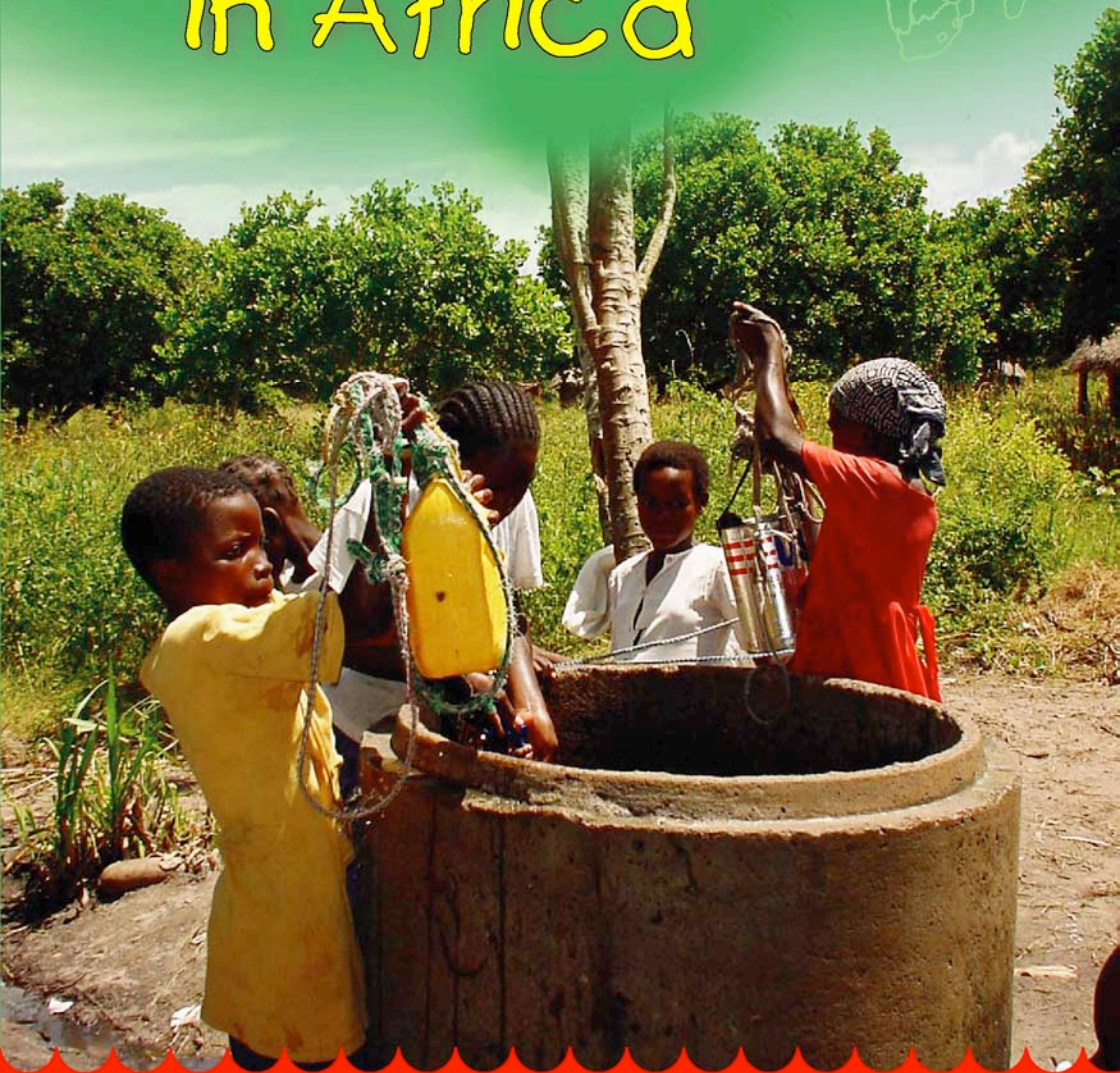
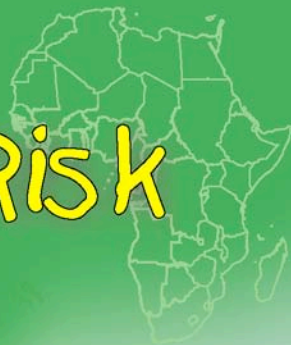


Water & Risk in Africa



Water & Risk in Africa

A school's guide



UN/ISDR Africa Educational Series, Volume 1, Issue 2

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FOREWORD

Dear school teacher,

Dear school student,

Water and Risk... These two words may look strange one next to the other. Indeed, water is generally helpful. But it is also true that water can be harmful: too little water is risk of drought, too much water is risk of flood, water - too scarce - is risk of conflict, water - impure - is risk of disease. Worse, these risks can lead to disasters. They can destroy property and ... life.

Yet, this should not always be the case. There is much we can do. You, me, each of us, teachers and students, we can take action. In fact, we should take action because when it is a matter of life and death, we should not expect others to do it for us.

It is in the light of the above concern that the present booklet entitled *Water and Risk in Africa - A School's Guide* has been produced.

This booklet seeks to help you to know more about risks and disasters related to water, and also about what to do to protect lives and property.

It seeks to help you, as a teacher, to help your students to be risk aware and learn to protect their own lives and property.

Still better, it also seeks to help you, as a school student, to help your family, your relatives and your friends to protect their own lives and property.

Sálvano Briceño,

Director,

UN Inter-Agency Secretariat

for the International Strategy for Disaster Reduction (UN/ISDR)

1. SETTING THE SCENE

1.1 Water - the key to life...

Think about all the things we use water for - to drink, to irrigate our crops, to wash in, to generate electricity for our homes and factories, for sewage disposal, for transport and for recreation. Now think about what would happen if it ever ran out ...

All living things would die - we humans could survive for only about 72 hours - which is why water is used as a symbol of life in many cultures. Water is the key to life...

...and disaster!

Although water is essential for our survival, it can also threaten our lives.

Here in Africa we have seen what can happen when the rains are poor: dams and rivers dry up, there is famine because the crops fail, animals die and thousands of hungry people are left in a dustbowl dependent for their survival on food sent from other regions and countries. Conflict and suffering are likely.

Receiving too much water at once can be just as devastating. Landslides and floods not only destroy our homes, infrastructure and livelihoods, but also help potentially killer diseases like cholera and malaria to thrive.

Experts predict that in the years ahead, Africa will be subjected to even more frequent and intense flooding and drought because of Global Climate Change caused by world-wide pollution from industry and fires. The need to find ways to minimise the risk to life and property is therefore urgent. This booklet will help you to identify risk factors and provide a guide to help you find solutions.

Mr. Kofi Annan; the UN Secretary General, in his message for The International Day For Disaster Reduction on 8 October 2003, had this to say:

"Better decision-making, improved planning, effective risk management, innovation in development and environmental protection activities - these are the human activities that can reduce the vulnerability of communities. To this end, risk assessment and disaster reduction should be integral parts of all sustainable development projects and policies."

Key factors

We cannot survive without water.

Too much, too little or contaminated water can kill us.

Global Climate Change is increasing the risk of floods and drought.

We cannot change nature but we can reduce the risk and impacts of disaster through proper land-use and water management.

1.2 Water - where in the world?

All the water that has ever existed is present today; it does not increase or decrease over time. Although almost three-quarters of our planet is covered by water, 97% of it is seawater and therefore not fit for human use. More than half of the remaining 3% of freshwater on earth is either trapped in the ice-caps or glaciers of the North and South Pole or is much too deep underground to be pumped out. This means that only 0.3% of all the water on earth is available to sustain 6.3 billion people, their livestock and crops, and all other forms of terrestrial life.

Water is recycled globally all the time by way of the hydrological cycle: evaporation occurs over the oceans, it becomes water vapour and turns into clouds through condensation and then into rain. Because evaporation is heaviest over the ocean, most rain falls within the equatorial and temperate belts in the northern and southern hemispheres. This means that while some parts of the world are experiencing floods, others might be having droughts and famine. Some of the rainwater goes into the ground to top up groundwater and aquifers and some runs into the rivers and so back into the sea.

Did you know?

70% of the earth's surface is covered by water?

97% of the earth's water is in the ocean?

3% of the total global water is fresh?

2.15% of all water is locked up in the polar ice caps or in glaciers?

0.6% of all water is in aquifers, most of which are more than 800m below the surface?

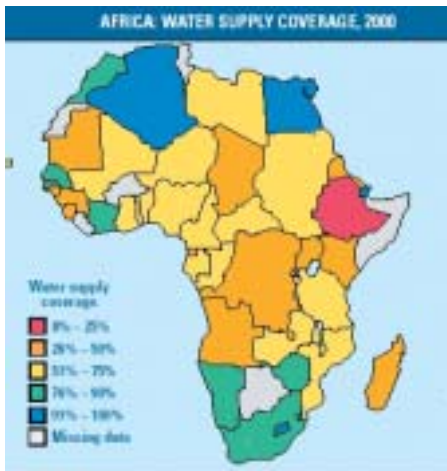
Key factors

Only 0,3% of the world's water supply is suitable for use by humans.

Water is not distributed evenly around the world.

Water is recycled via the hydrological cycle.

1.3 Water -where in Africa?



Sadly, Africa has only about 9% of the world's water resources but 13% of the world's population. It also has the highest population growth rate in the world, which means that the total amount of water available to each person per year is well below that of the world average. For many people in Africa, access to water involves travelling great distances. It is estimated that many of Africa's women use up to 40% of their daily nutritional intake travelling to collect water for their families.

In Africa, the highest demand for water comes from the agricultural sector. Only about 38% of the continent's population live in urban areas. The arid countries of northern and southern Africa rely heavily on irrigation for agriculture. For example, all Egypt's agricultural land is irrigated and almost a million hectares of land is under irrigation in Morocco. Agriculture uses as much as 50% of the available water in South Africa.

It is predicted that over the next 20 years, 30% more water will be needed just for farming, and that as many as 25 African countries will suffer water shortages. As a result, some countries in Africa -Algeria, Egypt, Libya, Morocco, South Africa and Tunisia - are using desalinated water (seawater from which the salt has been removed) to supplement their water supplies. Desalinating water is very expensive and therefore not an option for every country.

Key factors

Africa has only 9% of the world's water.

Africa has the highest population growth rate in the world (2,4% per annum).

It is predicted that 30% more water will be needed just for farming over the next 20 years.

Desalinated water is expensive.

1.4 What are the risks in Africa?

Risks related to water in Africa are mostly the result of too little or too much water, or water that is of a poor quality.

Although floods, drought and landslides are by far the most common forms of natural disasters everywhere in the world, almost a third of them occur in Africa. Let's look at some of the reasons why.

The water balance in any area depends on local climate, vegetation cover and land-use practices. Africa is vulnerable in all three categories.

- Local climate; much of the continent lies in the path of many extreme weather events, especially storms with torrential rain and cyclones, as well as heat waves - and their frequency and intensity is expected to increase as a result of Global Climate Change.
- Land-use practices; fires, over-cultivation and over-grazing reduce the fertility of the soil, whilst deforestation increases soil erosion. Because of population pressures, more people are living on marginal lands or floodplains where the risk from either drought or flooding is high.



Key factors

There is a high risk of floods and drought in Africa because of extreme weather events.

Bad land-use and Global Climate change are increasing the risk and impact of natural disasters.

Limited or degraded vegetation cover increases surface evaporation and run-off - 20% of Africa's rainfall is lost in this way.

- Vegetation cover; more and more land is being stripped of its natural vegetation to accommodate a rapidly growing population and this loss of the soil's protective cover creates the following problems:
 - a. Soil erosion - instead of soaking into the soil, rainwater runs off the surface taking the topsoil with it. More soil is washed into the rivers which affects the water quality and also causes the rivers to start silting up, thereby increasing the risk of flooding in low-lying areas downstream.
 - b. Soil leaching - nutrients that would have soaked into the soil are washed away leaving the soil less fertile.
 - c. Reduction in groundwater - more surface runoff means underground water supplies are not topped up.



Let's take a closer look at the causes of water-related problems and discuss possible ways to lessen their impact!

2. DROUGHT - WHEN THERE'S TOO LITTLE WATER!

Drought is the third most common disaster in Africa. It develops gradually and often lasts for long periods of time - inevitably with disastrous and extensive impacts on all forms of life.



Droughts lead to:

- Environmental degradation including deforestation and loss of land cover, overgrazing, soil erosion, bush, and forest fires, and a reduction in biodiversity.
- A build-up of toxic chemicals in slow moving or static waters.
- Increased drudgery, mainly for the women who have the task of searching for and collecting water for household use.
- A shortage of useable drinking water and a decline in its quality, with negative health and sanitation consequences.
- Food shortages due to crop failure and animal losses which in turn leads to malnutrition and hunger.



These diverse consequences of drought place an enormous burden on the economic viability of a region and seriously retard sustainable development.

Did you know?

Drought accounted for 31 % of all natural disasters events in Africa during 1975-2002.

The worst drought disaster in Africa killed 300,000 people in Ethiopia in 1984.

Agricultural use of freshwater is predicted to rise by more than 30% over the next 20 years.

Water losses through leaking pipes, faulty taps and evaporation are as high as 50% in South Africa alone.

UNEP estimated that over 70% of Africa's agricultural dry lands are degraded as a result of over-cultivation, mismanagement of irrigated croplands, overgrazing, and deforestation.

2.1 Famine



A total shortage of food within a geographical area is called a famine, and causes widespread disease and death from starvation. It is the most serious consequence of drought. Famine leads to a breakdown of communities as people leave their homes to seek food and water elsewhere. Many find their way to refugee camps, which often become overcrowded with poor water supplies and inadequate health facilities.

2.2 Causes of drought

Drought is caused by:

- an unreliable or persistent lack of rainfall.
- reduced natural stream flow.
- reduced groundwater levels.

Did you know?

Most deaths are related to famine occur in the semi-arid areas of sub-Saharan Africa. The UN has estimated that between 1968 and 1985, Famine killed as many as 250,000 people and 12 million cattle in the Sahel, with a further 10 million people having to abandon their homes to search for food and water.

- insufficient soil moisture to maintain average crop growth and yields.

All four conditions apply to Africa. Firstly, the annual rainfall in Africa has dropped causing most of the continent to become drier - for example, Lake Chad is only 5% of the size it was 35 years ago. Secondly, the higher rate of evaporation and runoff caused by land-clearing, deforestation, overgrazing and over-cultivation have led to increased soil erosion and leaching as well as less moisture in the soil, resulting in either crop failure or poor harvests. Silting up of rivers from surface runoff handicaps the natural flow of streams.

The long-term forecast is that many parts of southern Africa, particularly those that are already arid, will become even drier because of Global Climate Change. We therefore urgently need to find ways to reduce the risk and impact of drought.

2.3 What we can do?

When the life of the community is threatened by a water shortage, it makes sense for everybody to use every little bit of water there is very carefully and make sure they do not pollute it. At a community level we also need to make sure that we capture all the water that nature provides and not lose any to increased evaporation and runoff. Think of some ways in which your community could prepare for a drought - here are some ideas for you:

- Educate people about the damage caused by bad land-practices.
- Appoint a management team to protect and manage the community's water supply to ensure that no water is wasted.
- Introduce sustainable dryland farming whenever possible to improve production by way of careful soil conservation and rejuvenation; for example, planting grass and legumes improves the nitrogen content of the soil, whilst mulching helps to reduce to keep the moisture in soil. Cultivating along the contours reduces water erosion.
- Grow drought resistant plants and crops.

Key factors

The risk of drought is high in Africa because annual rainfall is dropping and poor land-practices are increasing.

Good land-use and proper water management can reduce the risk.

Dry land farming and the cultivation of drought resistant crops can lessen the impact of drought.

Produce and store extra crops and fodder in case of drought the next season.

- Be prepared for a drought by growing extra food in case the next crop fails; build up fodder reserves for livestock.
- Introduce herd diversification; keeping different types of animals with different grazing habits and breeding cycles reduces the stress on grazing lands.
- Collect rainwater in rainwater tanks, recycle 'grey' water (for example use washing for irrigation).
- Eliminate losses by immediately repairing leaking pipes and ensuring that taps are not left running.

Learning from tradition

The traditional pattern of agricultural land use in the Sahel was well adapted to uncertain rainfall conditions. Generally speaking, the northern zone, with a mean annual rainfall of 100-350 mm was used for livestock, while the southern Sahel, with a rainfall 350-800 mm, was used for rain fed crops. This system permitted a degree of flexible inter-dependence. Herders followed the rains by seasonal migration, while the cultivators grew a variety of drought-resistant subsistence crops, including sorghum and millet, to reduce the risk of failure. Fallow periods were used to rest the land for perhaps as much as five years in order to maintain the fertility of the soil. In the absence of cash economy, a barter system operated between herders and sedentary farms.

Source: Smith, K. 2001

3. FLOODS - WHEN THERE'S TOO MUCH WATER

Floods can help us, but they can also be life threatening. Floods have been a feature of life in Africa for thousands of years. Seasonal flooding helps by keeping the soil fertile. It does this by depositing fresh silt and flushing out the salts which accumulate in the surface layers of the soil. For example, the higher agricultural output on the floodplains of west Africa is due to seasonal flooding and not irrigation. The flood cycle helps sustain the health and productivity of wetland habitats and maintains their biodiversity. In the past, these annual floods provided enormous benefits as the floodplains created were amongst the most productive ecosystems on earth.

More recently, however, floods have become associated with loss and devastation as almost every year we learn that somewhere in Africa, floods are destroying infrastructure, livelihoods, and property. They also give rise to health risks from serious diseases such as cholera and malaria.

3.1 Causes of floods

Floods are caused by:

- Global and localised weather events such as cyclones and thunderstorms.
- Poor environmental and land-use management.
- Living in high-risk areas.



Key factors

The risk of floods is high in Africa. Floods can be good for the soil but life threatening to people.

Disaster response plans is important.

The risk and impact of floods can be reduced by good land-use and water management.

All three causes of flooding occur in Africa, which puts us in a high-risk category. Climate-wise, many parts of Africa have severe seasonal thunderstorms which result in more localised, rapid-onset flash floods, often accompanied by devastating landslides on steep slopes. In addition, parts of east Africa lie along the paths of powerful cyclones that develop in the tropical Indian Ocean. These can result in extensive flooding over wide areas, often affecting more than one country. It is predicted that Global Climate Change over the coming decades will result in more major cyclones and other extreme weather events.

For centuries, people lived on floodplains because of the abundance of water and the fertile soil. The annual floods were predictable and the people moved out before the first big rains and then returned to farm as the waters retreated. In recent years, the damming of rivers has changed this pattern. Regulated river flows mean that people no longer see the need for retreating from floodplains during the rainy season. Overcrowding can also prevent them from doing so. Unexpected releases of floodwater from dams have added to flood disasters. For example, in 1999, floodwaters released from large dams on the Niger inundated at least 200 communities, killing more than 1000 people. The inhabitants were warned too late to evacuate.

As we have seen, both vegetation and soil are important for soaking up water. Flooding will be slower if the soil is permeable and there is good plant cover. Deforestation, overgrazing, and fires, especially on steep slopes, greatly increase runoff and erosion which in turn increases the silting up of rivers, thereby increasing the risk of flooding, since shallower rivers overflow their banks more easily.

In urban areas, the clearing of vegetation for paving ("surface hardening"), increases the amount of water lost through storm water runoff.

3.2 What can we do?

Picture a deluge of water falling on your community - as in a cyclone or serious thunderstorm! All that water is drowning the land and swallowing up homes, people and livestock - especially those in low-lying areas. What can we do? In an emergency situation - as in a flash flood - we must move as fast as we can to higher ground.

Do you agree though, that it would have been better to have had some warning system of flooding and some emergency plans in place? Best of all would have been to have taken preventative steps.

The following is a list of suggestions from which you can select those most appropriate to your local conditions.

- Assess where and how your community is at risk from floods.
- Involve the community in finding solutions to the risks identified.
- Disaster response plans should be developed within the community, which include an early warning system, evacuation plans for people and livestock, temporary accommodation, emergency food and water stocks.
- Develop physical flood control structures such as overflow channels and river diversions.
- Avoid setting up permanent structures (for example houses) in areas vulnerable to flooding. These include:
 - a. the low-lying parts of floodplains.
 - b. the low-lying parts of coasts and deltas.
 - c. areas below unsafe or inadequate dams.
- Educate people about correct land use so that soil erosion does not add to the problem.

4. WATER - AND YOUR HEALTH

We cannot survive without water - but it has to be *clean water* because many life-threatening diseases are carried in contaminated water. The biggest cause of contamination is human waste that has not been disposed of correctly - usually because of inadequate sanitation. The resultant diseases are spread through poor hygiene putting entire communities at risk.

Disasters such as drought or flooding increase the risk of disease by disrupting a community's water supply and in so doing, creating the sanitation and hygiene problems that lead to contaminated water.



Some of the other ways in which water can affect our health are:

- Malnutrition - without water our crops would die and we would not have enough food to keep us healthy. Diseases such as kwashiorkor occur in children who do not receive enough protein.
- Skin and eye infections (trachoma) and tuberculosis.
- Water-borne diseases such as cholera, typhoid, viral hepatitis, dysentery and diarrhoea.
- An increase in malaria and bilharzia because both the malaria-carrying mosquito and the bilharzia carrying snail love stagnant water - these diseases pose some of the greatest health risks to people throughout Africa.
- Water supply projects like dams and reservoirs can become a breeding ground for 'vectors' (carriers) of water-related diseases.

4.1 Water, sanitation and health

Research has shown that good hygiene and proper sanitation are the most important factors in reducing the risk of death from diarrhoea and parasitic infections.

For a community to dispose of its waste safely, a good sewage system is needed. This would involve waste and water being piped from household latrines to sewage treatment plants rather than being dumped into the river. Because much of Africa has either poor or no sanitation facilities, improper disposal of human and animal waste is common. Diarrhoea-causing diseases such as cholera, typhoid and dysentery spread quickly in these conditions, which makes poor sanitation in Africa a cause for great concern.

Water contamination is not the only problem. Inadequate hygiene contributes significantly to health issues - for example, investigations have shown that hand washing with soap or ash reduces the incidence of diarrhoea by as much as 35%. Obviously, the better the supply of water the more chance there is of people practising good hygiene. Unfortunately, Africa has the worst rate of water supply in the world as well as low sanitation levels, which makes its people very vulnerable to water-related diseases.

Cholera:

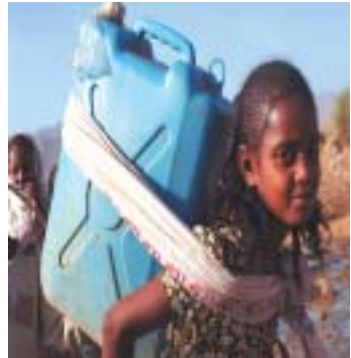
Cholera is a highly infectious and often deadly bacterial disease that is found in contaminated water. Floods and drought increase the risk of water supplies becoming contaminated. Drought also causes people to adopt less hygienic practices which again increases the risk of cholera spreading.

People usually get Cholera from drinking untreated or unboiled water that is contaminated by infected faeces, or by eating fruit and vegetables that have either been washed in contaminated water or handled by infected people.

In the human body the bacteria irritate the wall of the intestine, leading to vomiting and severe diarrhoea. Death results from dehydration and shock due to loss of body fluids.

4.2 What can we do?

- Personal hygiene is vital, but *do not use contaminated water* for this purpose.
- Hands should always be washed after going to the latrine and before preparing food.
- Fruit and vegetables should be washed in clean, uncontaminated water before eating - use cold, boiled water if you are unsure about the water.
- Make sure water is handled and stored in such a way that it cannot be contaminated.
- If latrines are not available, dispose of waste safely, by burying it, for example - do not dump it in nearby rivers and wetlands.
- Promote public health by talking to your community about health issues, especially the need for hand washing.
- It is important to include traditional hygiene practices and beliefs in education programmes.



4.3 Water and contamination

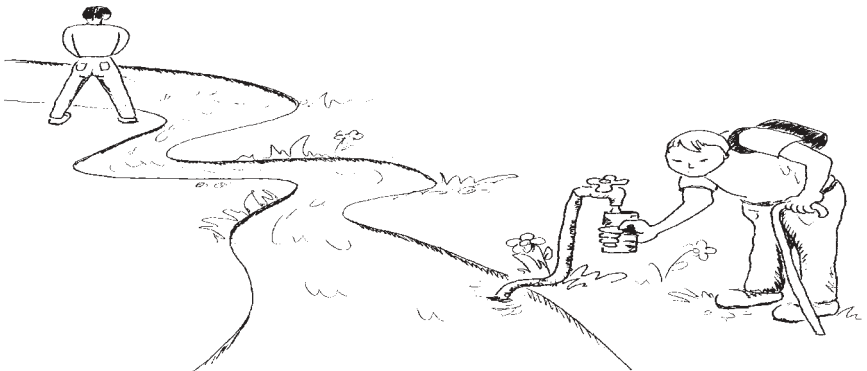
Human waste is not the only pollutant of water. Pollution from agriculture, waste dumps, mining and industry can find its way into surface and ground water, and when it does, the health risks are severe:

- High concentrations of nitrates (from agriculture) in drinking water result in oxygen-starvation in the brain. This is especially dangerous for babies (Blue Baby Syndrome).
- Benzene, a component of petrol, is carcinogenic (causes cancer).
- Most heavy metals are toxic. For example, arsenic is carcinogenic, lead damages the nervous system, cadmium results in kidney problems, and chromium causes severe skin reactions.
- Most organic components of products like pesticides, tar and solvents are toxic; they can lead to kidney and liver problems, heart problems, damage to the nervous system, cancer, and skin problems.



4.4 What can we do?

- Do not use water for washing or drinking from a source that is polluted.
- Do not dump your waste near a water source - use official waste deposits.
- Do not use water from a borehole that is sited close to an industrial area.
- Avoid contaminating the environment and especially water sources with any kind of chemical substances.



4.5 Water - related diseases

Some of the worst parasitic diseases are transmitted by creatures that live in or near stagnant, contaminated or slow-moving water. Bilharzia and Malaria pose some of the greatest health risks to the people of Africa. If we are to reduce the risk we need to understand their lifecycle.

MALARIA

Malaria is one of Africa's most serious health risks. Each year 1.5 - 2.7million people die from it, of whom 90% are children under the age of 5. In everyday terms, Malaria kills an African child every 30 seconds.

The fact that Malaria is on the increase in Africa is of great concern. There are several reasons for this:

- Changing climatic conditions are creating more favourable conditions for mosquitoes. Flooding, in particular, creates additional mosquito breeding areas.

Malaria

The malaria parasite enters the human host when an infected *Anopheles* mosquito sucks up human blood. The female mosquito needs blood to provide the nutrients and energy she needs to mature her own eggs. If she takes an infected blood meal from someone suffering from malaria, she becomes parasitized. Inside the mosquito the parasites develop and find their way to the mosquito's salivary glands. The next time she takes a blood meal (about 10-14 days later), the parasites are able to infect the next human host. Inside the human body, the parasites go through a series of developmental stages, infecting the liver and red blood cells. Malaria symptoms usually appear 9-14 days after infection.

Symptoms include fever, headache, vomiting and other flu-like symptoms. Untreated, malaria can cause death by infecting and destroying red blood cells and by clogging the capillaries that carry blood to the brain or other vital organs.

- There is a rapid spread of malaria parasites, which have grown resistant to the present range of anti malaria medication.
- Wars often force large numbers of people to flee their villages and settle in malaria-prone areas under poor conditions. It is estimated that up to 30% of all malarial deaths occur in areas of political strife.
- Some water development projects create new breeding sites for mosquitoes.
- Some countries cannot afford to spray.

Key factors

Contaminated water is a serious health hazard.

Water becomes contaminated through poor sanitation and poor hygiene. Always wash your hands and dispose of sewage safely.

Malaria and Bilharzia are the two most widespread diseases in Africa.

BILHARZIA

Africa has about 82% of all bilharzia cases in the world. This disease, often called schistosomiasis, is endemic in 74 countries, and infects more than 200 million people, mainly in rural and peri-urban areas. About 20 million people are severely infected. The disease mostly affects children under the age of 14. It is ranked as the second most important human parasitic disease after Malaria.

Bilharzia

Parasitic flatworms live part of their lifecycles in bilharzia snails. As larvae they escape from the liver of bilharzia snails into the water. When these flatworms come into contact with humans they penetrate the skin and find their way into the blood vessels of the intestine or bladder. Once in the blood vessels, the flatworms find a partner and mate continuously. Each female produces hundreds of eggs each day. The only escape for these eggs is through the rupturing of the blood vessels. If egg-infected urine and faeces escapes directly into fresh-water, the eggs can hatch into larvae and find their way back to bilharzia snails to repeat the cycle.

Poor sanitation is therefore central to the control of this disease.

Hope for the future:

In 1998, leaders from throughout Africa demonstrated a political commitment to take action against the malaria epidemic by founding the "Roll Back Malaria" (RBM) global partnership. Two years later, African Heads of State and their representatives met in Abuja, Nigeria to translate RBM's goal of halving the malaria burden by 2010 into tangible political action. The focus is on the following:

- Prompt access to effective treatment and up-to-date medicines;
- Promotion of insecticide-treated nets and improved vector control;
- Already almost 20 African countries have reduced or eliminated taxes and tariffs on insecticide-treated nets to make them more affordable;
- Prevention and management of malaria in pregnancy; and
- Improving the prevention of, and response to, malaria epidemics and malaria in complex emergencies.

5. WATER - AND THE ENVIRONMENT



Did you know?

Lake Malawi has more fish species than any other lake in the world.

Lake Victoria is the second largest lake in the world. The introduction of the Nile Perch into the lake has depleted or eradicated many of the natural fish species.

The floodplains of Senegal, Niger and Chad support over a million waterfowl.

The wetlands of Djoudji National Park in Senegal and the Dawling National Park in Mauritania provide a habitat for more than 3 million migratory birds belonging to nearly 400 different species.

The Bengweulu swamps in Zambia are home to 30 000 black lechwe antelope. Fish provides more than 50% of the animal protein consumed by people in Zambia, and up to 75% of the protein consumed in Malawi.

The floodplain fisheries around Lake Chad and the inland delta of the Niger are the dominant livelihood in those regions.

The floodplains of the inland delta of the Niger River are used by over 550,000 people for the post-flood dry season grazing of their at least 2 million sheep and goats.

Our survival is inextricably linked with that of the environment

When the environment becomes degraded, all forms of life become threatened. We need to ensure that our activities do not damage nature in any way, and that resources are harvested in a sustainable manner. Effective management of the environment is essential if we are to reduce the impacts of natural disasters and the risks associated with water in Africa. An area with a thriving and diverse ecosystem is better able to absorb the impact of a natural disaster than a degraded environment, and it can recover more easily.

Conserving Africa's biodiversity

Africa has a rich natural heritage with more than 1,150 species of mammals, 2,000 species of fish, 2,300 species of birds and more than 45,000 documented plant species found within our continent. To conserve this heritage for our children 1,200 Nationally Protected Terrestrial and Marine Areas have been proclaimed as well as almost 200 International Areas.

Regrettably many of these are highly threatened with over 2000 animal species, and close to 2,000 plant species being endangered.

5.1 Wetlands

Wetlands are one of the most important ecosystems in Africa. They are also one of the most threatened.

Wetlands provide essential resources to water-dependent animals such as the African buffalo, hippopotamus, and crocodile, especially in times of drought. They are also home to many endangered animals such as the Black Lechwe and the Shoebill Stork as well being the natural habitat of hundreds of different kinds of birds, fish, and amphibians. These in turn form important sources of food for nearby communities.

Wetlands act like large sponges, absorbing water and then slowly releasing it. This process slows down water flow and erosion potential, and helps to control floods. They also recharge groundwater and are a source of water to rivers during dry periods. Wetlands are excellent filtration systems because they clean the water as it flows through of excess nutrients and sediments.

Threats

Many wetlands are severely threatened by human activities resulting from:

- More and more people needing land to settle on.
- Contamination as a result of industrial growth and poor control of waste discharge.
- Poor land-use management such as land reclamation and filling.

Inappropriate agricultural development in the vicinity of the wetlands.

- Poorly sited dams.
- Introduction of alien species.

5.2 Clearing plant invaders

Certain plant species introduced into Africa from other parts of the world have become highly invasive. For example, the introduction of wattle (*Acacia cyclops* and *Acacia saligna*) into Africa has led to the following problems:

- A loss of arable land, loss of grazing and therefore reduced livestock production because the wattle is a thirsty plant and absorbs much of the groundwater.
- Poisoning of humans and livestock.
- Wattle is highly inflammable; fire prevention costs more, as does the damage caused by wildfires.
- Erosion following fires in heavily invaded areas.
- Increased impacts of flooding, especially after fires.
- Silting up of dams, rivers and reservoirs.

Key Factors

Alien invaders destroy or degrade the natural vegetation.

Many of them are thirsty and reduce the groundwater.

Aquatic plants such as water hyacinth (*Eicchornia cassipes*) have been equally invasive. They grow in dense mats and damage the environment in the following ways:

- Block navigation channels and get tangled in boat propellers.
- Modify wetland environments by absorbing water-borne nutrients.
- Release toxins.
- Reduce the water quality.
- Provide an ideal habitat for disease carriers such as mosquitoes.

Success Story

'Working for Water' is a South African environmental and social-development initiative whose aim is to clear invasive alien plants such as black wattle and water hyacinth.

More than \$65 million per year is spent on the removal of 300 invasive alien plants and on wetland rehabilitation projects. Approximately 15,000 short-term jobs a year are created for the purpose.

This multi-departmental programme is internationally recognised as one of the most outstanding environmental conservation initiatives on the continent.

6. CONCLUSION

Although water is vital to life, it has the ability to cause immense havoc to life in general, and to human society in particular.

Examples are:

- It can become a hazard, either as a quickly developing event, such as flood, or as a gradually disappearing resource such as a drought.
- It is the primary means through which many biological risks are carried, such as poisons, bacteria and viruses.
- Because of the importance of water resources, they can become a source of conflict.

We need to understand that steps taken to reduce vulnerability to water related disaster of one type may cause, or at least increase the risk of disaster from a different kind, for example wells, if unwisely sited, could introduce toxic elements or polluted water into a community's supply.

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The United Nations Inter-Agency Secretariat for the International Strategy for Disaster Reduction (UN/ISDR)

Within the United Nations system, the Secretariat for the International Strategy for Disaster Reduction is responsible for co-ordinating disaster reduction strategies and programmes.

Its mission is to help people withstand disasters by making them aware of the importance of disaster reduction measures and providing support to help reduce human, economic and social losses. The Secretariat also provides backing for an Inter-Agency Task Force on Disaster Reduction headed by the Under-Secretary-General for Humanitarian Affairs and comprising representatives of several United Nations agencies, regional institutions and non-governmental organisations. Within the United Nations system, the Task Force is the chief body responsible for the design of disaster reduction policy.

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