to more services. Municipalities and local councils have been challenged to meet the needs of this rapidly **increasing urban population,** especially for land and affordable housing. Many people end up living in informal settlements where they have little to no access to sewerage systems, waste disposal facilities, electricity and/or clean drinking water. Already, more than half of Namibia's population now resides in urban areas.



RESOURCE CHECK

The report and presentation ***Informal settlements in Namibia: their nature and growth*** give a perspective on this issue.

RESPONSES

Namibia's response to land use change to date is varied. Responses need to address past injustices and, therefore, balance development needs and social justice with environmental protection. These responses aim to apply the principle of sustainable utilisation and are often linked closely to climate change responses.

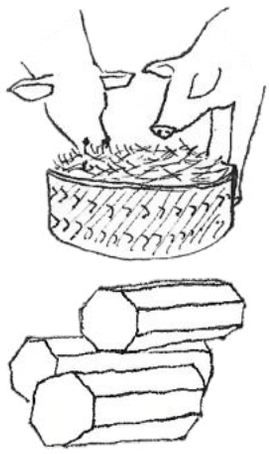
ENVIRONMENTAL MANAGEMENT ACT
(Act No. 7 of 2007)

Under the custodianship of the Ministry of Environment, Forestry and Tourism (MEFT), it has made provision for establishing regulatory functions of government including the Environmental Commissioner, Environmental Impact Assessments and Clearance Certificates and the Sustainable Development Advisory Council (SDAC).

RESOURCE CHECK

Read the user-friendly
Guide to the Environmental Management Act.

CONSERVATION AGRICULTURE & RANGELAND MANAGEMENT



Policies, such as Conservation Agriculture and the National Rangeland Management Policy & Strategy, together with training programmes are being implemented to improve climate adaptation whilst increasing economic output of land. Scientific research aims to develop improved practices and **sustainable, value-added products** from Namibia's dry climate farmland, such as the charcoal and bush-to-fodder industries, which use encroacher species. The Namibia Biomass Industry Group (N-BiG) is a national information platform that provides technical and monitoring support to develop **bioenergy** and **bio-based** products.

As with most sustainable development issues, there are trade-offs. Solutions to one problem may lead to new problems that are often only seen later. Research towards successful rangeland restoration, climate change mitigation and the management of an upscaled bush biomass sector is being done.

RESOURCE CHECK

For a great example of how Namibia has turned the bush encroachment issue into a productive and positive initiative, watch the video ***Turning Bush into Fodder – Bush Control Namibia*.**

RESOURCE CHECK

To gain a clear understanding of how bush biomass is used in Namibia, read the
Policy Brief - Greenhouse Gas Assessment of Bush Control and Biomass Utilization in Namibia.

The Conservation Agricultural programmes aim to achieve more sustainable and climate change resilient farming methods. There have been varying levels of success in this regard.

RESOURCE CHECK

Read the *IPPR* article on ***Conservation Agriculture*** and watch the short film ***Comprehensive Conservation Agriculture Programme Namibia*** to learn how this sector is responding.

RESOURCE CHECK

How can we halt desertification? Let's learn from an inspiring African story – watch the documentary on ***The Man Who Stopped the Desert***.

COMMUNITY BASED NATURAL RESOURCE MANAGEMENT (CBNRM)

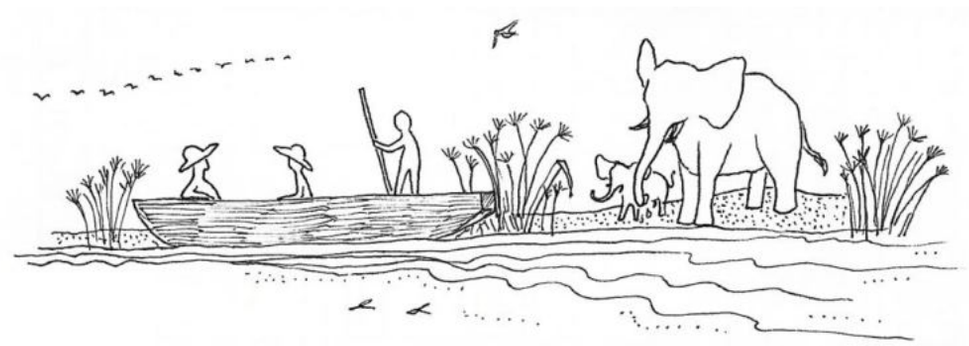
Namibia is a pioneer in Community Based Natural Resource Management (CBNRM) and prides itself in having more than **40% of the land under conservation protection**, including communal land. The now well-established communal conservancy system in Namibia has brought direct benefits to thousands of rural Namibians and has given economic value to nature conservation through eco-tourism and regulated trophy hunting. NACSO, an umbrella body, provides coordination, reporting and support.

RESOURCE CHECK

Read the annual ***State of Community Conservation in Namibia 2022*** report for an in-depth overview of community conservancies in Namibia. See the poster for a summary of the facts and figures.

"At the end of 2022 there were: **86** registered communal conservancies and (…) **46** registered community forests …"

STATE OF COMMUNITY CONSERVATION IN NAMIBIA REPORT 2022



As with the communal conservancies, the community forests are well-established and are run by a management committee. One of the many benefits is the sustainable utilisation of forest resources, including the wood crafters sector. There is a drive to development non-timber forest products in especially the North-eastern part of the country including products such as honey.

RESOURCE CHECK

Read *Conservation Namibia's* article on ***Namibian Community Forests***.

SUSTAINABLE TOWN PLANNING

As much as urbanisation can be a challenge, it can also **offer a solution to further land use change**. As populations live closer together, Namibia can become more efficient in providing services such as transportation, education, health care and food.

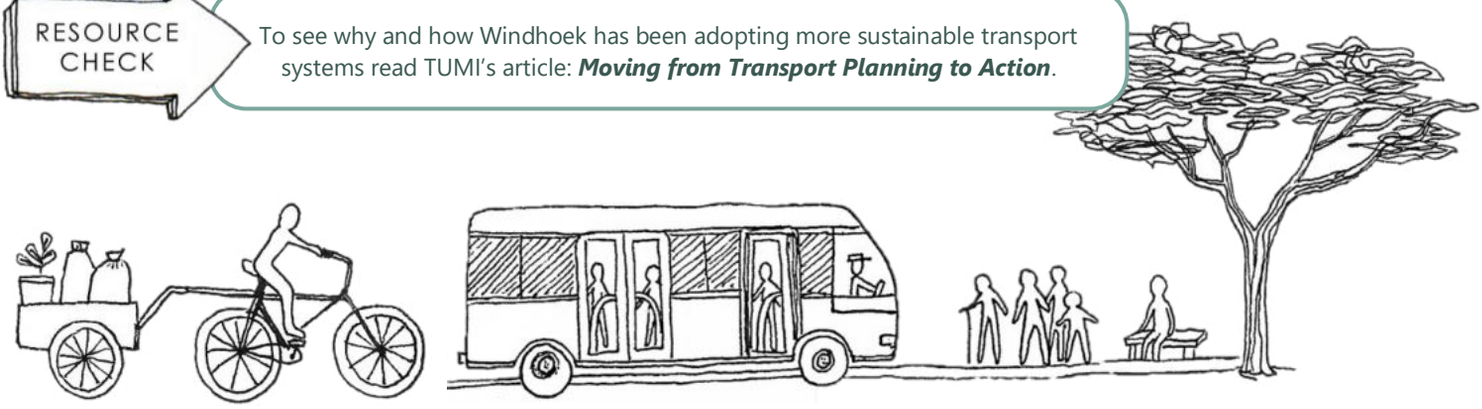
RESOURCE CHECK

Read *Conservation Namibia's* article on
Can Urbanisation Help Namibia Adapt to Climate Change?

Windhoek, as Namibia's capital city and most burdened with unsustainable urban sprawl, has embarked on the "Move Windhoek: its Sustainable Urban Transport Master Plan". Other municipalities, such as Swakopmund, have placed efforts into **improving town planning**. On a smaller, yet increasing scale, Ebikes4Africa has developed a locally made **e-bicycle** and operates an e-bike delivery service in Windhoek.

RESOURCE CHECK

To see why and how Windhoek has been adopting more sustainable transport systems read TUMI's article: ***Moving from Transport Planning to Action***.



The development of **sustainable urban housing** is a pressing issue that is being addressed by organisations such as the Development Workshop Namibia to improve the livelihoods of poor and disadvantaged communities. Programmes focus on urban sanitation, housing, and early childhood education.

RESOURCE CHECK

See the **Development Workshop Namibia** website to see what work they are doing to promote sustainable urban development in informal settlements and among disadvantaged communities that reside in them.

Other projects from NGOs and CBOs include community gardens, Community-led Total Sanitation (CLTS) campaigns, neighbourhood watch programmes and entrepreneur start-up hubs. Such innovations are required for Namibia to meet the various needs of urban residents.

RESOURCES FOR LAND USE CHANGE IN NAMIBIA

Junior Primary JP | Senior Primary SP | Junior Secondary JS | Senior Secondary SS | Teacher T

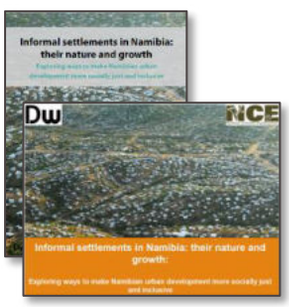
T

Depleting Natural Capital

RESEARCH PAPER: This paper explores how, since 2015, Namibia has been losing "natural capital" through mis-governance and maladministration. Read the section on the impacts of sand mining.

AUTHOR: F. Links (2020)

Link: https://ippr.org.na/wp-content/uploads/2020/10/Depleting-natural-capital-web.pdf



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Informal settlements in Namibia: their nature and growth

PAPER & PRESENTATION: This paper and presentation are exploring ways to make Namibian urban development more socially just and inclusive. It gives a comprehensive overview of the current situation.

AUTHOR: B. Weber & J. Mendelsohn (2017)

Link 1: https://www.raison.com.na/sites/default/files/Informal-Settlements-in-Namibia-Book-Web.pdf

Link 2: https://n-c-e.org/sites/default/files/2018-08/Equity%20Model%20Presentation.pdf

T

Guide to the Environmental Management Act, No. 7 2007

BOOKLET: The purpose of the guide is for the general public to understand the Act as a whole, and what it means for Namibian citizens and the country as a result of this legislation.

AUTHOR: D. Hubbard (2008)

Link: http://eia.met.gov.na/web/upload/Guide_to_EMA.pdf

T

Turning Bush into Fodder: Bush Control Namibia

VIDEO: This informative video brings awareness to Namibia's bush encroachment issue, including causes and effects. It presents and informs on the pioneer activity of turning bush into fodder.

AUTHOR: De-bushing Advisory Service (2019)

Link: https://www.youtube.com/watch?v=wfCaatiMDV0

T

Policy Brief: Greenhouse Gas Assessment of Bush Control and Biomass Utilization in Namibia

ARTICLE: This article explains the relationship between bush biomass and bush utilization, and how the management of each affect greenhouse gas emissions. Sustainable policy considerations are suggested.

Authors: M. Seebauer, A. Pinkwart, B Schwarz, C. Hartz (2020)

Link: https://www.n-big.org/download/policies/Climate-Policy-Brief.PDF

T

Conservation Agriculture (IPPR)

ARTICLE: For the purpose of informing policy, this paper provides an overview of Conservation Agriculture from definition to benefits and plans to promote this type of practice in Namibia.

AUTHOR: D. Remmert (2020)

Link: https://ippr.org.na/wp-content/uploads/2020/09/IPPR_HSF_CONAGRI_Web-1.pdf

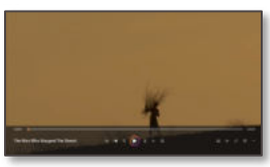
T

Comprehensive Conservation Agriculture Programme

VIDEO: This short documentary explains the programme and practice of Conservation Agriculture, how it is being implemented, who is involved and how it is transforming productivity and resilience of the land.

AUTHOR: A. Botelle, GIZ (2019)

Link: https://www.youtube.com/watch?v=-GtyG7RzuPM



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The Man Who Stopped the Desert

VIDEO: This documentary shows the inspiring story of Yacouba Sawadogo, a farmer in Burkina Faso, who used indigenous farming methods to combat desertification.

AUTHOR: M. Dodd & 1080 Film & Television (2012)

T

State of Community Conservation in Namibia

REPORT & POSTER: This annual State of Community Conservation in Namibia report reviews the challenges and successes of community conservancies and community forests in 2022. The poster summarises the main facts and figures of the report.

AUTHOR: MEFT & NACSO (2023)

Link 1: https://www.nacso.org.na/sites/default/files/2022%20SOCC%20Annual%20Report_p7.pdf

Link 2: https://www.nacso.org.na/sites/default/files/2022%20SOCCR%20Poster.pdf

T

Namibian Community Forests

ARTICLE: This write up explains what community forests are, how they are structured and how they play such an important in conserving and Namibia's natural forests. It also gives insight to the crucial role forests play.
AUTHOR: Conservation Namibia (2020)
Link: http://conservationnamibia.com/factsheets/community-forests.php

T

Can Urbanisation Help Namibia Adapt to Climate Change?

ARTICLE: This article suggests a move towards urbanisation presents an opportunity to alleviate pressure on farmlands, as well as a potential climate change adaptation through improving impact on natural resources.
AUTHOR: G. C. Potgieter (2019)
Link: http://conservationnamibia.com/articles/2019nam-urbanisation.php

T

Moving from Transport Planning to Action

ARTICLE: This article contextualizes the capital city and explains the current transport situation under a rapidly growing population. It outlines Windhoek's plans to implement a sustainable transport system.
AUTHORS: B. Robinson and R. Fisher (2019)
Link: https://www.transformative-mobility.org/assets/publications/10.-TUMI-City-profile-and-story-Windhoek.pdf

T

Development Workshop Namibia

WEBSITE: The website provides many resources for sustainable development in informal areas including how-to-manuals for housing and sanitation as well as manuals for early childhood education programmes.
AUTHORS: Development Workshop Namibia (2024)
Link: https://dw-namibia.org/

POLLUTION IN NAMIBIA

POLLUTION
Any harmful or poisonous substance introduced into an environment.

There are many different forms of pollution such as land, water, air, light, and noise, which are often interlinked with one another. Pollution contributes directly to the environmental crisis and causes health risks for humans.

CHALLENGES

LAND POLLUTION

As more of the population adopts modern lifestyles that are wasteful, more waste is produced. Solid waste is produced by both industries (the producers of consumer items) and households (the end consumer). This waste ends up in **landfills** if it is not recycled. Landfills not only take up unnecessary space (land use change), but they also result in other forms of pollution. Through the decomposition of organic waste (such as food waste) in landfills, **methane** and other **greenhouse gases** are released into the atmosphere (air pollution). When water from rainfall, surface run-off or groundwater enters the landfill it can mix with harmful chemicals and produce a toxic liquid, known as **leachate**. If this contaminates groundwater, it poses a health hazard to humans and other organisms.

Most places in Namibia don't have proper waste management facilities, which regularly results in people illegally dumping or burning their waste and littering. **Plastic pollution** especially is an issue as it does not degrade. Plastic litter can be ingested by both domestic and wild animals, resulting in their death. Unfortunately, land pollution too often results in water pollution.

MARINE & FRESHWATER POLLUTION

Worldwide, plastic pollution is a critical problem for marine organisms and for people that depend on them for their livelihoods. Whales, seals, sharks, and many other marine animals can become entangled in plastic nets and die as a result. Turtles and seabirds ingest plastic, mistaking it for food. **Microplastics** are an invisible threat. These are plastic pieces smaller than 5 mm, that are eaten by zooplankton, and travel up the food chain onto our plates, when we eat larger fish.

RESOURCE CHECK

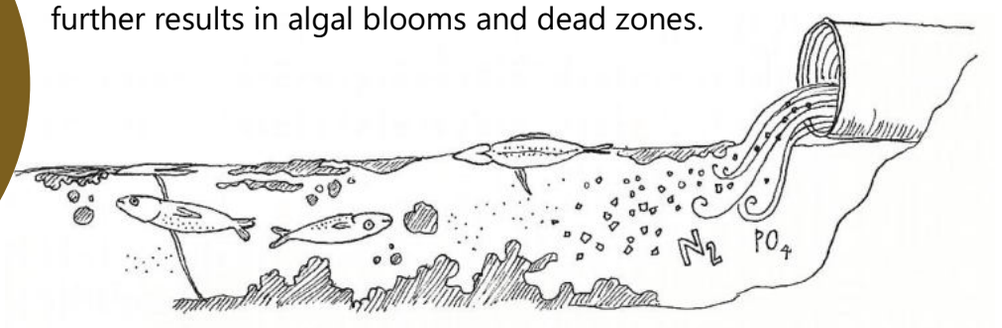
See **pgs. 16 and 18** of ***The Ocean Atlas*** and the **pgs. 28-29** in the ***Plastic Atlas*** in the previous section, to understand the threat of plastic pollution on marine ecosystems.

RESOURCE CHECK

How bad is plastic pollution in Namibia? Read ***The Challenge of Plastics in Namibia*** poster and watch the video ***Namibia's Seal Population at Risk Due to Ocean Waste***.

EUTROPHICATION
A process when an environment becomes enriched with nutrients, increasing the amount of plant and algae growth in rivers, estuaries and coastal waters.

Large scale water pollution is caused by fertilizers, pesticides, pharmaceutical products, untreated sewage and inappropriate dumping of oil and hazardous waste. This can result in **eutrophication**, which further results in algal blooms and dead zones.



On a smaller scale, and most often in rural areas, water sources may be polluted due to everyday activities, such as washing laundry directly in rivers, and animal manure.

"The available water sources are increasingly under pressure from pollution associated with human activities. Studies undertaken show that water … contains substances such as nitrate often associated with animal manure."

CALLE SCHLETTWEIN, MINISTER OF AGRICULTURE, WATER & LAND REFORM (MAWLR)

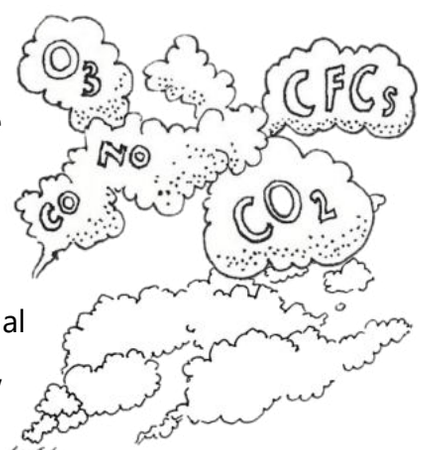
RESOURCE CHECK

See the list of agrochemicals used in Namibia, and their potential adverse effects on **pg. 9** and **11** in ***Agrochemicals in Namibia: A Toolkit***.

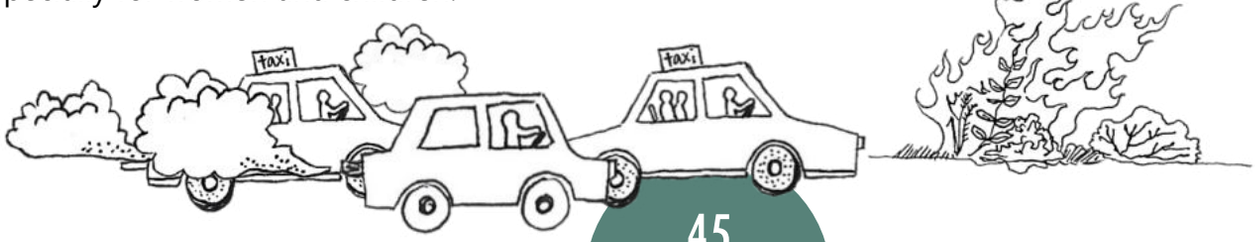
RESOURCE CHECK

In celebration of World Wetlands Day, the Ministry of Agriculture, Water & Land Reform (MAWLR) highlighted that in addition to climate change, water pollution also threatens our water sources. Read the *UNEP's* article on **Urgent Action Needed to protect Wetlands in the face of Climate Change**.

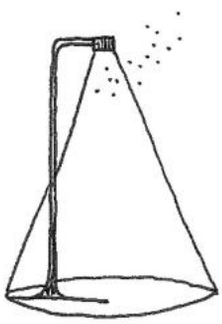
AIR POLLUTION



In Namibia, air pollution is a more localised problem and does not compare to the scale of other countries. Nevertheless, by depending on coal-produced electricity and using road traffic for most transportation purposes, we are contributing to air pollution. Contributors to **poor air quality** in Namibia include food processing and solid waste burning. Seasonal uncontrolled wildfires also create a lot of air pollution. On a household level, indoor open fire cooking and heating is a significant **health hazard**, especially for women and children.



LIGHT & NOISE POLLUTION



As Namibia becomes more urbanised and crime continues to be a problem, more lights that are brighter and **unshielded** are installed. This causes light pollution, which is disruptive to surrounding habitats. In areas with bars and shebeens - often illegal - noise pollution has become a pressing problem, which goes unchecked due to **insufficient regulations**.

LIGHT POLLUTION

Artificial light in the night environment that is excessive and / or misdirected.

RESPONSES

Responses to pollution have concentrated more on the urban areas but are mostly unresolved on a national scale. Most of these responses have been focused on solid waste pollution, with only limited initiatives focused on the other forms of pollution.

POLICY

The Ministry of Environment, Forestry and Tourism has developed a **National Solid Waste Management Strategy** and have introduced legislation to ban all plastic bags in national parks, as well as a levy of 50 cents per shopping bag nationwide. Several municipalities have also developed solid waste plans to better manage their landfills.

These policies are a first step in addressing a growing problem, but with only a small positive impact as most consumers still take a plastic bag – even though they must pay!

Read the **National Solid Waste Management Strategy**.

ZERO-WASTE

The creation of pollution is easy; however, once there, its removal requires financial and human resources. The concept of **zero-waste** therefore aims to not even create the problem in the first place.

Inspired by the international movement, zero-waste shops have opened in Windhoek and Swakopmund, where locals can buy unpackaged produce and food staples. Some large brand stores have reduced their packaging in their effort to achieve zero waste. Many of our open markets also are zero waste as long as they are not giving us food items in a plastic!

ZERO WASTE

Redesign of products to ensure re-use and thereby prevent waste.

CLEAN-UP DAYS

Clean-up days have been a local response for many years. In September 2019, an **annual national clean-up day** was declared. These initiatives have an important impact on national attitude, but usually only a short-term environmental impact, as there are insufficient facilities provided for proper waste disposal and law enforcement. The Recycle Namibia Forum (RNF) is a membership-based organization driven by industry to improve conditions for recycling. RNF has coordinated clean-up campaigns, a school recycling competition, and a green directory.

Litter clean-ups are important, but we need to keep in mind that we are addressing the "symptom", not the root cause of the problem.

RESOURCE CHECK

Check out the *Recycle Namibia Forum's* **Green Directory** and clean-up campaign guidelines in **Toolkit 3.6**.

RECYCLING & WASTE-TO-ENERGY

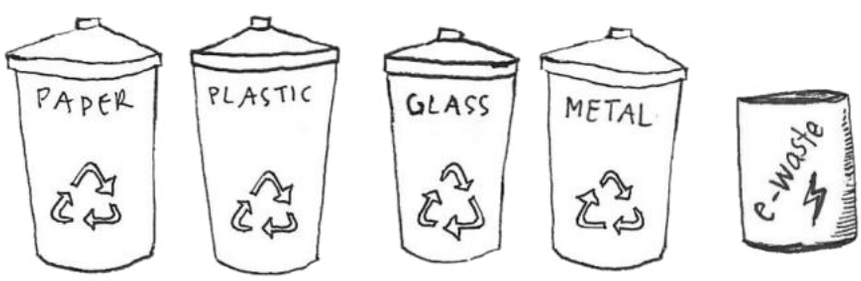
There is a small local economy focused on collecting recyclables, as well as **upcycling**. Although there are several companies in Namibia focused on recycling, Rent-a-Drum is the largest waste management company in Namibia, with a main **recycling plant** in Windhoek and collecting and sorting plants in Swakopmund and Rundu.

RESOURCE CHECK

Read the *RNF's* document ***Paving the Way for Recycling*** to get an overview of challenges in the field.

UPCYCLE

To reuse something that is waste to create a product of higher quality or value.



The Ohorongo cement factory has **found a use for non-recyclable**, low-value plastics and Styrofoam by burning them at high temperatures creating energy for cement production.

RESOURCE CHECK

Watch the video on ***Ohorongo Cement Factory*** that uses what would otherwise end up on a land fill or as litter, as an alternative energy source.

RESOURCES FOR POLLUTION IN NAMIBIA

Junior Primary JP | Senior Primary SP | Junior Secondary JS | Senior Secondary SS | Teacher T

SP JS SS T

The Challenge of Plastics in Namibia

POSTER: This poster summarises the issue of plastic pollution in Namibia. It highlights the environmental and human affects, those responsible for the issue and outlines some of the plans and solutions to the problem.

AUTHOR: Namibia Chamber of Environment (2017)

Link: https://n-c-e.org/sites/default/files/2017-04/NCE_Plastics_in_Namibia_Poster_April-2017.pdf

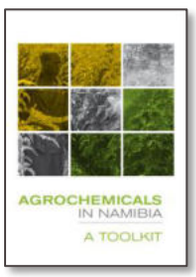
SP JS SS T

Namibia's Seal Population at Risk Due to Ocean Waste

VIDEO: This video is a news report on how the Namibian seal population around Walvis Bay is being affected by marine plastic pollution, and a recent oil spill.

AUTHOR: Voice of America (2023)

Link: https://www.youtube.com/watch?v=jmpfd_h8zas



JS SS T

Agrochemicals in Namibia: A Toolkit

MANUAL: This is a useful guide to the different chemicals used in agriculture, within Namibia. It outlines the uses and environmental effects of the chemicals and suggests safe alternatives.

AUTHOR: Namibian Nature Foundation (2022)

Link: https://data.jncc.gov.uk/data/09d2032d-0108-48b6-99ae-a4617ab72fc4/rptp-namibia-report-agrochemicals-toolkit.pdf

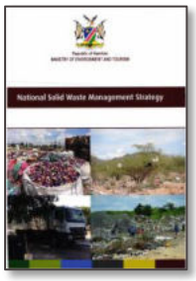
SS T

Urgent Action Needed to protect Wetlands in the face of Climate Change

ARTICLE: This article explains the threat that climate change presents to our wetlands, which includes dams, lakes, estuaries, Oshanas and flood plains. It mentions that water pollution too, is an additional threat to our already threatened water sources.

AUTHOR: UNEP (2023)

Link: https://www.undp.org/namibia/stories/urgent-action-needed-protect-wetlands-face-climate-change



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National Solid Waste Management Strategy

POLICY: This policy is in response to the Ministry recognizing the need to improve solid waste management. It aims to ensure regulations, management, funding and actions plans are consistent with national policy.
AUTHOR: Ministry of Environment and Tourism (2017)
Link: https://www.meft.gov.na/files/downloads/43e_NSWM%20Strategy.pdf

SS
T

Paving the Way for Recycling

ARTICLE: This is a write up on a study by Recycle Namibia Forum to build a knowledge base with which to assess the extent of recycling in Namibia, the associated challenges, and to develop strategy going forward.
AUTHOR: Recycle Namibia Forum (n.d.)
Link: https://rnf.com.na/sites/default/files/downloads/EIF-Paving_the_Way_for_Recyling.pdf

SS
T

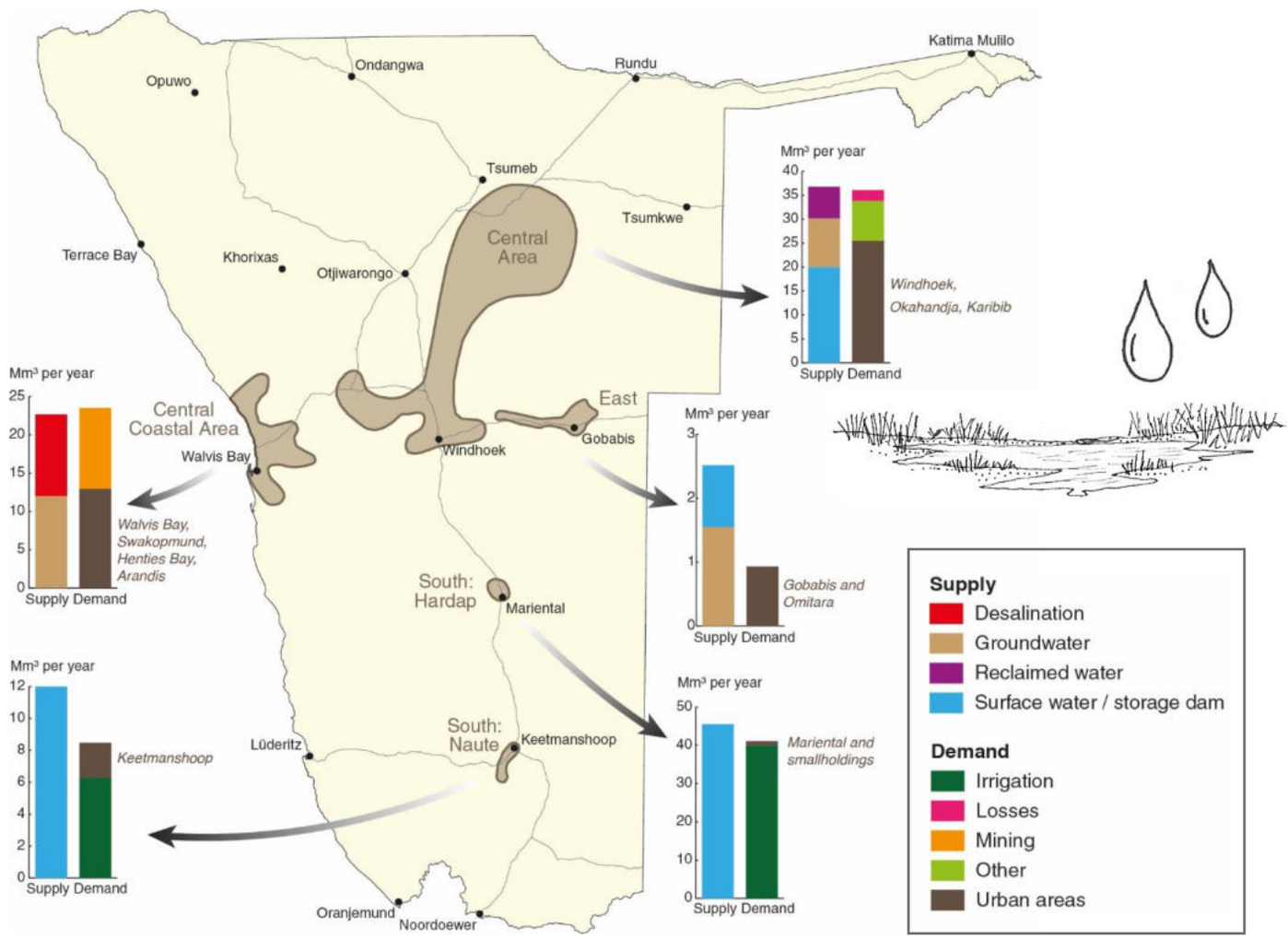
Ohorongo Cement Factory

VIDEO: This video shows the Ohorongo cement factory's commitment to Namibia's sustainable development through use of alternative energy production, namely the burning of non-recyclable materials.
AUTHOR: One Africa TV (2018)
Link: https://www.youtube.com/watch?v=YOOaqEYLk_k

WATER SCARCITY IN NAMIBIA

Namibia is one of the most arid countries in sub-Saharan Africa. Water is scarce due to high evaporation rates and low annual rainfall. Perennial rivers are only found along international borders and are located far from central areas, where there is the greatest demand. As a result, Namibia relies heavily on **groundwater reserves**, both ecologically and economically.

WATER SUPPLY AND DEMAND IN NAMIBIA



Adapted from ATLAS OF NAMIBIA: ITS LAND, WATER AND LIFE (Chapter 4)

CHALLENGES

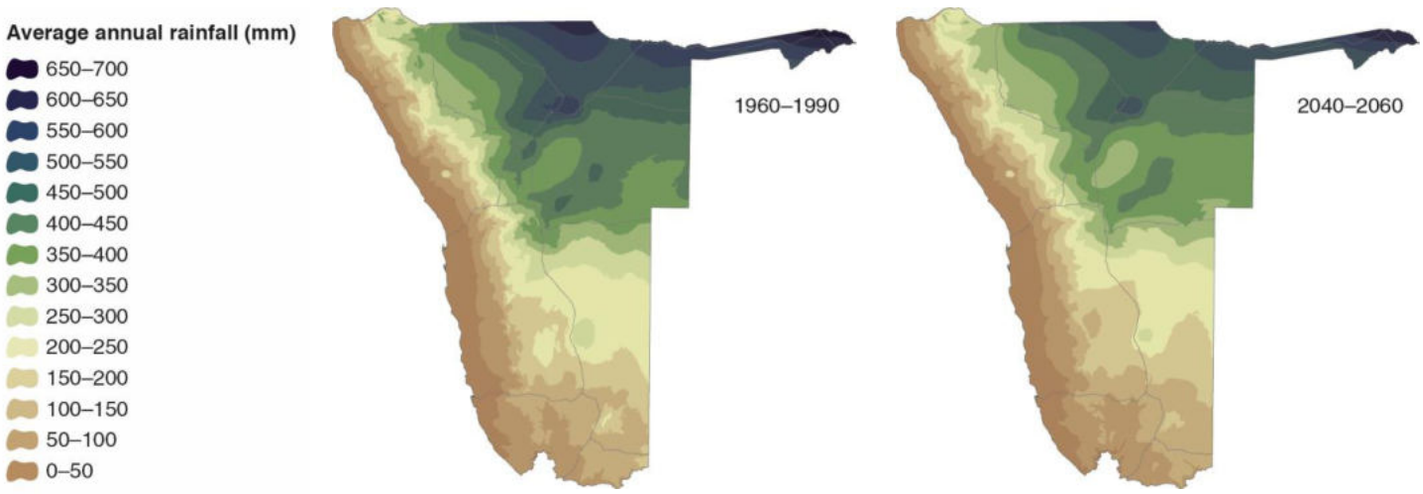
SUPPLY

Namibia's water reserves are constantly **under pressure** due to the low recharge rate (only 1%), water pollution and vulnerability to regular drought. The impacts of climate change, such as increased temperatures and wind, further threaten this limited resource due to increased evaporation.

RESOURCE CHECK

Read the paper ***Weak Policies & Conflicting Visions: Drought, Water Shortages and Climate Change*** to understand how Namibia's policies contribute to the country's water scarcity situation.

PROJECTED CHANGES IN RAINFALL BY 2060

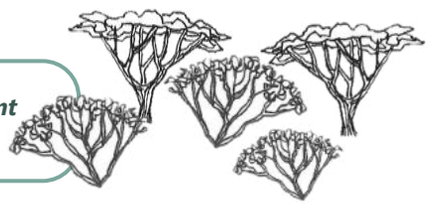


Adapted from ATLAS OF NAMIBIA: ITS LAND, WATER AND LIFE (Chapter 3)

Land-use change has reduced the already low groundwater recharge from rainfall. One example of this is the impact of bush encroachment on the recharge rate.

RESOURCE CHECK

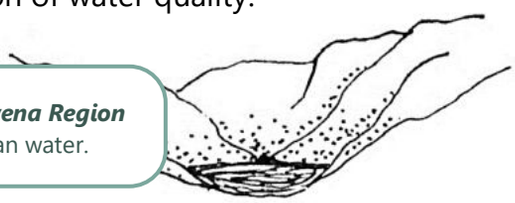
Read the factsheet on ***Impacts of Bush Encroachment on Groundwater Recharge***.



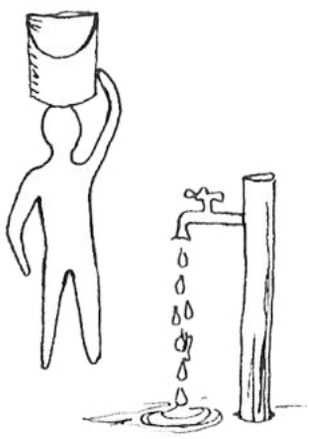
There are still areas in the country that do not have **consistent access** to clean water. Some people walk far distances to collect water from wells or earth dams; some underground water is too brackish; rainy season interferes with wells; unprotected wells can lead to deterioration of water quality.

RESOURCE CHECK

Watch the video ***Water shortage remains a problem in Ohangwena Region*** which showcases the challenges of rural people's access to clean water.



Many buildings have old, broken water infrastructure resulting in massive water loss through lack of maintenance, further hampering to sustainably supply the nation with clean water. Unfortunately, lack of education and a general attitude that water should be free causes unnecessary water wasting. Another challenge directly linked to water supply is the provision for adequate sanitation infrastructure.

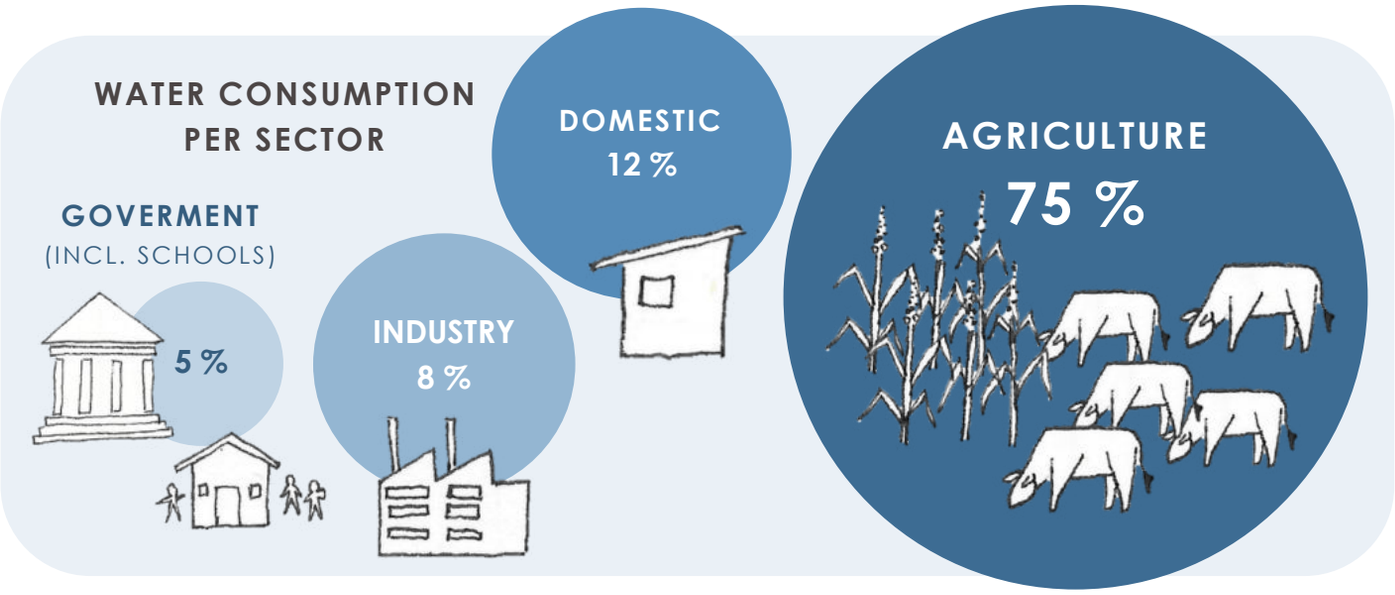


RESOURCE CHECK

For an overview of Namibia's water status, review the ***Integrated Water Resources Management -Survey and Status Report.***

DEMAND

With development and population growth, the **demand for freshwater** continues to rapidly increase.



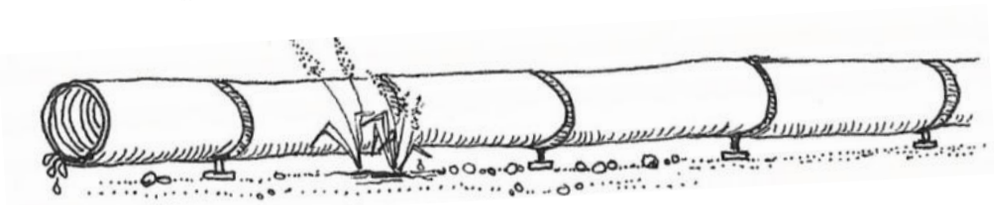
HIDDEN WATER

Water that is used in the production of goods and services, but not felt or seen in the end-product.

Some of this increased demand is directly through our lifestyles - as we consume more products, we consume more **hidden water**. When supply cannot meet the demand there are serious knock-on effects for sustainable development projects.

RESOURCE CHECK

Look at the projections for water scarcity by 2040 (per country) in the **Water Stress Scenarios 2040 World Map.**



RESPONSES

Overall, access to water has improved since Independence; however, the responses to the challenges have been varied. The Ministry of Agriculture, Water and Land Reform (MAWLR) is responsible for the management of our water resources and supply nationally. Water supply and management differs for rural compared to urban areas, as well as between domestic and commercial use. The sector is guided by the Water Resources Management Act (2004) and uses the **Integrated Water Resource Management (IWRM)** approach.

RESOURCE CHECK

Read the ***Water Innovations*** factsheet and poster from *Think Namibia* in **Toolkit 3.6** to learn what is done to supply water in Namibia.

POLITICAL

As a water-stressed country, Namibian delegates attended the **UN 2023 Water Conference** to engage in global conversations around the water crisis, and to advocate that the water crisis needs to be addressed together with the climate crisis, as these are interconnected.

RESOURCE CHECK

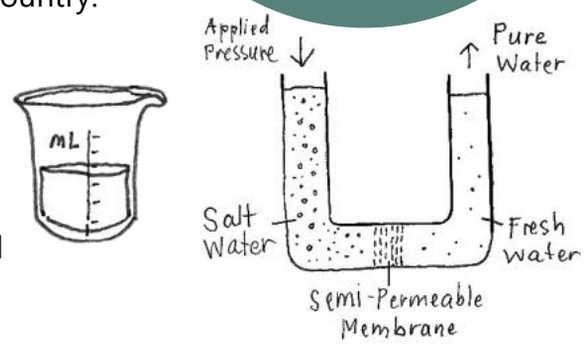
Watch the video ***Namibia's Successful Submissions at the UN 2023 Water Conference*** to learn about Namibia's participation at the second water conference.

URBAN AREAS

To supply water to urban areas a variety of approaches are used. The **inter-basin transfer schemes** have been developed to transfer water from catchment basins of higher rainfall and groundwater reserves to areas of high demand - where there is typically a lack of water, such as Windhoek. The Goreangab Reclamation Plant in Windhoek has been a pioneer in direct potable **water reclamation**. It is the first city in the world to produce drinking water directly from municipal wastewater; essential to sustain growing urbanisation in the country.

REVERSE OSMOSIS

A water treatment process that removes contaminants by using pressure to force water molecules through a semipermeable membrane.



At the coast, a portion of the water supplied is from a **reverse osmosis seawater desalination plant,** the largest in southern Africa. The potential of developing this source of fresh water is significant yet has many physical barriers and environmental considerations.

RESOURCE CHECK

Watch the video and then read the **Orano Erongo Desalination Plant** brochure that answers some commonly asked questions on desalination and how the plant works.

RURAL AREAS

In rural areas, water basin committees have been established to manage their local water resources. These committees involve local residents, local government and the national water authority responsible for the area. Some of these communities have also benefited from localised desalination.

RESOURCE CHECK

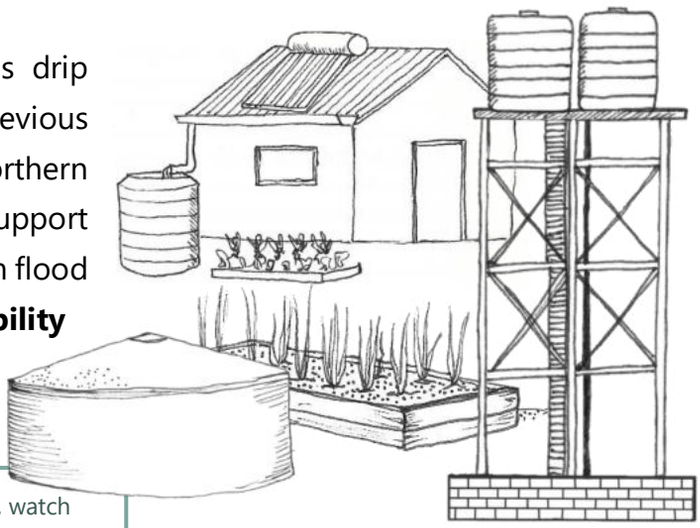
Look at *Big Issue*'s ***Water Basin Management: Working Together to Manage Our Water and Natural Resources*** to learn how it functions and its importance.

RESOURCE CHECK

Watch the launch video of the ***Grünau Groundwater Desalination Plant,*** where they also explain the role of this kind of infrastructure.

AGRICULTURE

The agricultural sector has adopted practices such as drip irrigation and **hydroponics**, as highlighted in previous sections, to become more climate resilient. In Northern Namibia, the CuveWaters project did extensive work to support local farmers to use water resources more efficiently from flood waters; they focussed on **extending the water availability** for crops into the dry season through improved storage.



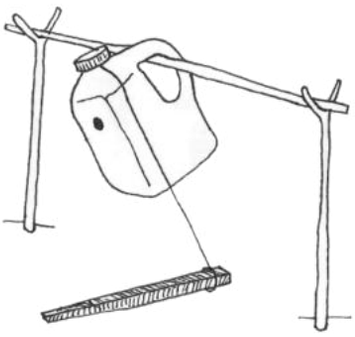
RESOURCE CHECK

To see some of the work *CuveWaters* is doing, watch their two **videos** and read the **factsheet.**

TECHNOLOGY & INNOVATION

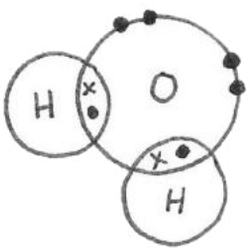
There is still much to be done to respond to water efficiency, such as **adopting new technologies**.

The Covid-19 Pandemic has highlighted the need for innovative responses to supplying sufficient, clean water and sanitation. The Tippy-Tap is an example of how Namibia has quickly adapted to a more sustainable way of managing the limited resource.

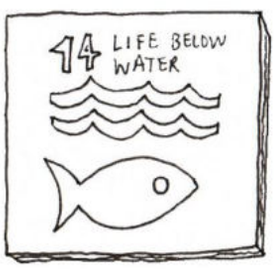


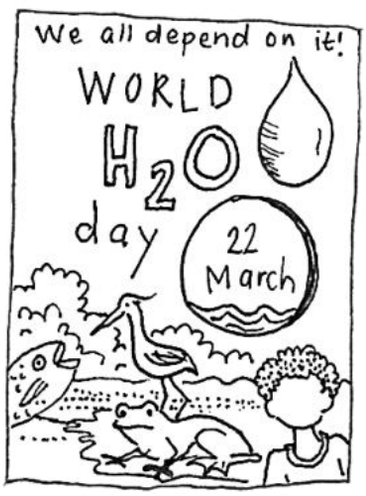
EDUCATION

"Water is Life" is a common theme in Namibia's curriculum for school children. Many schools have implemented water saving systems such as water bottles or cups instead of a flowing tap.



World Water Day is celebrated annually; several competitions to promote water awareness have been conducted, such as the City of Windhoek essay and drawing contest in 2021.





RESOURCE CHECK

Refer to **Toolkit 3.1** and **Toolkit 3.6** for many educational resources on water.

RESOURCES FOR WATER SCARCITY IN NAMIBIA

Junior Primary JP | Senior Primary SP | Junior Secondary JS | Senior Secondary SS | Teacher T

T

Weak Policies & Conflicting Visions: Drought, Water Shortages and Climate Change

BRIEFING PAPER: This paper highlights disparities between Namibia's water resource management policies and the science informing them; exploring conflict between policies and national agenda on climate change.

AUTHOR: D. Remmert (2020)

Link: https://ippr.org.na/wp-content/uploads/2020/03/drought-climate-web-copy.pdf

T

Impacts of Bush Encroachment on Groundwater Recharge

ARTICLE: Through years of soil hydrological monitoring in Namibian thorn-bush savanna, this article explores the evidence for the impact of bush encroachment on groundwater recharge, and the consequences of that.

AUTHOR: De-Bushing Advisory Service (2018)

Link: http://the-eis.com/elibrary/sites/default/files/downloads/literature/Impacts%20of%20bush%20encroachment%20on%20groundwater%20recharge.pdf

T

Water shortage remains a problem in Ohangwena Region

VIDEO: This video reports on the water shortages experienced in the Ohangwena region and shows how many people still have to walk far distances to collect water from wells or earth dams, which can be dangerous.

AUTHOR: NBC Digital News (2019)

Link: https://www.youtube.com/watch?v=GtpdPETjUAg

T

IWRM Survey and Status Report

REPORT: This paper reports on the status of Namibia's IWRM. It looks at how coordinated the country's development is with sustainable water resource management, without compromising the environment.

AUTHOR: Desert Research Foundation of Namibia (2009)

Link: https://www.gwp.org/globalassets/global/gwp-saf-files/namibia-iwrm-report.pdf

SS
T

Water Stress Scenarios 2040 World Map

INFOGRAPHIC: This infographic illustrates the worldwide projection for water scarcity by 2040. It highlights the importance for awareness now, and strategy implementation to conserve the precious resource.

AUTHOR: Encyclopedia Britannica (2019)

Link: https://cdn.britannica.com/47/204547-050-3132059B/World-map-country-water-stress-scenarios-2040.jpg

SS T

Namibia's Successful Submissions at the UN 2023 Water Conference

VIDEO: This video reports on the second UN 2023 Water Conference, and Namibia's proposal to the conference that the water crisis needs to be addressed together with the climate crisis.

AUTHOR: The Namibian (2023)

Link: https://www.youtube.com/watch?v=K_OiNtoi2R0

T

Orano Erongo Desalination Plant

VIDEO & BROCHURE: The video reports on the opening of the Orano Erongo Desalination plant; the brochure gives information on the plant and answers some commonly asked questions on the operation. Read to further understand desalination and the role it plays in overcoming water scarcity.

AUTHOR: NBC Digital News (2023), ORANO (2018)

Link: https://www.youtube.com/watch?v=KCREWrnZvI8

T

Water Basin Management: Working Together to Manage Water and Natural Resources

BOOKLET: This publication gives understanding to water basin management, and the how and why Namibia relies on it as a response to water scarcity. See examples of water management in the Namibian context.

AUTHOR: The Big Issue Supplement (2004)

Link: http://the-eis.com/elibrary/sites/default/files/downloads/literature/Basin%20management_working%20together%20to%20manage%20our%20water%20and%20natural%20resources_2004.pdf

T

Grünau Groundwater Desalination Plant

VIDEO: This launch video informs on the state of rural access to potable water. The key speakers talk on the issue and how these groundwater desalination operations are an answer to this challenge.

AUTHOR: NBC (2020)

Link: https://www.youtube.com/watch?v=pLGGFThztvo

SS T

CuveWaters Videos and Factsheet

VIDEO & FACTSHEET: These videos and factsheet show how CuveWaters empowers and equips communities to better their water resource protection, management and sanitation practices.

AUTHOR: CuveWaters (2014)

Link 1: https://vimeo.com/97124645

Link 2: https://vimeo.com/90001599

Link 3: http://www.cuvewaters.net/fileadmin/edit/Downloads/Publications/CuveWaters-Factsheet-RWH-2015.pdf

BIODIVERSITY LOSS IN NAMIBIA

Most of the environmental issues above are connected and eventually contribute to biodiversity loss; this is primarily due to the **loss of habitat**. We often only focus on large 'megafauna' species, such as lion, rhino and elephants, as these capture our attention. However, population changes in one species affects all others in the ecosystem (e.g. deforestation leads to reduced habitat for birds, reptiles, and insects).

RESOURCE CHECK

Read the short article **Threats to Namibia's Biodiversity**.

CHALLENGES

The majority of the previously described challenges affect the health of biodiversity. Additionally, there are other direct contributors to biodiversity loss.

HABITAT LOSS

Land use change has led to a **decrease** in natural resources and overall habitat loss for Namibia's biodiversity. Fencing off land has led to additional landscape and habitat fragmentation. Often there is competition between livestock and wildlife for grazing.

RESOURCE CHECK

See *Think Namibia's* website for videos and factsheets in **Toolkit 3.1**.

Human-wildlife conflict (HWC) is of particular concern as many Namibians live in areas together with wildlife. As human populations increase and need more land, this conflict becomes more acute. Conflicts with lions and elephants affect human safety and infrastructure, whilst predators such as cheetahs, leopards, and hyenas ever-present a challenge to livestock farmers. The use of poisons and pesticides has intentional or accidental side effects; particularly for vulture populations, which have been seriously affected by poisons.

RESOURCE CHECK

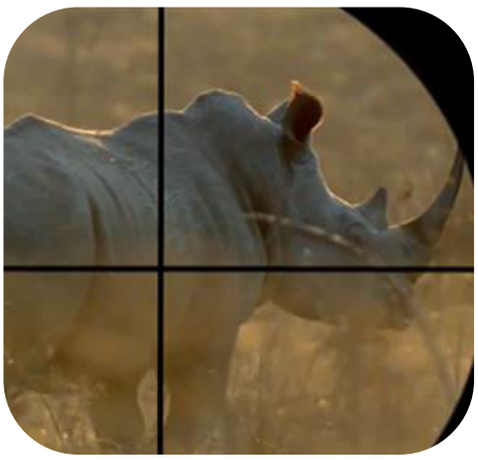
For an example of a species under threat, read *NARREC's* ***Endangered and Critically Endangered – All 7 Vulture Species that Should Occur in Namibia***.

OVEREXPLOITATION

Overexploitation results from **overconsumption** of a species, e.g. overfishing, overhunting, overharvesting and deforestation. This may be done legally or illegally.

OVER-EXPLOITATION

The removal of a species at a rate *faster* than it can naturally replenish.



Another threat is **poaching**, either for own consumption (meat) or for profit (wildlife products). The lucrative – and often illegal - international wildlife trade encourages poaching of species such as rhino, pangolins, and various bird and reptile species. Through corruption, greed, and a lack of regulations and/ or enforcement these problems are exacerbated.

RESOURCE CHECK

Read the articles ***From Facing Certain Death to Contributing to Science – A Pangolin's Tale*** and ***Plight of Illegally Traded Birds Highlighted at Windhoek Show***.

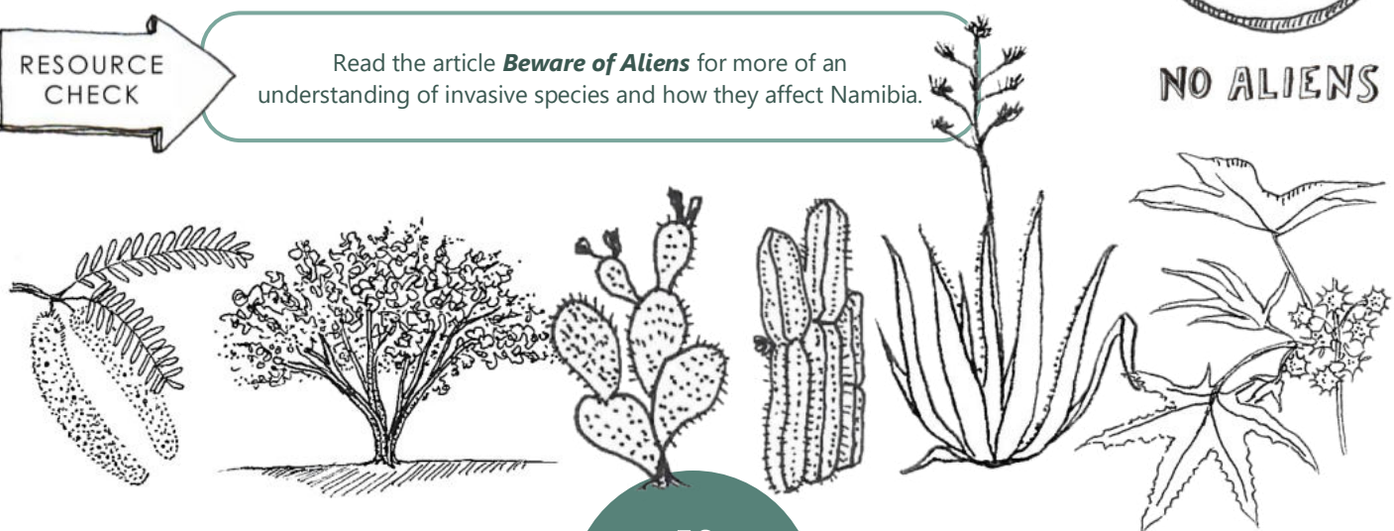
ALIEN INVASIVE SPECIES

Alien invasive species are **introduced organisms that alter the environment**. Although the species may have a beneficial purpose, it has a negative effect on other species and the natural resources in the area. The introduction of invasive species may occur on purpose or by accident.

Along our coastline, exotic mussels, and barnacles, which have entered our shores on the bottom of ships, are outcompeting our indigenous sea life. Plants, such as the Mesquite (*Proposis* species) tree and cacti - as decorative and food plants - have proven to have detrimental consequences for local water resources.

RESOURCE CHECK

Read the article ***Beware of Aliens*** for more of an understanding of invasive species and how they affect Namibia.



RESPONSES

Addressing biodiversity loss locally and globally demands that we respond to all cross-cutting issues, but we must also respond to the direct causes.

POLICY

The Ministry of Environment, Foresty and Tourism (MEFT) is the main agent of government responsbile for the protection of biodiversity; however, it relies on **cross-sectoral support** on most issues.

RESOURCE CHECK

Read the executive summary of ***Namibia's Second National Biodiversity Strategy and Action Plan*** to find out Namibia's national goals and targets to achieve biodiversity conservation.

PROTECTED AREAS

Namibia has a worldwide recognised approach to land conservation through a system of national parks, communal conservancies, private nature reserves and multi-stakeholder approaches. Namibia has a long history of biodiversity conservation through its system of national parks, including **Etosha National Park**. These parks play a vital role in providing a safe haven for natural ecosystems to flourish with only minimal disturbance, if any.

Namibia can pride itself in having over 40% of its land under conservation management.

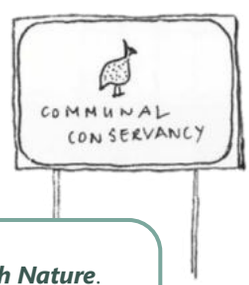
RESOURCE CHECK

Look at the many maps and summaries in the ***State of Protected Areas in Namibia: A Review of Progress and Challenges***.

The establishment of the **communal conservancy legislation in 1996** has been one of the key factors to considerably widen the network of protected areas in Namibia. Guided by a constitution, an elected committee manages the conservancy to sustainably utilise the wildlife in the area. Today there are over 85 registered conservancies.

RESOURCE CHECK

Learn more about how a communal conservancy is structured in *Conservation Namibia's* article on ***Namibian Communal Conservancies.***



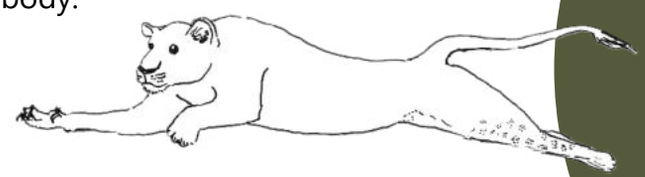
RESOURCE CHECK

Watch the short film on the NAM-PLACE Project: ***Namibia: Living in Balance with Nature***.

Commercial landowners have also formed conservancies and private nature reserves. One of the largest private nature reserves in southern Africa, the NamibRand Nature Reserve, provides a vital wildlife corridor for desert animals in the Namib Desert. To further develop protected areas, **multi-stakeholder platforms** have been established for like-minded neighbours to improve conservation efforts through combined actions such as fence removal.

COMMUNITY BASED NATURAL RESOURCE MANAGEMENT (CBNRM)

In Namibia, CBNRM has been a success story and has evolved into **eco-tourism and trophy hunting**. It is a significant source of income and depends on a large support network of NGOs and private partnerships. The Namibian Association of CBNRM Support Organisations (NACSO) acts as an umbrella coordinating and networking body.



COMMUNITY-BASED NATURAL RESOURCE MANAGEMENT
(CBNRM)

A form of resource governance that has evolved together with communal conservancy legislation, that aims to empower local communities to manage their wildlife and natural resources in a sustainable manner.

An essential component of CBNRM is **communal game guards** who are to protect the local biodiversity from poachers, as well as from Human-Wildlife Conflict (HWC).

RESOURCE CHECK

Learn more about *CBNRM* and *NASCO* through the **NASCO website** and the booklet ***Communal Conservancies- Namibia's Gift to the Earth***.

RESOURCE CHECK

Read *IRDNC*'s ***Lessons from the Field*** and watch a TED Talk from John Kasaona, *IRDNC* Director, ***How Poachers Became Caretakers***.

ECO-TOURISM

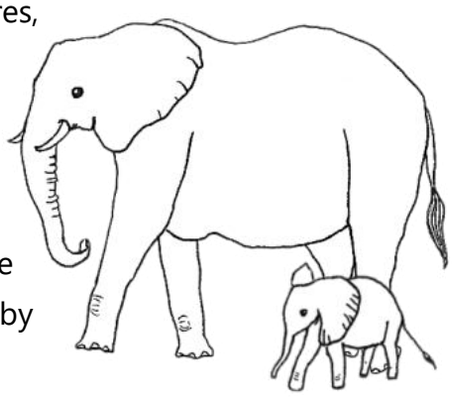
Eco-tourism is a **vital financial partner** in the success of conservation in Namibia. It provides a self-sustainable model for communities and private landowners to have nature conservation as a primary form of land-use. This is a win-win for biodiversity conservation if done in a responsible manner. Eco-tourism helps bring funds to the country for many other activities including research, education, and wildlife monitoring programmes. Several NGOs receive significant funding for their work through volunteer tourism, which also helps educate local communities.

RESOURCE CHECK

Watch the video ***Asser Ndjitezeau talks about Conservation Benefits.*** Check out Namibia's sustainable tourism certification programme on the **Eco Awards Namibia** website.

ENDANGERED & THREATENED SPECIES PROTECTION

The **protection of key species** under threat include rhinos, vultures, pangolins, elephants, giraffe and large carnivores, to name a few. There are many NGOs that have established a variety of responses to challenges faced by these species including direct support to minimise HWC, research to learn more about their behaviour and ecology and direct wildlife rescue and care. Through strategic partnerships, wildlife crime and trafficking is being tackled to help curb this crisis faced by several species.



RESOURCE CHECK

Learn more about Namibia's efforts to curb wildlife crime by reading ***What is Being Done to Fight Wildlife Crime in Namibia*** by *Conservation Namibia* and *MEFT*'s ***Revised National Strategy on Wildlife Protection and Law Enforcement***.

RESOURCE CHECK

Visit the **Namibia Chamber of Environment Website** to learn about several action groups to protect key species such as the pangolin and large carnivores.

EDUCATION

Tertiary institutions in Namibia now offer a variety of courses specifically on biodiversity conservation, land management, CBNRM and tourism. In the non-formal sector there are many **environmental education centres** run by government, NGOs and the private sector that provide opportunities for Namibians to visit and learn about biodiversity and land conservation. Awareness raising campaigns through billboards, newspaper and radio ads have been an important component to combatting illegal wildlife trade and poaching.

We can become part of international education initiatives such as the Leadership for Conservation in Africa (LCA) and the UN Decade for Ecosystem Restoration.

THE UN DECADE FOR ECOSYSTEM RESTORATION

The UN Decade for Ecosystem Restoration was launched in 2021 and strives towards Nature Positive goals. It aims to stop the destruction and degradation of ecosystems worldwide, to prevent these in the future, and to restore ecosystems that have already been damaged.

RESOURCE CHECK

Attend upcoming online talks and check out previous presentations from African conservationist on the **LCA** and the **ShareScreen** website. Learn more about ecosystem restoration on the ***UN Decade on Ecosystem Restoration*** website.

RESOURCES FOR BIODIVERSITY LOSS IN NAMIBIA

Junior Primary JP | Senior Primary SP | Junior Secondary JS | Senior Secondary SS | Teacher T

JS SS T

Threats to Namibia's Biodiversity

ARTICLE: This article outlines the major threats to Namibia's biodiversity, animal species and well as plant life. Per threat, it also suggests ways that human population can help overcome these and/or protect biodiversity.
AUTHOR: A. Iiyambula, N. Barry, R. Portas (2020)
Link: https://www.news-namibia.org/threats-to-namibias-biodiversity/

JS SS T

Endangered and Critically Endangered – All 7 Vulture Species That Should Occur in Namibia

ARTICLE: This case study looks at why the vulture population in Namibia has been seriously reduced and what farmers and land managers, as well as the general public, can do about this loss to biodiversity.
AUTHOR: A. Ring (2016)
Link: https://narrec.electric.com.na/Articles/Article36.htm

JS SS T

From Facing Certain Death to Contributing to Science – A Pangolin's Tale

ARTICLE: This article shares research methods to learn more about pangolin behaviour in order to be able to protect this highly endangered species.
AUTHOR: K. Prediger (2020)
Link: https://conservationnamibia.com/blog/b2020-pangolin-release.php

JS SS T

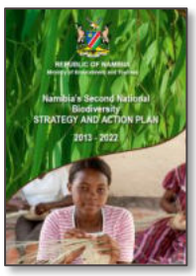
Plight of Illegally Traded Birds Highlighted at Windhoek Show

ARTICLE: This article highlights the issue of illegal animal trade, specifically the illegal trading of parrots. It outlines the work of key organisations in action against the activity and how the country can address it.
AUTHOR: L. Komen (2012)
Link: https://narrec.electric.com.na/Articles/Article32.htm

JS SS T

Beware the Aliens

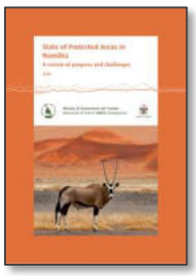
ARTICLE: This article gives an overview of what alien plants are, and the affect they have on landscape and biodiversity. It discusses some of the major invasive species and what can be done to prevent their spread.
AUTHOR: B. Curtis (2021)
Link: https://www.news-namibia.org/beware-the-aliens/



SS T

Namibia's Second National Biodiversity Strategy and Action Plan

POLICY: This policy is a reviewed strategy and action plan in response to the Convention on Biological Diversity Strategic Plan including matters of biodiversity management, protection, initiative and awareness.
AUTHOR: Ministry of Environment and Tourism (2014)
Link: https://www.meft.gov.na/files/downloads/168_NBSAP%202%20Namibia.pdf



SS T

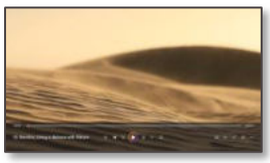
State of Protected Areas in Namibia

BOOKLET: This report reviews progress and challenges of the national protected areas of Namibia. It outlines their history, significance, and informs on recent trends, achievements and future conservation plans.
AUTHOR: Ministry of Environment and Tourism (2010)
Link: https://rris.biopama.org/sites/default/files/2019-03/State%20of%20the%20Protected%20Areas%20in%20Namibia%202010.pdf

JS SS T

Namibian Communal Conservancies

ARTICLE: To learn what communal conservancies are, this article explains how they are setup, what they do and their means of operating. Read to understand their important role in the country's conservation efforts.
AUTHOR: Conservation Namibia (2019)
Link: https://conservationnamibia.com/pdfs/fs-communalconservancies.pdf



JS SS T

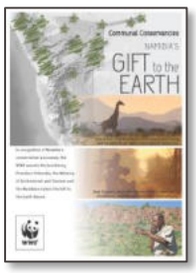
Namibia: Living in Balance with Nature

VIDEO: This video about the NAM-PLACE project explains how protecting natural landscapes is key to protect biodiversity. The national project is presented and their objectives explained.
AUTHOR: Global Environment Facility (2015)
Link: https://www.youtube.com/watch?v=2YLnGgvMNeY

SS T

NASCO Website

WEBSITE: This website is a source of materials, resources and data to learn more about the conservation efforts of Namibia as well as the role of NASCO in connecting communities and conservation organisations.
AUTHOR: NASCO
Link: http://www.nacso.org.na/



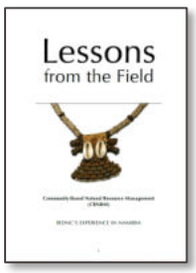
JS SS T

Communal Conservancies: Namibia's Gift to the Earth

ARTICLE: In recognition of Namibia's conservation efforts through community conservancies, this article highlights the value of the concept and informs on the work of the core organisations/initiatives involved.

AUTHOR: Namibia Tourism (2013)

Link: https://namibiatourism.com.na/uploads/file_uploads/Namibian_Conservation_Fact_Sheet_copy.pdf



SS T

Lessons from the Field

BOOK: This book outlines the key work and role of the IRDNC in wildlife conservation. Each chapter focuses on different elements of the organisation's experiences and operations – all worth looking over.

AUTHOR: IRDNC (Ed: M. Jacobsohn) (2011)

Link: https://www.irdnc.org.na/pdf/IRDNC-Lessons-from-the-Field.pdf

JS SS T

How Poachers Became Caretakers by John Kasaona

VIDEO: John Kasaona gives context to the wildlife crisis in Namibia and its causes, and explains how poachers have now become wildlife protectors. He speaks on how this movement proposes a model to the world.

AUTHOR: TED Ed (2015)

Link: https://www.youtube.com/watch?v=hoF4FHCbHwU

JS SS T

Asser Ndjitezeu Talks About Conservation Benefits

VIDEO: Asser Ndjitezeu explains what a conservancy is, its purpose and role in the relationship between wildlife and the community. He describes the CBNRM programme and its significant role in conservation.

AUTHORS: WWF Namibia, Steve Felton (2018)

Link: https://www.youtube.com/watch?v=3aFoO9GdwOc

SS T

Eco Awards Namibia Website

WEBSITE: This website shows how the Eco Awards works. Explore the site to understand the benefits of this kind of programme on sustainable tourism and, in consequence, the country and its resources as a whole.

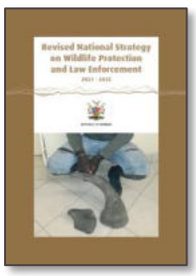
AUTHOR: Eco Awards Namibia

Link: https://ecoawards-namibia.org/

JS SS T

What is Being Done to Fight Wildlife Crime in Namibia?

ARTICLE: This article gives facts and figures on Namibia's efforts to stop/slow the major wildlife crime issue in the country. It presents successes as well as challenges that have been faced so far by the various initiatives.
AUTHOR: H. Denker (2020)
Link: https://conservationnamibia.com/pdfs/cnam2020-wildlife-crime.pdf



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Revised National Strategy on Wildlife Protection and Law Enforcement 2022

STRATEGY: This strategy provides a brief background on wildlife protection and law enforcement in Namibia and outlines specific objectives. It then outlines the actions that the country intends to take from 2021 to 2025.
AUTHOR: MEFT (2020)
Link: https://www.meft.gov.na/files/downloads/072_National-Strategy_Wildlife-Protection&Law-Enforcement_F_re1_201209s%20(2).pdf

SS T

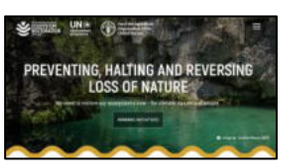
Namibian Chamber of Environment Website

WEBSITE: To learn more about what the NCE is, it's role and the extensive initiatives they are working on, explore their website. This includes several stakeholder working groups focussed on key issues.
AUTHOR: Namibian Chamber of Environment (n.d.)
Link: https://n-c-e.org/

SS T

Leadership for Conservation in Africa & ShareScreen Africa

WEBSITE: The Leadership for Conservation in Africa website provides information on their conservation work in Africa, including educational materials for learners of all ages, such as videos and online talks which they host through their ShareScreen project.
AUTHOR: Leadership for Conservation in Africa (LCA) (n.d.); ShareScreen Africa (n.d.)
Link: https://lcafrica.org/
Link: https://sharescreenafrica.org/



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UN Decade on Ecosystem Restoration Website

WEBSITE: To learn more about the 2021-2030 decade to prevent, halt and reverse the loss of nature explore the many initiatives and resources on this website.
AUTHOR: UNEP & FAO (n.d.)
Link: https://www.decadeonrestoration.org/

TEACH for ESD

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