

## **CHAPTER THREE**

### **A GLOBAL OVERVIEW OF POTABLE WATER RESOURCES AVAILABILITY AND ACCESSIBILITY IN SOUTHERN AFRICA**

#### **3.0 INTRODUCTION**

This chapter is a continuation of the conceptual and evolutionary review of governance. It differs from chapter 2 in that whereas chapter 2 was largely general and theoretical, in this chapter the concepts are narrowed down to potable water supply governance and are measured on empirical experiences as reported by different scholars and researchers. The chapter is divided into a discussion on what potable water is; the availability of potable water supplies; and the main forms of residential communities and their potable water supply challenges in southern Africa. These broad thematic areas are further divided into appropriate and more focused subsections for simplicity, precision and effective communication.

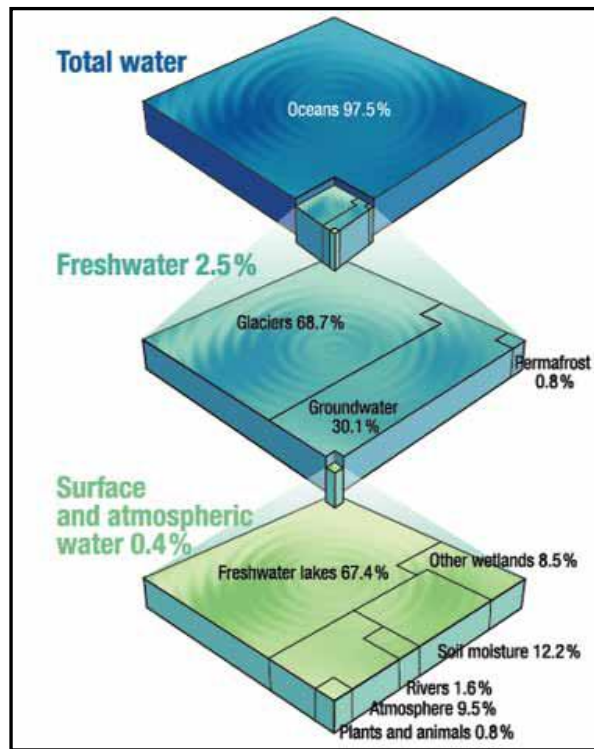
Like chapter 2, this chapter is based on documentary sources on the management of water resources, academic books and journals, Internet sources, UN reports, SADC publications, doctoral theses, MA dissertations, geographical and geo-hydrological maps, aerial photos, and other geographical information systems. All relate to managing water resources in general and in the study locations specifically.

This study is mainly about potable water supply. However, it is difficult, if not impossible to discuss water supply issues without touching on its cousin, sanitation. In fact they are two sides of the same coin and heavily affect each other.

#### **3.1 WHAT IS POTABLE WATER?**

As already seen in 2.3, potable water is a common pool natural resource for which everyone is responsible. The commodity is highly delicate and vulnerable to pollution and contamination. As such it has to be handled with a high degree of care.

The Oxford advanced learner’s dictionary (1995) defines water as, ‘a liquid without colour, smell or taste that falls as rain, is in lakes, rivers, seas, and is used for drinking, washing’. Therefore, if water starts smelling and showing colour it means it is contaminated and no longer qualifies to be water in its pure and natural sense.

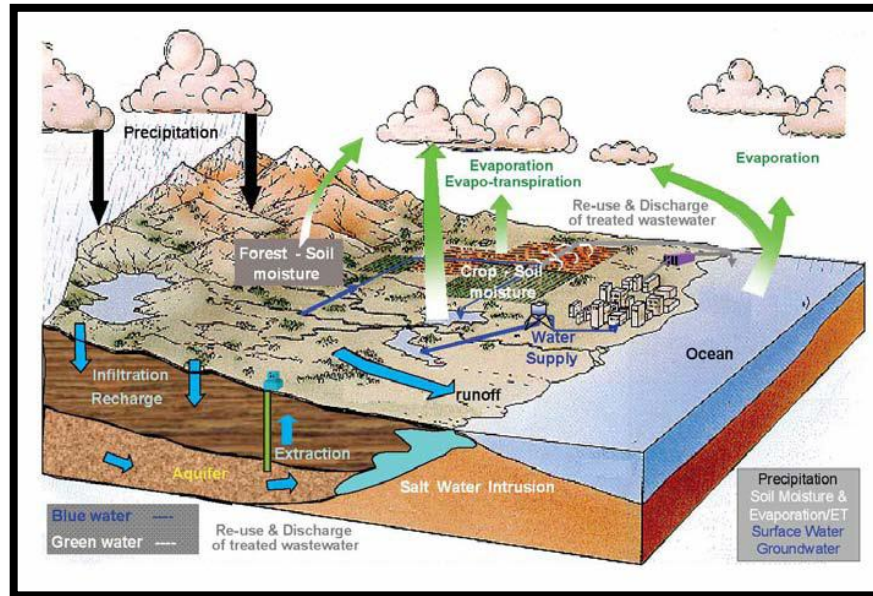


**Figure 3.1: Global distribution of the world’s water**  
 (Source: WWAP, 2006: 121)

Figure 3.1 and Figure 3.2 show that potable water is found in several forms: precipitation, evaporation and transpiration, snow and ice, surface waters, wetlands, and groundwater.

The conceptual model in Figure 3.2 takes into consideration the detail of the fluxes of all waters and their pathways while differentiating between two components: ‘blue water’ and ‘green water’. Blue waters are directly associated with aquatic ecosystems and flow in surface water bodies and aquifers while green water is what supplies terrestrial ecosystems and rain-fed crops

from the soil moisture zone. It is green water that evaporates from plants and water surfaces into the atmosphere as water vapour.



**Figure 3.2: Schematic of the hydrological cycle components in present-day setting**

(Source: WWAP, 2006: 123)

The earth's hydrological cycle is the global mechanism that transfers water from the oceans to the surface and from the surface and plants into the atmosphere. The principal natural component processes of the hydrological cycle are precipitation, infiltration, runoff, evaporation and transpiration. Human activities (settlements, industry, and agricultural developments) may disturb the components of the natural cycle through land use diversions and the use, reuse and discharge of wastes into the natural surface water and groundwater pathways.

According to Cap-Net (2009: 5), 97% of global water is sea water and therefore not suitable for human consumption, 87% of the 3% usable fresh water is inaccessible to man (see Figure 3.1). This means man only has approximately 1% of global water available for consumption and utilisation. Water exists naturally in different forms and locations. It exists in the air, on the surface, below the ground and in the oceans.

For Cap-Net (2009: 5) fresh water is not only vital for human survival, health and dignity, but is also fundamental and indispensable for development. Human life, animals, vegetation, the ecosystem, agriculture and many other things, all depend on water. Gorbachev (quoted in Law, 2005: 7) believes, ‘All life is dependent on water to survive’ and thus ‘water sustains all’ (Miletus, 600BC, in Law, 2005: 7).

The paradox, however, is that although water is essential to life and seen as a symbol of purification and replenishment in many religions and cultures, it can also spread disease, breed mosquitoes, cause floods, and so forth. A good fresh water decision can improve the lives of everyone in a community, boost the economy and safeguard the natural environment. A poor fresh water decision can wreak havoc on nature, exacerbate poverty and disease, and create conflict.

## **3.2 AVAILABILITY OF POTABLE WATER SUPPLY**

Fresh water is found above and below the earth’s surface. Below the surface, fresh water is found in the form of underground springs, rivers and lakes, while above ground, freshwater sources include lakes, streams and rivers. The way humankind interacts with, and uses water, impact on all these sources of water, causing them to become depleted (Redelinghuys, 2008: 3).

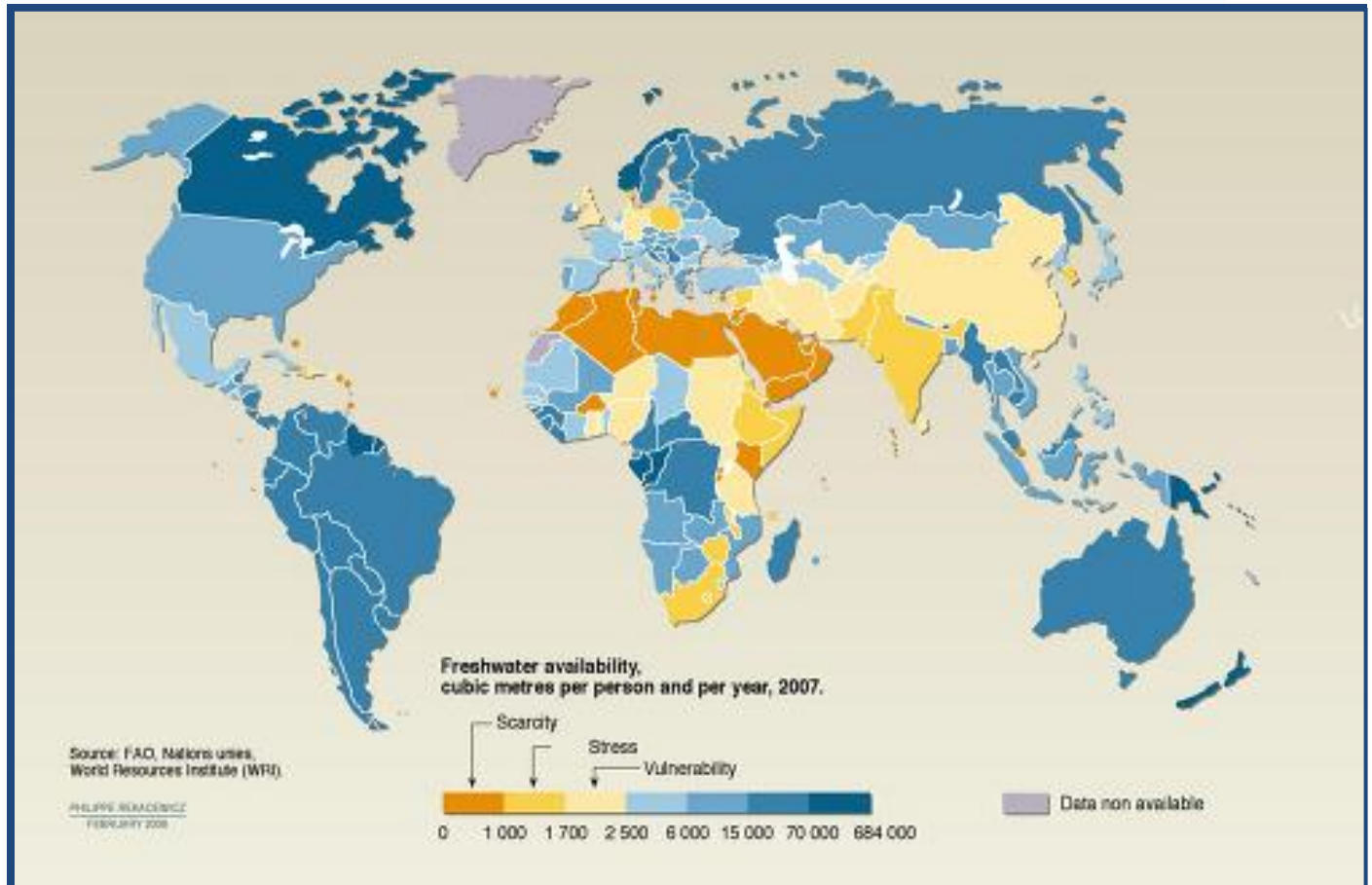
### **3.2.1 The global overview**

According to COHRE, AAAS, SDC and UN-HABITAT (2008: xix):

There is sufficient clean freshwater in the world for everyone’s essential personal and domestic needs. However, lack of distribution networks and working systems to extract groundwater or harvest rainwater; exclusion from these services or facilities; inequitable allocation of water resources; and pollution limit people’s access to sufficient clean water. In some cases excessive extraction and contamination of groundwater limit domestic use and threaten long-term use.

COHRE, AAAS, SDC and UN-HABITAT (2008: 3) further report that in rural areas many people collect water of dubious quality from unprotected wells (see Figure 3.4) often at a great

distance from their homes, deterring them from collecting sufficient quantities. Toilets are often seen as unnecessary or unaffordable.



**Figure 3.3: Availability of fresh water in 2007**

(Source: UNEP, 2008: 1)

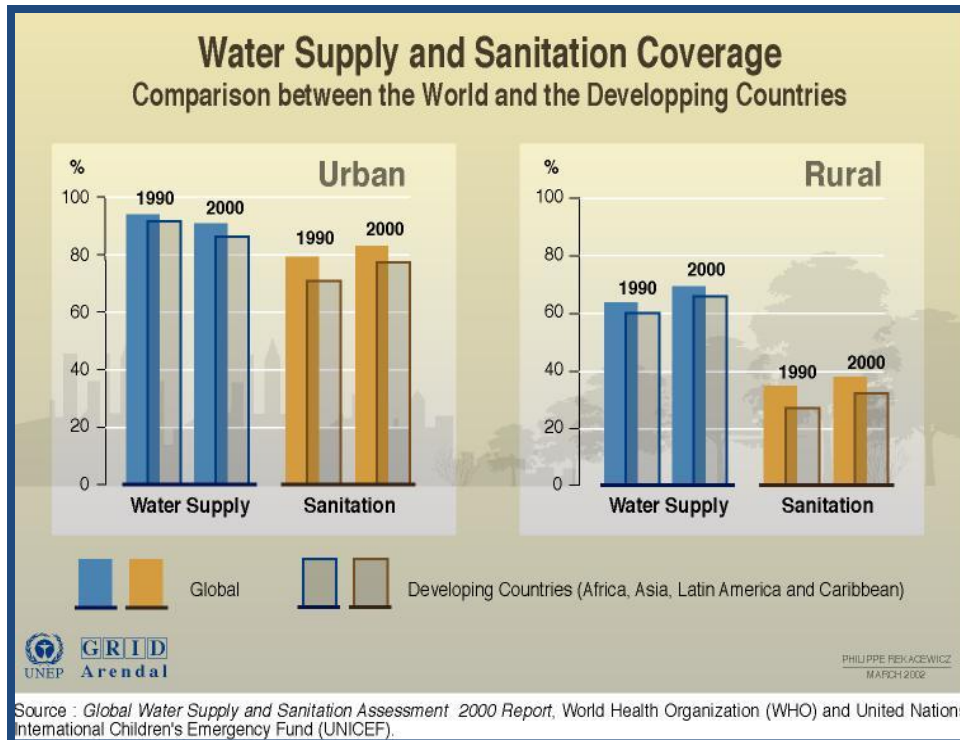
In urban areas, low-income groups often lack access to adequate water supply and sanitation. Piped water supplies and sewers seldom cover informal areas. This means that people living in these areas access water from a variety of generally inadequate water supply options, such as wells built close to latrines or from small-scale water providers, such as door-to-door water vendors, whose water supplies may not be of good quality.



**Figure 3.4: A rural woman fetching water for domestic use in the Manyame catchment area in Zimbabwe**

(Source: Boroto, 2006: 2)

COHRE, AAAS, SDC and UN-HABITAT (2008: 5) posit that sanitation in most countries is severely neglected by both governments and households. The number of toilets per inhabitant is generally inadequate, with no guarantee that they are hygienic to use. Because of the lack of sanitation, many people use plastic bags, streets or other unhygienic places for defecation. The lack of access to water and sanitation has a severe effect on human health, exacerbates poverty and undermines economic development. COHRE, AAAS, SDC and UN-HABITAT (2008: 5) estimate that at any one time, nearly half the population of developing countries is suffering from health problems linked to inadequate water and sanitation. In most cases water and sanitation policies and programmes exclude marginalised groups and areas such as informal settlements and arid areas.

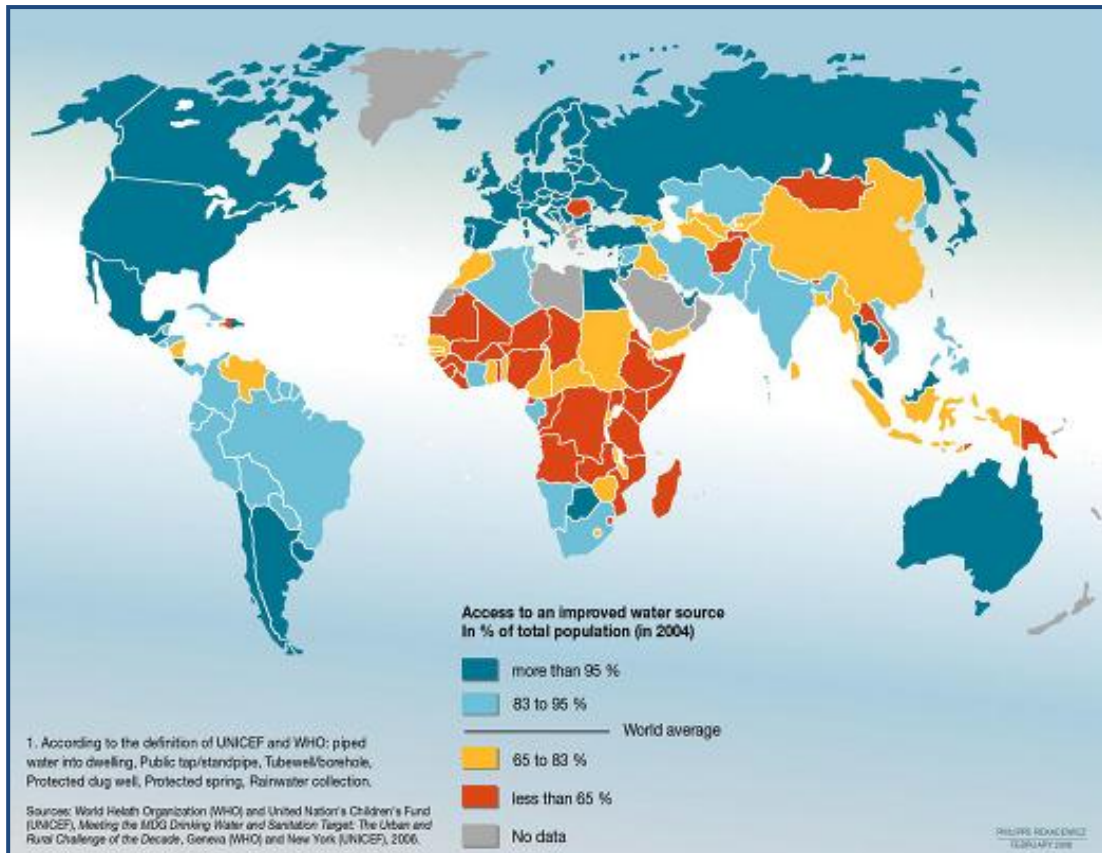


**Figure 3.5: Global water supply and sanitation coverage in 2000**

(Source: UNEP, 2008: 3)

The foregoing shows that generally speaking, the main challenge to water provision is neither water stress nor the scarcity of water. The major problem is the governance of potable water supply and the attitude of the relevant authorities. Water stress and scarcity are symptoms of the overall poor governance of public and natural resources (COHRE, AAAS, SDC and UN-HABITAT, 2008: 3). The running theme in this study is that the root cause of lack of basic potable water supply services is poor management and/or corruption by those in authority, lack of appropriate institutions, bureaucratic inertia and a shortage of new investments in building human capacity and physical infrastructure.

Water shortages and increasing pollution are to a large extent socially and politically induced challenges. These challenges are issues that can be addressed by changes in water demand and use and through increased awareness, education and water policy reforms (WWAP, 2006: 27). The current global water crisis is thus increasingly about how people, as individuals, and as part of a collective society, govern the access to and control over water resources and their benefits.



**Figure 3.6: Access to an improved water source in 2004**

(Source: UNEP, 2008: 2)

COHRE, AAAS, SDC and UN-HABITAT (2008: 9) outline the current global levels of lack of access to water and sanitation under four subheadings as follows:

### **Exclusion of particular groups**

- In planning and political terms, poor people are excluded from decision-making, and their needs are seldom prioritised.
- In many situations, resources are used to provide high quality services to a few or to fund prestigious large-scale projects, such as dam construction or river diversion, rather than lower cost alternatives, such as rainwater harvesting or sand dams which are more likely

to reach the majority of people in rural areas who have no access to water and sanitation services.

- In some situations, unpopular minorities are excluded from access to water and sanitation for political reasons.
- Deprived urban areas, remote rural areas, semi-arid and arid areas are frequently neglected or intentionally excluded from government programmes for infrastructure development and maintenance. This results in insufficient infrastructure and facilities for water and sanitation.
- There is a lack of culturally sensitive and pro-poor policies for the allocation of water resources between the different sectors of water use, and also within these sectors (such as the agriculture, education, and sectors).

### **Insufficient allocation of resources**

- There is insufficient recognition by governments and international organisations that access to safe water and sanitation services has a positive impact on other development objectives, including economic objectives. Water and sanitation, generally do not receive the priority they deserve in national budgets and in allocations by international donors, despite well-documented evidence that the benefits outweigh the costs of delivering these basic services. As a result, there is a lack of sufficient finances and capacity to maintain water delivery systems and sanitation services. Remote rural areas and informal urban areas are often particularly resource poor.
- Cost recovery for water services is increasingly being utilised to generate a significant part of the finances necessary for the construction and maintenance of water supply and sanitation infrastructure, and to conserve water. This principle of cost recovery is reflected in a series of international declarations and agreements, with the proviso that cost recovery should not become a barrier to access to safe water by poor people. However, the latter consideration is often insufficiently addressed when it comes to setting tariff structures for water services: these therefore tend to be unfavourable to the poor.

## **Changing social and environmental contexts**

- Urbanisation is ongoing at a significant rate, dramatically increasing the populations of urban informal settlements. Lack of access to water and sanitation services will increasingly become an urban problem, exacerbated by the insecure tenure of those living in informal settlements and the lack of planning for urban growth. This is often a symptom of the fact that informal settlements are not politically accepted and the people who live there are not seen as a crucial part of the urban economy. For detailed exposition on the urbanisation challenge see the World Water Development Report 1 (WWAP, 2003: 12; and Ashton and Turton, 2005: 4)
- Increasing levels of human and animal waste, agricultural run-off and industrial waste are polluting water sources in many countries. There is frequently little control over wastewater, with insufficient legislation, regulation and monitoring to ensure that wastes are properly treated. See also WWAP (2003: 275); and Ashton and Turton, (2005: 4).
- Levels of drought are being exacerbated by alterations in weather patterns due to climate change and by desertification due to poor farming practices. Climate change is causing increasingly extreme weather patterns, which in turn impact on water availability and accessibility. Developing countries are in the most vulnerable position, not just because they lack the necessary resources to deal with emergencies effectively, but also because people are more likely to be living in vulnerable areas in sub-standard housing. Often governments lack the necessary resources and human capacity to tap new sources of water. See also WWAP (2003: 275); and Ashton and Turton, (2005: 4).

## **Changes in management and ownership of water supply and services**

- Shifts in land use and ownership are reducing or limiting access to previously available water sources. Agricultural land on the edges of cities or towns is increasingly being used for housing or industrial purposes, often leading to contamination of existing wells or traditional water sources. Further to this, the inequalities of land ownership translate to inequitable access to water and related problems as the forced evictions of rural communities and communities in urban informal settlements, and their relocation to areas lacking adequate water and sanitation services.

- Management of water supply and sewerage services has been delegated to private corporations in some countries, primarily in larger cities. Often privatisation has been carried out without adequate regulation, leading to higher tariffs (in some cases to unaffordable levels for the poor) and a failure to extend services. The assumption that privatization would be a source of investment for the water sector (which has not been borne out) may be linked to low levels of international assistance to the water sector.
- Decentralisation policies in many countries are transferring responsibility for water and sanitation from the national to the regional or local (municipal) level. The necessary capacity and finances are often not transferred to the newly responsible units, making it difficult for them to manage services adequately, and extend such services to the historically disadvantaged, especially those living in rural areas.

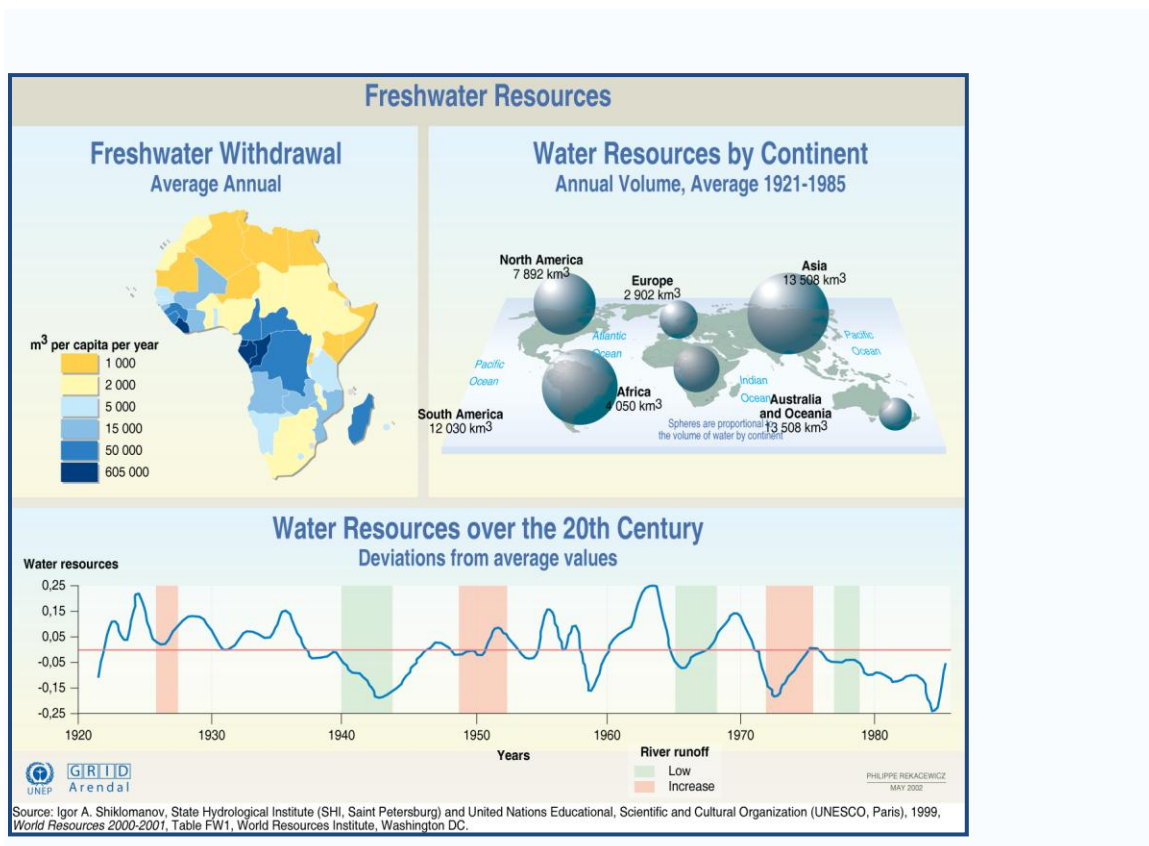
Globally cultural practices and legislation recognise potable water as a basic and natural human right. The right to fresh water is mentioned in a number of international conventions and strategic documents. Examples are the UN water conference action plan (1977); the convention on the elimination of all forms of discrimination against women (1979); the convention on the rights of the child (1989); and the Dublin statement on water and sustainable development (1992). Thus, the governance of fresh water supply is currently firmly on the world's agenda.

In 1976, at the UN Conference on Human Settlements (Habitat), 132 governments committed themselves to the recommendation that 'safe water supply and hygienic disposal should receive priority with a view to achieving measurable qualitative and quantitative targets serving all the population' (UN, 1976). In 1977, at the UN Water Conference at Mar del Plata, it was agreed that national plans should aim to provide safe drinking water and basic sanitation to all by 1990. In 1990, at the World Summit for Children, governments made a commitment to achieving universal access to safe water and adequate sanitation by the year 2000.

However, these targets were not met, and hundreds of millions of rural and urban dwellers still suffer from very poor or non-existent provision of water and sanitation. There are also signs that the targets set in the millennium development goals (MDGs) will not be achieved (COHRE, AAAS, SDC and UN-HABITAT, 2008: 8; WWAP/UNESCO, 2009: vii). At the 2000

Millennium Summit, the global community adopted the challenge of attaining eight Millennium Development Goals (MDGs). Countries pledged to meet specific targets aimed at eradicating extreme poverty by 2015. Central to all eight goals is water. Its role in human and physical development and its intrinsic value in sanitation, health and poverty reduction was formally recognised in target 10: to ‘halve by 2015, the proportion of people without sustainable access to safe drinking water and basic sanitation.’ Subsequently, there has been an increase; both at national and international levels, of dialogue, conferences, and workshops on what approaches could accelerate the achievement of this goal. Recently, some nations have been giving commendable attention to water policies issue; be it in developing new water policies or modifying existing ones. Unfortunately, despite the attractiveness of many such policies, national water services have typically not witnessed commendable improvement (Folifac, 2007: 8).

It is, however, important to note that without these conventions and set targets the situation might well have been even worse by now.



**Figure 3.7: Global trends in availability of fresh water resources in the twentieth century**  
(Source: UNEP, 2008: 5)

Cap-Net (2009: 7), Brasil (2006: 203), Gorbachev (2005: 1), Law (2005: 7), Mtisi and Nicol (2003: 4), Ashton, *et al* (2001: xxvii), Conley and van Niekerk (2000: 131), van Wijk-Sijbesma (1998: 13), contend that water is scarce, finite and vulnerable. For Ashton, *et al* (2001: xxvii), all countries face severe and growing challenges in the management of water resources because of several reasons: the population continues to grow; water supplies continue to dwindle because of the resource depletion and pollution; and demand is rising fast because of rapid industrialisation, and so forth. The gloomy picture is well summarised by the rate at which water is being depleted in the world as illustrated in the following observations captured from world water development reports (2003, 2006, 2009):

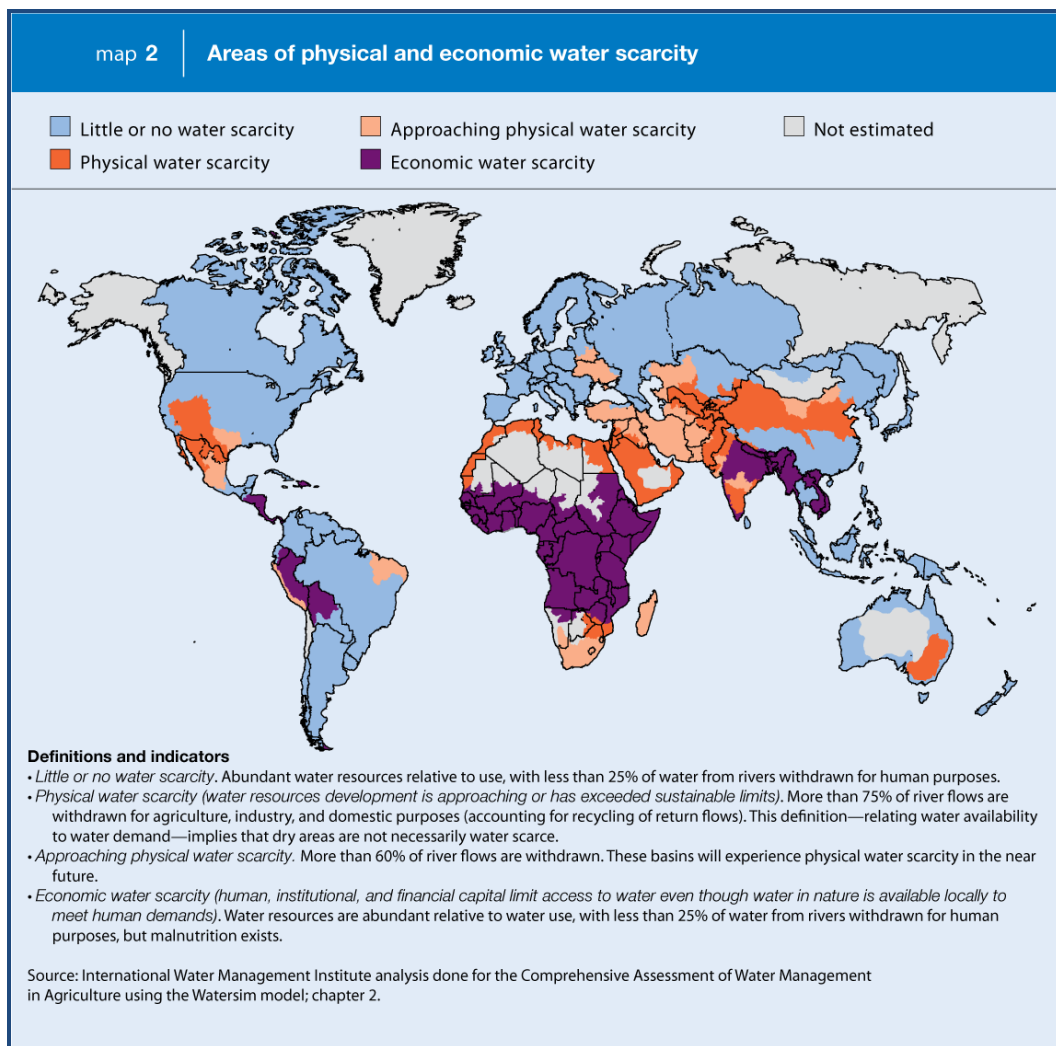
- prominent rivers like the Colorado River in the USA, the Yangtze in China, the Indus in Pakistan, the Ganges in India, and the Nile in Egypt are drying up;
- the Aral Sea in Central Asia was the fourth largest lake in 1960. By 1970 it had shrunk to 10% of its original size;
- the five great lakes of the USA and Canada; Erie, Huron, Michigan, Ontario and Superior are shrinking at an alarming pace;
- lake Chad has shrunk by 95% since the 1960s and may disappear entirely;
- water withdrawals have increased more than twice as fast as population growth; and
- two million tonnes per day of human waste are deposited in freshwater courses.

The above developments, coupled with a rapid global population growth, urbanisation and industrialisation translated to a general global water scarcity and water stress<sup>12</sup> (see Figure 3.8, Figure 3.9 and Figure 3.10). In fact, urbanisation has led to deterioration in the quality of water in streams and lakes near urban centres (COHRE, AAAS, SDC and UN-HABITAT (2008: 6)

The world population is growing by 80 million people per year, implying increased fresh water demand of about 64 billion cubic metres per year (WWAP/UNESCO, 2009: 29).

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<sup>12</sup> Countries are considered 'water stressed' when the number of people per million cubic meters of water supply exceeds 600 and 'water scarcity' arises when the number reaches 1000 per million cubic meters (Rothert and Macy, 1999).

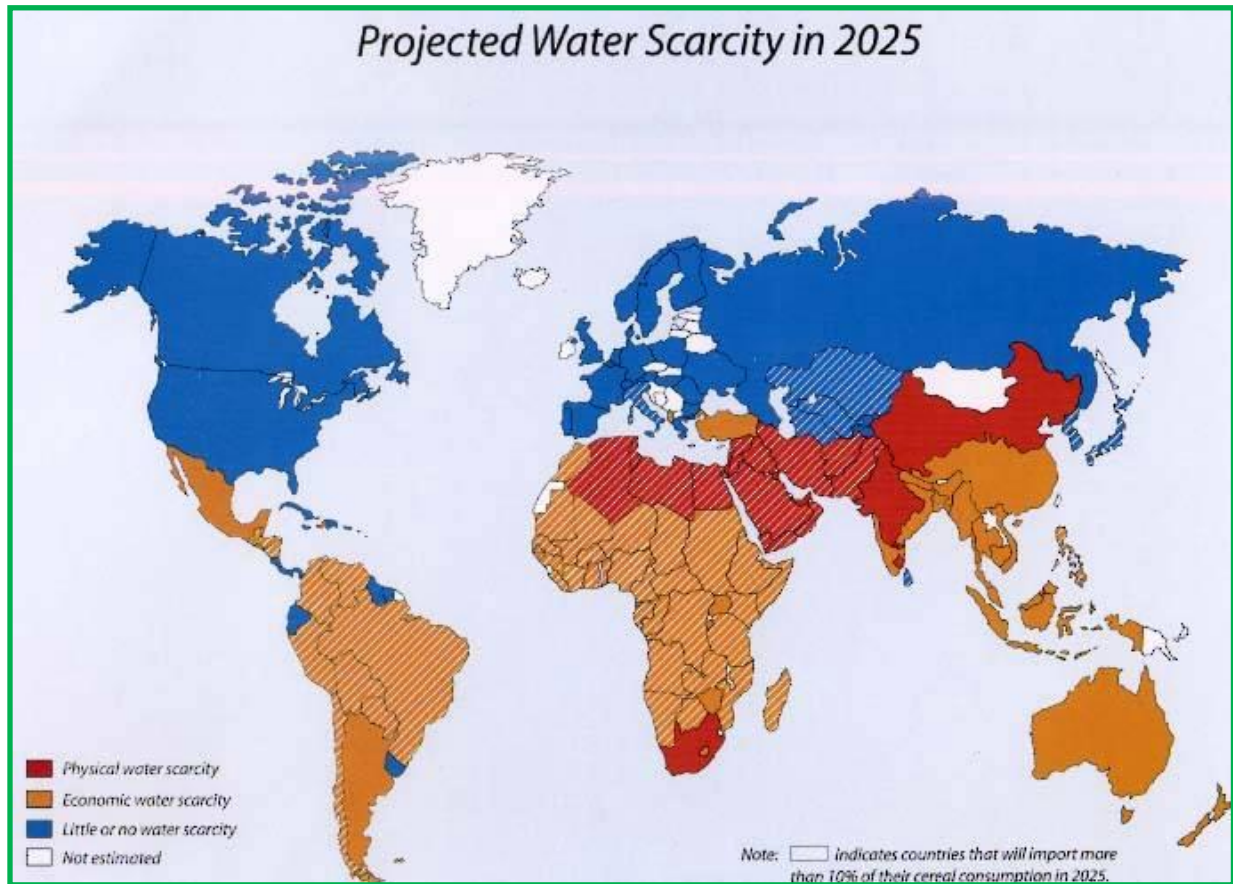


**Figure 3.8: Global water scarcity in 2009**

(Source: UNEP, 2008: 7)

Water supply in many countries is falling behind the demand of a growing population, especially in Africa. Figure 3.9 and Figure 3.10 give an indication of the growing worldwide problem of water scarcity by the year 2025, and highlight Zimbabwe and South Africa as among the countries that will have to address the problem of increasing water shortages. However, it should be noted that the southern African problem is more an economic problem than a physical problem<sup>13</sup>.

<sup>13</sup> Whereas economic water scarcity is a state of water resources underdevelopment (the potential is there but there is underutilization of the resource because of lack of financial / economic power or other related reasons), physical water scarcity is the depletion or physical absence of the resource.



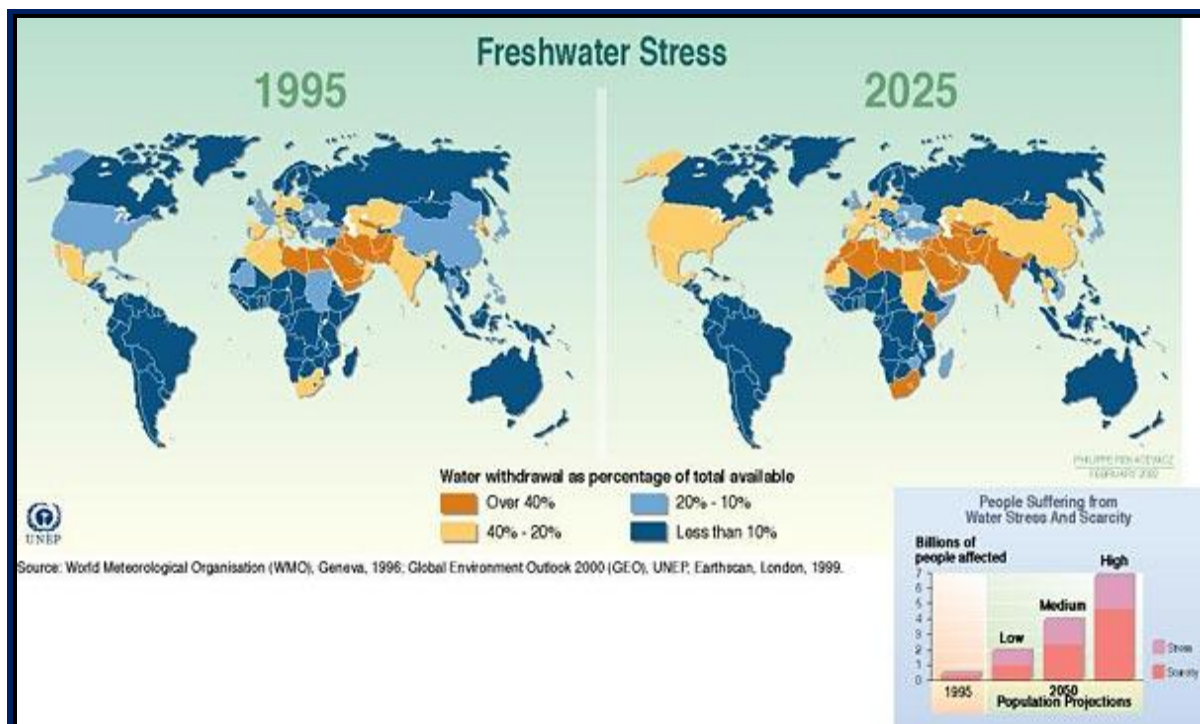
**Figure 3.9: Projected world water scarcity in 2025**

(Source: IWMI <http://www.iwmi.org>)

### 3.2.2 The African overview

The problem in most of Africa is lack of development, mobilisation and effective utilisation of available resources due to several factors. Some are external forces, such as mismanagement and corruption by authorities, the lack of appropriate institutions, bureaucratic inertia and a shortage of new investments in building human capacity and physical infrastructure (Musingafi, 2008: 25). As observed by Boroto (2006: 2), freshwater resources of the southern African region are enormous, averaging some 1,400 billion cubic metres a year. The continent is endowed with enough natural resources (however unevenly spread) to meet the requirements of all its people, but the resources are still inaccessible because they are still to be mobilised and developed. The result is water scarcity as shown in Figure 3.8, Figure 3.9 and Figure 3.10.

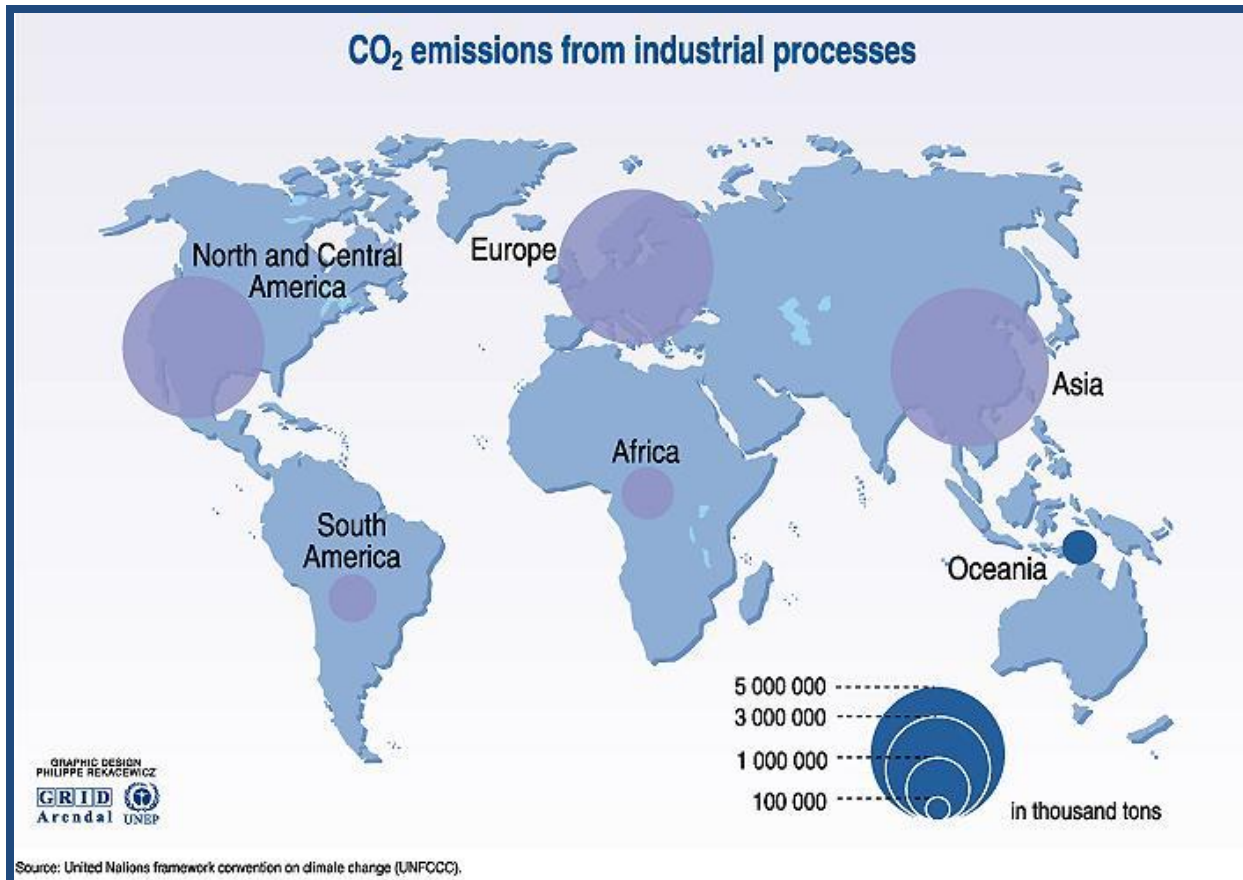
It is important to note that due to climatic factors and the level of water resources development, water is unevenly distributed in time and space in the region. There is a high degree of seasonal variation in rainfall and stream flows, even in a single country. Water is generally not available in places of highest water demand. For example, there are abundant water resources in the DRC, the northern parts of Zambia and Angola, but these are also areas of least water demand. Highest water demands are in southern and south-western parts of the region like South Africa, Namibia and Botswana. This high variability in availability of water resources has led to localized deficits in water (Boroto, 2006: 2).



**Figure 3.10: Global projections of water stress (1995 & 2025)**

(Source: UNEP, 2008: 6)

Figure 3.10 is a comparative picture of levels of global potable water stress in 1995 and 2025. For most regions, southern Africa included, instead of improving, the situation is projected to have deteriorated by 2025.



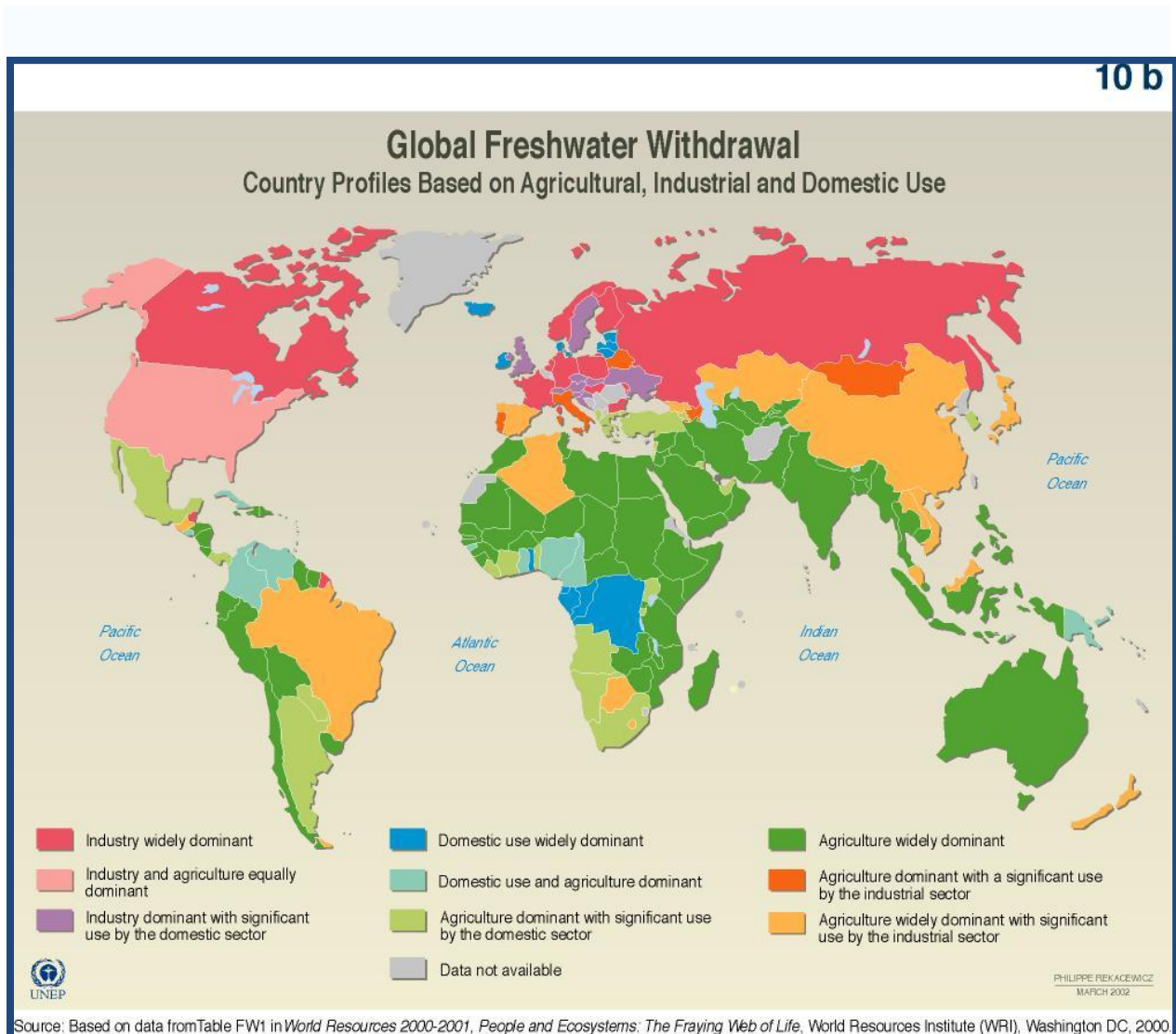
**Figure 3.11: Emissions from industrial processes**

(Source: UNEP, 2008: 9)

There is also the issue of global climate change which is immediately and severely felt in the poorest and most vulnerable countries which do not have the means or resources to adapt to the changes in their natural environment (Kwabena, 2009: 6). Africa is particularly hard hit in terms of low level of food security, poor fresh water management and extreme weather phenomena such as droughts, floods and cyclones. Yet Africa contributes very little to global warming, which is affecting the ozone layer and thereby the global climate. Africa contributes next to nothing to the disturbances of the climate set-up but suffers the most (Kwabena, 2009: 6).

As far as utilisation of resources is concerned, potable water included, Africa suffers from economic disability. According to Kwabena (2009: 6) the amount of water withdrawn in Africa for agriculture, domestic water supply and industry amounts to only 3.8% of the internal

renewable water resources (see Figures 3.12 and 3.13). This is also a reflection of the low level of water resources development. Per capita water withdrawal in Africa is the lowest of any region in the world, being just one quarter of the global average (Kwabena, 2002: 6).



**Figure 3.12: Global fresh water withdrawal**

(Source: UNEP, 2008: 12)

According to Kwabena (2009: 9), only 7% of Africa's hydropower has been developed and there is a growing gap in electrification. There are strong regional disparities, though. Access to electricity is above 97% in north Africa; 47% in southern Africa; 29% in west Africa; 10% in east Africa; and less than 10% in central Africa and island states. Kwabena (2009: 11) further

claims that outside of west Africa, only the richest 20% of households have electricity. Yet there is growing demand for electricity, and the gap in its supply is widening.

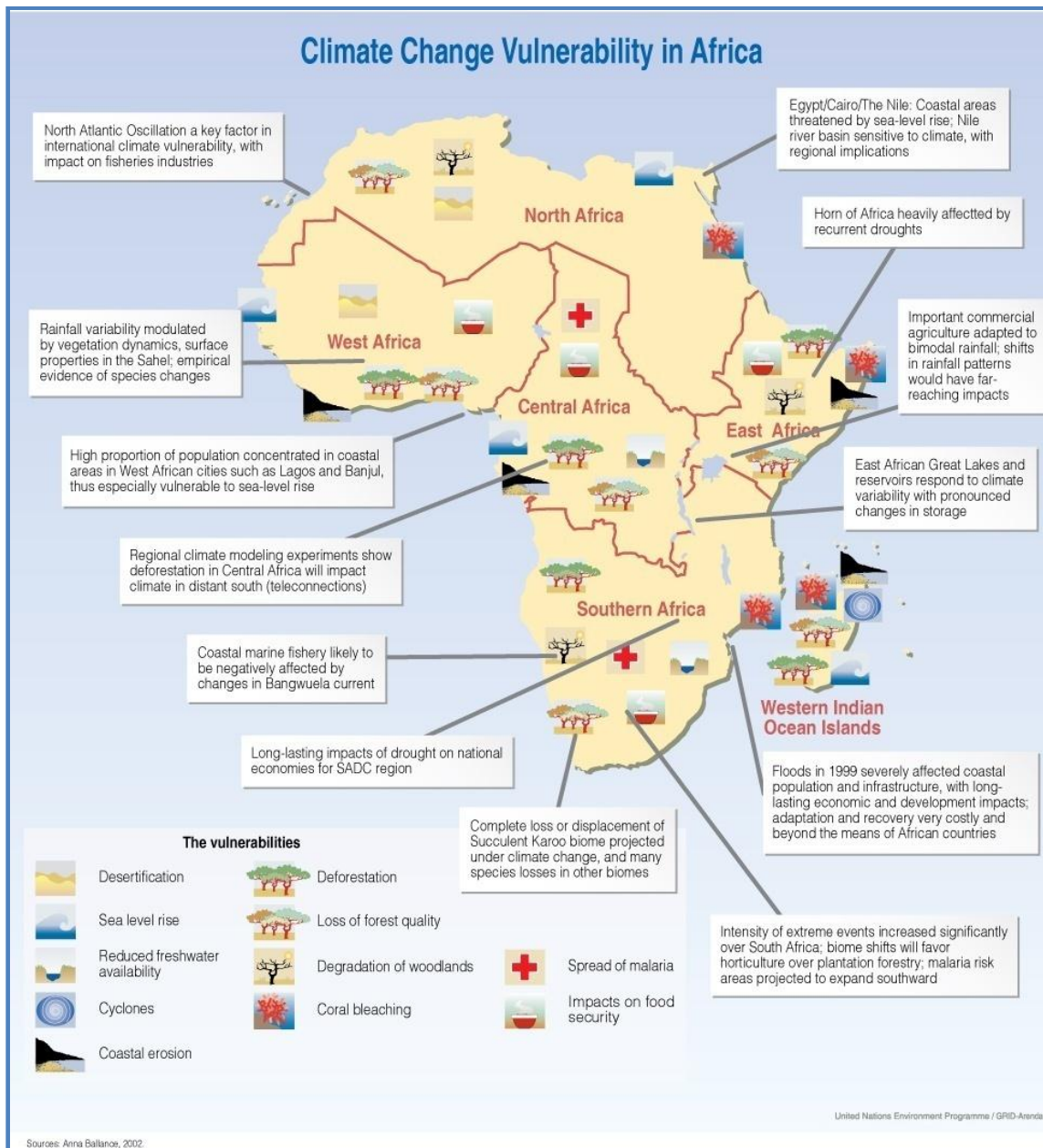


**Figure 3.13: Global water withdrawal and use**

(Source: UNEP, 2008: 13)

Most of the over two million people, who die annually as a result of poor sanitation and contaminated water, live in Africa where 6 out of 10 people do not have a toilet (WHO, 1999b: 15). This absence of toilets results in 'the transfer of bacteria, viruses and parasites found in human excreta which ... contaminate water resources, soil and food' (WHO, 1999: 15)

The bizarre picture is worse in Zimbabwe and southern Africa, where, according to Dent (2000: 513), emphasis has been on getting more water rather than on using water more efficiently. Commenting on Zimbabwe, Nilsson and Hammer (1996: 1) talk of the underdevelopment of water resources, serious weaknesses in water resources planning and management procedures, and lack of understanding of an institutional facility for dealing with water in its broader environmental and cyclical context. Added to this, the region experiences frequent prolonged and extreme droughts, sometimes broken by equally extreme floods (Ashton, *et al*, 2001: xxix).

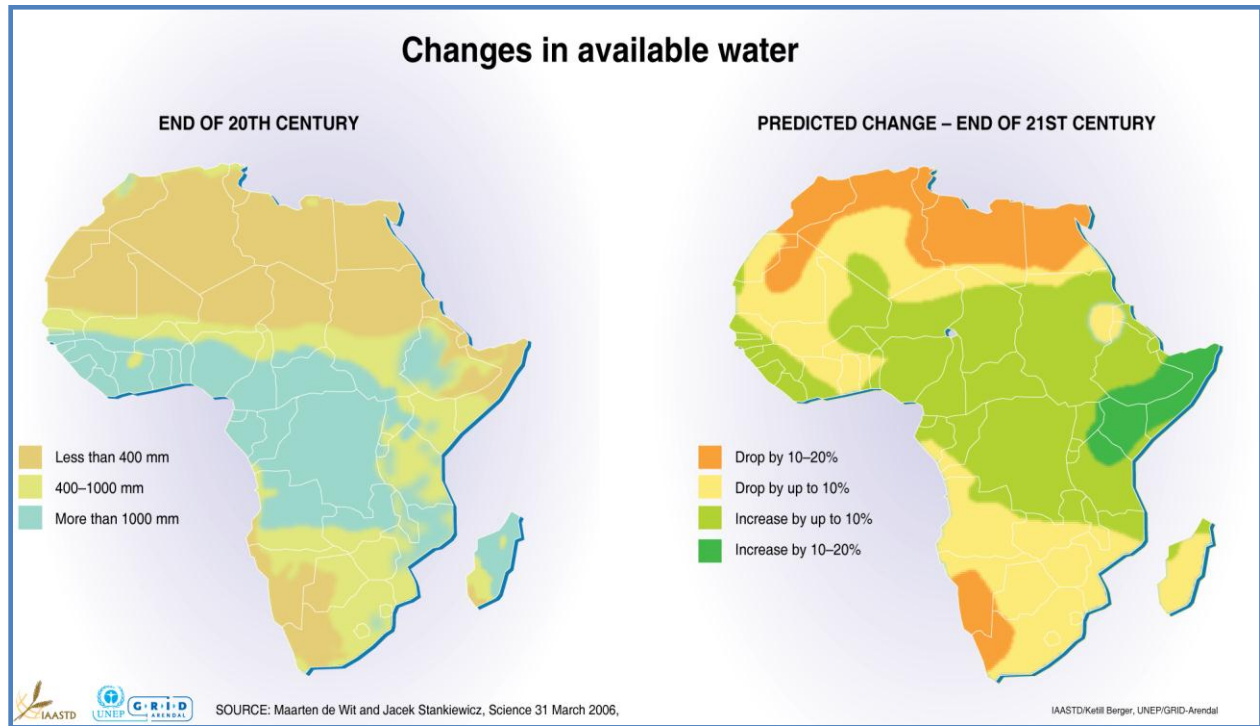


**Figure 3.14: Climate change vulnerability in Africa**

(Source: UNEP, 2008: 25)

Other characteristics of the water sector in the southern African region include low coverage of urban and rural water supply and sanitation services leading to high incidence of water-borne diseases, rapidly growing and urbanizing populations leading to growing water scarcity and increasing water pollution, generally very low water-use efficiency in irrigated agriculture (see

Table 3.1), degraded watersheds and deteriorating water quality, and the importance of hydropower to the regional economy (SADC, 2005b: 8).



**Figure 3.15: Changes in available water in Africa**

(Source: UNEP, 2008: 27)

For van Vuuren (2010: 25), although Africa is unlikely to meet the 2015 MDGs deadline to halve the number of people without access to basic water and sanitation, the continent has made significant inroads. He reports that 26 of the 54 countries are on track and will certainly meet the MDGs deadline. The picture painted for Zimbabwe, South Africa, Lesotho, Namibia and Botswana seems encouraging.

Redelinghuys (2008: 118) questions the ability of any southern African country to meet the MDGs by 2015, provision of safe drinking water included. Her argument is based on high poverty levels which are revealed in the percentages of people living in absolute poverty in the region. More than 75% people in Zimbabwe and Mozambique live on less than US\$2 a day. For Botswana, Lesotho and Namibia, 56% of the population fall into this category. In South Africa,

at least 34% of the population lives on less than US\$2 a day. She further argues that Zimbabwe only managed to increase access to water and sanitation by 3%, while 58% of Mozambique's population still does not have access to safe water and 68% lack access to improved sanitation. South Africa has only managed to provide an additional 5% of its population with access to fresh water since 1990, while the proportion of people with access to adequate sanitation has actually decreased from almost 70% to 65% since 1990 (Redelinghuys, 2008: 119).

In southern Africa only South Africa has put more than 10% of its arable land under irrigation. Table 3.1 shows that available freshwater is under-utilised throughout most of the region and that most abstracted freshwater goes to agriculture. Nonetheless, the small amounts of land irrigated throughout the region account for the lion's share of this usage. Moreover, much of the land that might be put under small scale irrigation (e.g. one farm/one dam) is privately held by a small number of influential actors. For example, in South Africa the IFAD estimates that smallholders control less than 13% of all agricultural land, whereas about 60,000 commercial farmers control the rest. Similarly, in Namibia some 5000 commercial farmers own somewhere between 67 and 80% of all land, and in Zimbabwe prior to Mugabe's land seizures 5000 white farmers owned 45% of all land (Swatuk, 2008: 34).

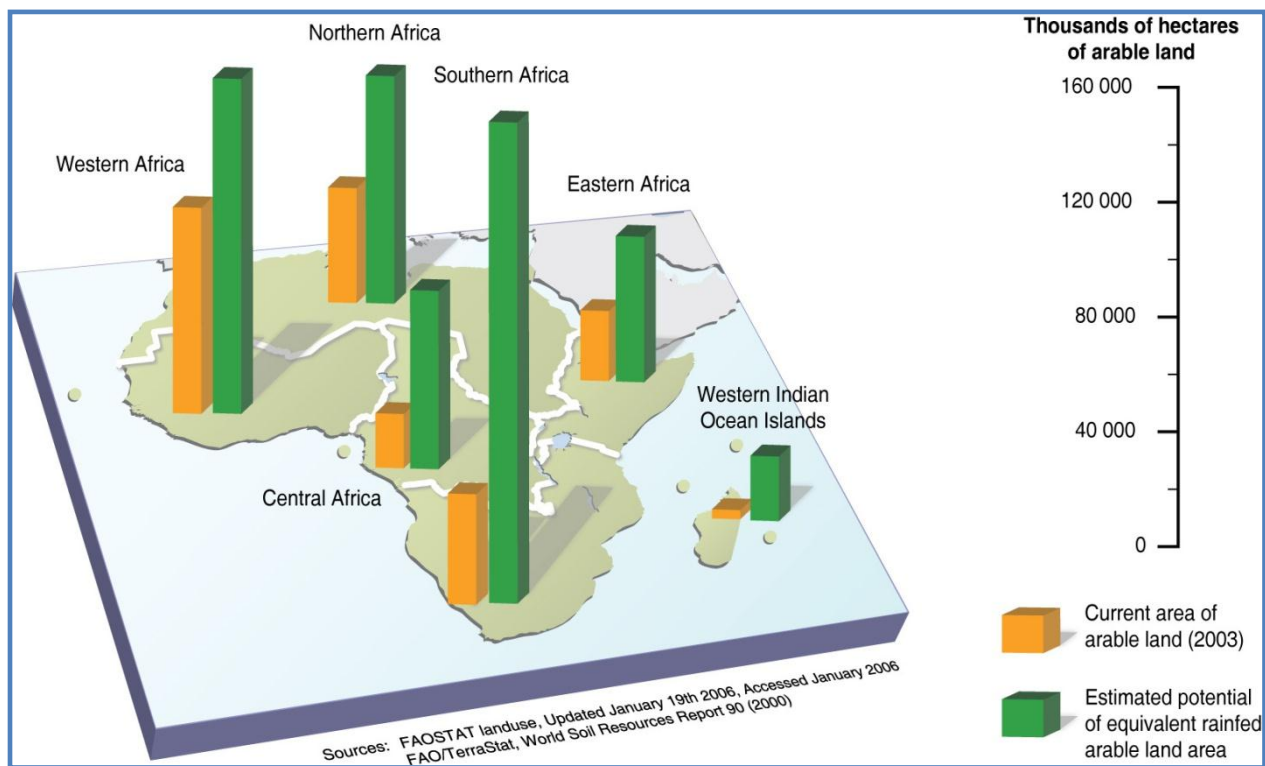
Swatuk (2008: 34) observes that southern African states have large rural populations living on communal land in small, scattered settlements. These communities are dependent for their sustenance on a combination of rain fed agriculture and wage labour. Throughout the region they are squeezed between vast tracts of state land and private leasehold land. He further observes that due to the disproportionate distribution of land there is a worrying trend toward urbanisation throughout the region; the reality is that southern African states are becoming increasingly urbanised. This is made all the more problematic because the primary and secondary centres (e.g. Harare and Bulawayo in Zimbabwe, Blantyre and Lilongwe in Malawi, which are major cities in the region) are growing beyond the capacity of the relevant municipalities and are increasingly unable to manage the transition smoothly (Swatuk, 2008: 34).

**Table 3.1: Freshwater withdrawals in mainland southern Africa**(Source: CIA Factbook [www.cia.gov/search?NScollection=Factbook](http://www.cia.gov/search?NScollection=Factbook))

State	Total renewable water km3 (yr of data)	Freshwater withdrawal km3/yr	Per cap freshwater withdrawal m3/yr	% domestic	% industry	% agriculture
Angola	184 ('87)	0.35	22	23	17	60
Botswana	15 ('01)	0.19	107	41	18	41
DR Congo	1283 ('01)	0.36	6	53	17	31
Lesotho	5 ('01)	0.05	28	40	40	20
Malawi	17 ('01)	1.01	78	15	5	80
Mozambique	216 ('92)	0.63	32	11	2	87
Namibia	46 ('91)	0.30	148	24	5	71
South Africa	50 ('90)	12.5	264	31	6	63
Swaziland	5 ('87)	1.04	1,010	2	1	97
Tanzania	91 ('01)	5.18	135	10	0	90
Zambia	105 ('01)	1.74	149	17	7	76
Zimbabwe	20 ('87)	4.21	324	14	7	79

**Table 3.2 Land and agriculture in mainland southern Africa**(Source: CIA Factbook. [www.cia.gov/search?NS-collection=Factbook](http://www.cia.gov/search?NS-collection=Factbook))

State	Territory km2	Arable land % of total	Permanent crops % of total	Other % of total	Irrigated land km2
Angola	1,246,700	2.6	.23	97.1	800
Botswana	600,370	0.6	.01	99.3	10
DR Congo	2,345,410	2.9	.47	96.7	110
Lesotho	30,355	10.9	.13	89.0	30
Malawi	118,480	20.7	1.18	78.1	560
Mozambique	801,590	5.4	.29	94.3	1,180
Namibia	824,418	1.0	.01	99.0	80
South Africa	1,219,912	12.1	.79	87.1	14,980
Swaziland	17,363	10.3	.81	88.9	500
Tanzania	945,087	4.2	1.16	94.6	1,840
Zambia	752,614	6.9	.04	93.0	1,560
Zimbabwe	390,580	8.2	.33	91.4	1,740



**Figure 3.16: Arable land in Africa**

(Source: UNEP, 2008)

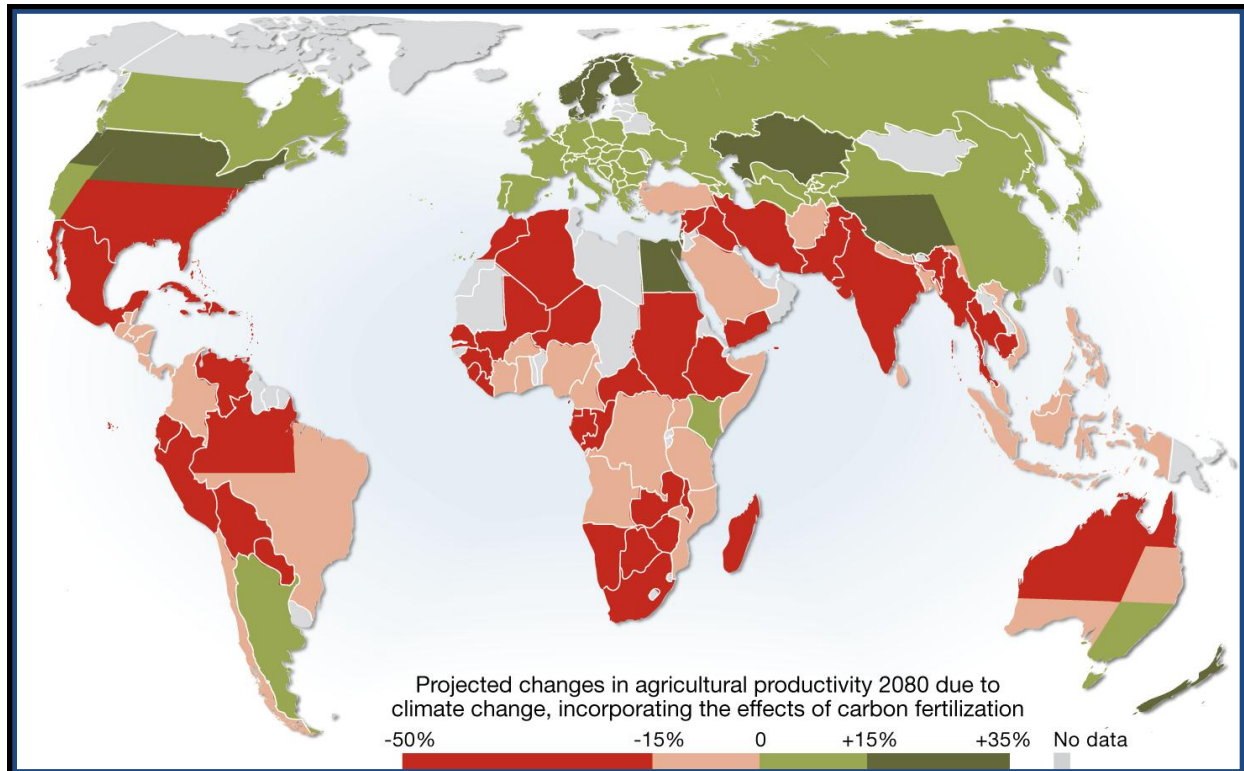
Table 3.3 shows that there is an uneven relationship between the number of people active in the agricultural sector, and that sector's contribution to national GDP.

**Table 3.3: Employment in agriculture and agriculture value-added in selected southern Africa countries**

(Source: World Bank, 2007)

State	Rural population (millions)	% employed in agriculture	Agricultural value-added (US\$ millions)	US\$/worker	Agriculture as % of GDP
Malawi	10.5	83.2	627	66	37.8
Mozambique	12.9	66.3	1,220	83	23.1
Namibia	1.3	65.4	548	595	11.0
South Africa	19.1	41.2	5,565	947	3.1
Tanzania	28.6	76.2	4,797	167	45.8
Zambia	7.5	65.0	1,047	136	20.7
Zimbabwe	8.3	64.5	744	95	17.6

Figure 3.17 shows that agricultural activities, especially in Africa, are threatened by climate change and carbon fertilization in the long term if measures to curb the developments are not taken.



**Figure 3.17: Projected changes in agriculture due to climate change and carbon fertilisation**

(Source: UNEP, 2008: 31)

### 3.2.3 The way forward for Africa

Africa now focuses on what it calls Vision 25, visualising ‘an Africa where there is an equitable and sustainable use and management of water resources for poverty alleviation, socio-economic development, regional cooperation, and the environment’ (Kwabena, 2009: 1). Africa Water Vision looks forward to:

- a minimum investment of US\$20 billion per annum to meet the basic needs in water supply, sanitation, food, energy and other economic, social and environmental uses;

- seventy five percent (75%) and seventy percent (70%) access to improved water supply and sanitation respectively by 2015, and ninety five percent (95%) for both access to improved water supply and sanitation by 2025;
- one hundred percent (100%) increase in irrigated area by 2025; and
- twenty five percent (25%) of hydro power potential developed by 2025 (Kwabena, 2009: 1).

For Kwabena (2009: 1), the following has to be in place for the attainment of the above goals:

- closing the gap in attaining the MDGs and the outstanding ‘unserved’;
- integrating water as key to poverty reduction and socio-economic development and expanding Africa’s water infrastructure assets to achieve this;
- fostering transboundary cooperation;
- mobilizing the financial resources needed to build the infrastructure assets;
- building and strengthening institutional and technical capacity and skills: the water data base, information knowledge and monitoring capacity;
- fostering partnership with stakeholders for full participation;
- closing the implementation gap between Africa’s agenda and the policies of development partners; and
- tackling the climate change challenges and building resilient adaptation systems.

Kwabena (2009: 2) further argues that Africa suffers from public policy implementation failure disease. To cure this he provides three recommendations. Firstly, the arrangements already in place must continue to strive for the provision of basic services and water resources infrastructure. The rate should be increased if possible. This means scaling-up, strengthening and supporting programmatic instruments such as the Rural Water Supply and Sanitation Initiative, and the Water for African Cities Programme. Secondly, there is a need to strengthen operational mechanisms in areas where arrangements have not yet been made. This will embrace a number of actions like sector and utility reforms, putting in place the right capacity, trans-boundary cooperation, and easing of the complexity of institutional arrangements in some areas. Thirdly, there is also a need for refinement of public strategies and policies, but only insofar as they

sharpen the high-level commitments that have already been made. There are still many opportunities to improve strategy formulation at national level for drinking water and sanitation. Water resources management remains disconnected from development priorities, instead of being central to it, and much work is still needed to connect to the African framework of economic growth.

Kwabena's (2009: 2) emphasis is on implementation because he believes many of the existing mechanisms are adequate to drive forward on Africa's water agenda. For him the mechanism only needs to be strengthened. The real focus has to be on implementation, with any new mechanisms serving only to sharpen, and not compete with or duplicate, existing ones. He argues that there is a need for some strategy refinement, especially as lessons learnt from practical experience can have a bearing on the success of implementation. It is important to break the pervasive cycle of continually revising and renewing development plans and strategies that can pull manpower out of the important delivery challenge. Strategies and policies on particular topics and themes will only serve their purpose if they are linked to Africa's priorities (Kwabena, 2009: 2).

### **3.3 THE MAIN FORMS OF RESIDENTIAL COMMUNITIES AND THEIR POTABLE WATER SUPPLY CHALLENGES IN SOUTHERN AFRICA**

The three main forms of residential communities in southern Africa include rural/communal, peri-urban, and urban residential communities. Rural/communal areas are further divided into pure rural (former Tribal Trust Lands in Zimbabwe), farm workers compounds and growth points. Urban centres are also further divided into low and high density suburbs, and mining compounds. The provision of potable water in these different areas also differs as determined by their financial and economic muscle. Although provision of fresh water in urban centres is far better when compared with the other residential, areas it is the low density suburbs that get the lion's share of this potable water provision (COHRE, AAAS, SDC and UN-HABITAT, 2008: 7).

Often the proportion of the population that lives in the designated areas is used to determine whether a residential area is urban or rural. According to WWAP/UNESCO (2006: 25) populations living in large villages and small urban centres have not been accorded sufficient attention. It is generally agreed that settlements with more than 20,000 inhabitants are urban centres. However, there is disagreement on categorising settlements with fewer than 20,000 inhabitants. Some classify all settlements (even those with only a few hundred inhabitants) as urban while others consider most or all settlements with less than 20,000 inhabitants as rural. Yet in developing countries a very high proportion of people live in settlements with between 500 and 20,000 inhabitants. Designation of such settlements as urban generally means more government structures and improved provision of potable water supply and sanitation.

According to WWAP/UNESCO (2006: 25), for more urbanised nations, 20 to 40 percent of their total population lives in urban centres with fewer than 200,000 inhabitants. For less urbanised nations, the majority of the population often lives in urban centres with fewer than 200,000 inhabitants. A study of potable water supply and sanitation in urban areas of different sizes in 43 low-income nations showed that the smaller the urban centres the worse the service provision (WWAP/UNESCO, 2006: 25). It was found that the percentage of households with piped water and flush toilets on the premises generally declined with city size, and that generally the worst served urban populations were those in urban centres with fewer than 100,000 inhabitants (Montgomery, *et al*, 2003: vi).

### **3.3.1 The case of rural and communal areas**

Rural and communal areas are the closest form of community residential organisation in which common pool resources like water still retain much of their communalist character. Ownership of such resources is still common, perhaps still in that state seen by Karl Marx as primitive communalism as explained in chapter 2.

As a result of increased demand for water services in urban areas, rural areas have often been disadvantaged in terms of access to fresh water (Redelinghuys, 2008: 123).

In most southern African rural and communal communities, provision of water for domestic use is shown in Figure 3.2 above and Figure 3.18 below. These figures show the gender characteristics of fetching water in southern African communities. Women and girl children are responsible for fetching water for domestic use. Even in urban communities, when systems fail, as in Harare during the 2008 - 2009 cholera outbreak, women have to walk (often long distances) to fetch water from streams and wells (see Figure 5.10), some with babies on their backs.



**Figure 3.18: Women fetching water for domestic use in a southern African rural community**

(Source: Water research commission, 2010: 25)

Wahaj, *et al* (2007: 3) report that most of the world's 1.2 billion poor people, two thirds of whom are women, live in water scarce countries and do not have access to safe and reliable supplies of water for productive and domestic uses. Women 'play an important role in the domestic and productive uses of water, in the domestic and public management of water supply systems, and

in the local knowledge and learning systems on water and preventive health' (Van Wijk-Sijbesma, 2001: 38). Men rarely collect domestic water unless as water sellers or when women are highly secluded or the sources are very far away (Van Wijk-Sijbesma, 2001: 38). In all these cases, men generally have some means of transport; unlike women and children, they seldom have to physically carry water (Van Wijk, 1985: 17).

Van Wijk-Sijbesma (2001: 41) argues that women do not only collect water for use in the home and for productive purposes. As domestic managers and decision-makers, they influence the use of domestic water services. The female household-head determines which water sources will be used for the collection of drinking and cooking water and which for other purposes such as bathing and the washing of clothes. She also decides how much water will be collected for each of these purposes. Thus, if women decide not to use an improved water service because it is not adjusted to their needs, obviously the service will not contribute to the improvement of public health in that community. In rural communities, women's concepts of water quality are based especially on sensory perceptions such as clearness, colour, taste, and flow, as well as on safety from contamination, poisoning, and sorcery (Van Wijk-Sijbesma, 2001: 41).

Van Wijk-Sijbesma (2001: 41) observes that a common misconception about women is that they use water only domestically; other uses are sometimes not considered. In southern Africa women are also engaged in agriculture, trade and/or small enterprises. They also have their own production within the home like running home gardens, raising and keeping livestock, brewing beer and processing food. In addition, they may carry out a great deal of community work which may require the use of water.

The general effects of climate change on the people of Africa have already been discussed above. However, because Africa is largely based on peasant agriculture, rural farmers (mostly women) are the most vulnerable to climate change. The greatest impact of climate change upon Africa's rural poor is the effect the weather has on food production. The majority of African farmers are already producing at levels well below achievable yields due to a basket of input challenges, of which access to water is but one.

The reasons why most improvements suggested by outsiders to boost potable water supplies in communal and rural areas are probably doomed to fail, are well summarised by a poor Latin American community's opinions of such initiatives. These are captured by Cortes *et al* (1990), as quoted in Frayssinet (1995). They are also cited in Musingafi (2008: 30) as follows. Outsiders' suggestions fall short because there is:

- much investigation and little action; they show off with data;
- [they are] very good at motivating people, but weak in carrying out the actions on a particular problem;
- they are not fluent in our language; they assess things in Spanish;
- they don't hear us; they don't listen to us, unless we pat them on the back;
- they don't dance to our tunes; they don't eat what we eat;
- they don't integrate themselves into our organizations;
- they want to be godparents, but they wouldn't choose us as their godparents;
- if we are sick, they don't visit us; they don't accompany us to our burials; they don't grieve over what we grieve over; and
- they don't know about our jokes, our stories, our beliefs, but they claim that they know us.

Implicit in these comments is the fact that the outsiders have a superiority complex and view the recipients of the development projects as the 'other', 'who knows nothing'. This approach means that they ignore centuries of valuable knowledge these people have of their own particular circumstances and core values. Experiences in the Ovambo community in Namibia as reported by Beukman (2002: 6) clarify this point.

Ovambo local communities have developed highly efficient and wise practices in their use and management of scarce water resources. Traditional practices encourage the use of local water that is of inferior quality for specific and appropriate purposes. Basic livelihoods depend on keeping cattle and goats and growing millet. With the development of the Ovambo water scheme, the local communities were encouraged to pursue irrigation projects but they had no interest in doing so, nor did they have the necessary skills. Furthermore in developing the new

scheme, the traditional, centuries-old water use and management of the Ovambo people were not acknowledged or integrated into the management of the new scheme. This was both a lost opportunity to develop and incorporate local knowledge into modern water management schemes, and also a waste in terms of the time of the technical advisers who may have tried to ‘teach’ the local people about efficient water practices. Also, it appears that there was inadequate participation of the local communities in deciding on the best use for piped water to improve the quality of their livelihood. The people of Ovambo could have benefited far more had they been given the opportunity to share their wisdom about efficient water management. It should have been pointed out to them (although not in a high handed manner) that in some cases, local traditional management systems are prone to break down in a changing physical and socio-economic environment.

The folly of sidelining clients or beneficiaries’ knowledge in water and other community development projects is well illustrated in the story of an old man from a village near Ouaninou in the Western part of Ivory Coast, a tale captured by Clavreul in De Graaf (2003: 5). He told the head of a well drilling team that had drilled for water for three full days without any success:

I admire your courage. You are doing everything in your power to give us water, but may I give you some advice? [...] The water runs beneath the earth in small brooks. We cannot see these little brooks beneath the earth, but they exist. I have noticed that in the dry season the termite hills continue to grow. And termites need a lot of water. They look for water in the brooks deep down in the earth. I know the location of the termite hills in the fields around the village. Put your machine there. You will find water.

The following day the team found water at the location indicated by the old man (Clavreul in De Graaf, 2003: 5)

Van Koppen, Giordano, Butterworth and Mapedza (2007: 1) argue that water resources management reform has paid little attention to community-based water laws<sup>14</sup> in rural communal

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<sup>14</sup> According to Van Koppen, Giordano, Butterworth and Mapedza (2007) community-based water law is defined as the set of mostly informal institutional, socio-economic and cultural arrangements that shape communities’ development, use, management, allocation, quality control and productivity of water resources. These arrangements, anchored in the wisdom of time, are embedded in local governance structures and normative frameworks of kinship groups, smaller hamlets, communities and larger clans and groupings with common ancestry.

areas in developing countries. Outside reformers, in collaboration with the local politicians, have tended to ignore, frown upon or even erode community-based water law.

As put forward by De Beer and Swanepoel (2000: 62), promoting sustainable development at grassroots should therefore consider and harness:

- context and local knowledge;
- participation and local choice;
- devolution of power; and
- open-ended reciprocal learning.

They further argue that the actions of outsiders should not create the impression that they have all the answers or that they know better. Patience and the ability to listen and to learn from others in an open-ended way are crucial to promote grassroots development. The power relationship between outsiders and local people should be of such a nature that the locals feel at ease to talk about their problems and their development priorities in their own particular way without being pressured. The development process should be an empowering and capacity building process for everyone involved.

Thus Wetmore and Theron (1998: 33) conclude by saying, ‘Development is not about the delivery of goods and services to a passive citizenry. It is about active involvement and growing empowerment’.

### **3.3.2 Potable water supply in the peri-urban communities of southern Africa**

One of the most significant urban changes has been the unprecedented growth in the size of cities. WWAP/UNESCO (2003, 2006) reports that over sixty percent (60%) of the world’s population (nearly 5 billion people) is expected to be living in urban areas by 2030 (compared with less than 15 percent in 1990 and 48 percent in 2002). These developments have a bearing on

governance and services provision in general and potable water supply and sanitation in particular.

The rapid growth in urban population has translated to a corresponding growth of slums,<sup>15</sup> backyard extensions, squatter settlements and peri-urban settlements, especially in poor economies of Africa (Van Vuuren, 2010: 26). The slums and squatter settlements increase the population of the poor who according to WWAP/UNESCO (2003, 2006, 2009) are the most vulnerable.



**Figure 3.19: Children playing with dirty water in a peri-urban residential area in Harare**  
(Source: CHRA Website [[www.chra.co.zw](http://www.chra.co.zw)], accessed October 2009)

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<sup>15</sup> Slums are defined by the United Nations as settlements which are lacking in one or more of the following: secure tenure, access to improved water, access to improved sanitation, durability of dwelling, and sufficient space to avoid over-crowding.

In cases of water scarcity, clean water tends to gravitate towards the rich and wastewater towards the poor (WWAP/UNESCO, 2006: 27). This lack of access to safe water and basic sanitation causes widespread ill-health that further limits the poor's productive capability. Many urban water systems are poorly maintained. In third world major cities like Harare this has led to regular water borne diseases. In the case of Harare, in addition to the ballooning population pressure, mismanagement of fresh water supply and sanitation culminated in catastrophic cholera outbreaks of 2008 – 2009 (CHRA Website [[www.chra.co.zw](http://www.chra.co.zw)], 2009; Nyandoro, 2011: 154).

One should note that cities rarely develop with careful water and wastewater management and the governance structures these require (WWAP/UNESCO, 2003: 171). Most cities that today enjoy good water systems have histories of mismanagement and crises, many of them only developed their water supply and wastewater management systems in response to the water problems generated by growth and accelerated by industrial development. Today, in cities of rich nations, it is taken for granted that each home or business premises has a 24 hours per day piped water supply that can be used for drinking, bathing and other domestic purposes (WWAP/UNESCO, 2003: 171).

Peri-urban residential settlements are those on the outskirts of urban areas. Usually this group is worse off even when compared to rural communities because of its informal status. Whereas the urban community falls under the jurisdiction of urban municipalities and rural communities are part of demarcated rural district councils, the peri-urban residents have no formal authority that sees to their service provision.

According to Allen, Dávila and Hofmann (2004: 5) the peri-urban interface is the location of a mixed population which often disproportionately comprises poor households. Many of the localities in these areas are in transition from being predominantly rural to acquiring urban features. This process is often accompanied by substantial pressures for land and water due to volumes of pollution generated by higher concentrations of population and industries/enterprises.

Peri-urban areas generally lie outside the established coverage of formal water supply and sanitation systems of urban areas. Water supply and sanitation are characterised by a high

diversity of practices, many of which could be characterised as informal. As put forward by Allen, Dávila and Hofmann (2004: 5), these practices are at best overlooked and at worst resisted by the set of regulations, policies and resources that structure and support the formal system. Examples are lack of consideration of the role played by the informal private sector (such as push-cart vendors) in any policy attempts to reshape current water supply and sanitation systems.

Allen, Dávila and Hofmann (2004: 6) further argue that there is a high degree of fragmentation in terms of the agents involved in the different stages of water and sanitation supply. The highest variety of agents is to be found in the stage of water distribution and access. For instance, to a large extent, water abstraction continues to be the responsibility of the public sector, although isolated cases can be found where abstraction is performed by the private sector (individual private well owners or illegal aquifer extraction, for example).

Discussions about water supply governance usually make reference to the formal system, yet in addition to the governance regimes that are responsible for the functioning of the formal systems of service provision, there is also a variety of unwritten rules that support and structure the informal system. Whilst the formal system is ‘policy-rooted’, the informal system is ‘practice-rooted’.

As put forward by WWAP/UNESCO (2006: 47), improving and extending provision for potable water and sanitation services in peri-urban, slums and squatter settlements presents any formal service provider with difficulties. These include the uncertainty of which an individual in a particular dwelling (be it a house, apartment or shack) takes responsibility for ensuring that payments are made. The matter becomes even more fraught with difficulty if there are multiple families, tenants and sub-tenants living there. For most informal settlements, there is uncertainty about who actually owns the land and the lack of official maps showing plot boundaries, roads and paths (without which it is impossible to design and lay piped systems) is yet another problem. Often there is no register of households and no official addresses assigned to dwellings.

Furthermore, many informal settlements have sites and site lay-outs for which it is difficult to provide piped services. They may be on difficult terrain (such as steep slopes and waterlogged

sites) and the lack of public roads and footpaths alongside or under which a piped system could be installed, is hurdle to overcome. In some settlement areas, especially those near mining activity, geological formations like the dolomite in South Africa's East and West Rand may lead to sinkholes and pollution of groundwater aquifers. All these add to the difficulty of providing water services to peri-urban communities.

Despite the gap between supply and demand for housing, Zimbabwean cities remain largely immune to the explosive growth of slums and squatter settlements that are characteristic of most African cities (UN-HABITAT, 2001: 14). In 2003 it was reported that only 3.4 % of the urban population lived in slums, a figure lower than that for industrialised nations where about 6.2% of the population lived in squalid slum conditions (UN-HABITAT, 2003: 3). This unique scenario in Zimbabwe is probably because there are stringent building bylaws and standards, and there is limited access to public land because most of the land surrounding cities is privately owned agricultural land. The acquisition of peri-urban farms during Zimbabwe's fast track land reform programme in 2000 provided one of the first opportunities for the urban poor to occupy land in the vicinity of cities and establish slum pockets.

Unable to squat on public land, low-income urban dwellers resorted to backyard extensions of legal dwellings. These extensions proliferated as a form of affordable rental housing. By 2004, backyard tenancy had become a dominant source of housing for the urban poor. In Mutare, for example, there were 34 000 backyard extensions compared to 27 000 approved dwellings. In Victoria Falls, extensions comprised 64% of the housing stock (UN-HABITAT, 2006: 17).

Zambia is one of the most highly urbanised countries in sub-Saharan Africa. The rate of urbanisation is, however, not matched with infrastructure development because of unplanned, informal settlements/peri-urban areas. The city of Lusaka has 33 peri-urban areas that account for over 60% of the city's population (Government of Zambia). Water supply services are mainly from piped water supplied from the local area or the main city system by the responsible local authority. Community schemes facilitated by NGOs distribute public taps and those in yards. Private shallow wells, rivers and lakes are also used for basic water supply. The status of potable water supply is very poor and the same can be said of the population. The government of Zambia

has developed a Peri-Urban Water Supply and Sanitation Strategy. This sets out the policy framework, institutional arrangements, finances and required technology. Emphasis is also placed on the responsibilities of communities and local authorities. While there appears to be a commitment to addressing water supply and sanitation in peri-urban areas, to date, implementation progress has been slow and hampered by inadequate funds and skills. While there are often good intentions and comprehensive plans and strategies, the understanding of what resources are required seems to be severely limited (Kwabena, 2009: 7).

In South Africa, large informal settlements have mushroomed around many of the large cities such as Johannesburg (see Figure 3.20), Tshwane, Durban and Cape Town (WWAP, 2006: 45). This growth has been fuelled by the stream of migrants and economic refugees from neighbouring countries.



**Figure 3.20: A peri-urban shanty township near Johannesburg, South Africa**

(Source: WWAP/UNESCO, 2006: 102)

It is estimated that while residents of low density urban areas may consume on average 700 litres of potable water per person per day, residents of high density and peri urban settlements may get

by on as little as 10 litres per person per day (Pallett, 1997: 15). Generally, neither group wields much influence over government decision making, although residents of low density urban areas are generally better serviced by municipal governments and are more politically engaged as citizens who voice their opinions and preferences through such bodies as ratepayers organisations, the media, and the ballot box. For the most part, residents of high density areas and peri-urban settlements will exercise exit before voice, disengaging themselves from the system rather than seeking formal redress.

### **3.3.3 An overview of potable water supply in urban communities.**

Whereas water is naturally a common pool and public resource, in the urban community it tends to lose some of the attributes of a common pool resource (Straub, 2009: 3). Instead of it remaining a community resource drawn from a village stream, river, well or tap, potable water is in most cases brought to the homestead and paid for.

According to WWAP/UNESCO (2006: 45) there are several common-sense reasons why urban areas should be better served than rural areas. The first is that urban areas provide significant economies of scale and proximity for the delivery of piped water and provision for good-quality sanitation and drainage. So unit costs are lower. The second is that many cities have a more prosperous economic base than rural areas, providing higher average incomes for large sections of the population and greater possibilities for governments or private utilities to raise revenues for such provision. The third reason is that urban areas concentrate not only on people and enterprises but also on their wastes.

When infrastructure and services are lacking, urban areas are among the world's most life-threatening environments (WHO, 1999b: 3). A good example is the Harare cholera pandemic of 2008-2009.

Van Vuuren (2010:27) observes, 'Urban residents remain much more fortunate than their rural counterparts. About 57 million people living in Africa's cities have no access to improved water sources compared to the estimated 284 million unserved people living in rural areas'.

With specific reference to access to water and sanitation, Table 3.4 below provides the population size, proportion urbanized and levels of access to safe water and sanitation facilities by the urban and rural populations of each mainland SADC country in 2000.

**Table 3.4: Population size and proportion of urbanised and levels of access to safe water and sanitation facilities by the urban and rural population in mainland SADC countries in 2000.**

(Source: Ashton and Ramasar, 2002: 65)

Country	Population 2000 (millions)	Proportion urbanized	Access to safe water (%)		Access to sanitation (%)	
			Urban	Rural	Urban	Rural
Angola	12.903	31	69	15	34	8
Botswana	1.693	64	100	91	91	41
DRC	52.046	29	37	23	23	4
Lesotho	2.156	25	65	54	53	36
Malawi	10.778	14	80	32	52	24
Mozambique	19.980	35	17	40	53	15
Namibia	1.739	37	87	42	77	32
South Africa	43.265	49	80	40	79	50
Swaziland	0.928	32	61	44	66	37
Tanzania	33.744	25	67	45	74	62
Zambia	9.191	43	64	27	75	32
Zimbabwe	13.109	43	90	69	90	42

In 2008, Redelinghuys (2008: 116) came up with a slightly different picture of urbanisation in the region. She believes South Africa and Botswana both currently have more than 50% of their populations urbanised. She further postulates that by 2030, 70% of South Africa's and 66% of Botswana's population will be urban.

Namibia and Zimbabwe are expected to increase their proportions of urbanised people from 34% to 51% and from 36% to 52% respectively between 2005 and 2030, while Mozambique’s urban population will increase from 38% to 60% over this period (see Table 3.5) (Redelinghuys, 2008: 116).

**Table 3.5: Percentages of the population urbanised in selected southern African countries**

(Source: Redelinghuys, 2008: 116)

Country	2005	2015	2030
Botswana	52.5	57.5	65.7
Lesotho	18.2	21	29.8
Mozambique	38	48.5	60
Namibia	33.5	39.8	50.9
South Africa	57.9	62.7	70
Swaziland	23.9	27	35.6
Zimbabwe	35.9	41.4	51.8

Despite these slight inconsistencies, the fact is that urbanisation is rapidly increasing in the region.

As put forward by Beukman (2002: 9), in southern African urban centres, services are provided either through tankers, public standpipes (common in Angola, Lesotho and South Africa), and yard and private house connections through reticulation networks. Even though the majority of the urban populations are served, interrupted flows, temporary water shortages and generally poor levels of service are common in many towns and cities. Part of the problem is that the infrastructure is either old (Lusaka), destroyed (Maputo) or just poorly maintained (Zimbabwe).

Generally, national governments sell to bulk suppliers who then supply local authorities. Municipalities are responsible for managing water services as far as the end consumer is concerned. In South Africa, the local authority level is further complicated by distinctions between all the water services bodies – including Water Services Authorities (WSAs), Water Services Providers (WSPs), Water Boards and Water Services Committees (DWAF, 2001). An

additional complication is that legislation has defined different categories of municipalities and local authorities that meet the requirements for being a WSA or a WSP.



**Figure 3.21: Water supply during the 2008-2009 cholera outbreak in Harare**

(Source: CHRA Website [[www.chra.co.zw](http://www.chra.co.zw)], accessed October 2009)

According to Beukman (2002: 7), apart from the confusing legislative requirements, there is tremendous inefficiency of water use in urban areas. Potable water is scarce and supplying and treating it is costly. Yet, urban residents, industries, local authorities and politicians allow huge financial losses in water provision. A good example is that of the city of Mutare in Zimbabwe. The city receives its water from two nearby dams and the Pungwe River. Leaking pipes, broken water metres, lack of data and no budget for basic maintenance were all given as explanations for the 52% of the water use that was unaccounted for (Gumbo and Van der Zaag, 2001; as captured in Beukman, 2002: 9). Beukman (2002: 9) observes that lack of awareness and short-lived comfort may explain consumer apathy. Lack of data collection/monitoring and neglecting to translate data to useful management information in a user-friendly system, are additional explanations. Inadequate technical and financial capacity may explain why basic maintenance is often not undertaken. But why, one may ask, are millions of US dollars actively sought by local

politicians to fund more water wastage? Gumbo and Van der Zaag (2001) clearly illustrate the politics behind costly supply schemes. This case and others like it favour elaborate short-term, solutions. The price of inefficiency and unsustainable management of supplies that the people of Mutare will have to pay in the future will only become apparent much later. (Beukman, 2002: 9).

In short, although urban potable water supply is steps ahead of peri-urban and rural potable water supply in southern Africa, much is still to be done to ensure effective and efficient service delivery in the region.



**Figure 3.22: Sewerage system failures in Harare**

(Source: CHRA Website [[www.chra.co.zw](http://www.chra.co.zw)], accessed October, 2009)

### **3.3.4 Potable water supply challenges in southern Africa**

#### **3.3.4.1 Water availability**

According to Ashton, *et al* (2001: xxviii), southern Africa (see Figure 1.1) receives considerably less rainfall during any given annual cycle than their equatorial neighbours. These drier areas

also experience greater variability in annual rainfalls and generally have more extreme air temperatures and higher rates of evaporation. In combination, these features reduce surface water flows in rivers and streams, and provide little recharge to ground water. On average, flows in the rivers draining the southern areas of Africa comprise less than 10% of the mean annual rainfall (Ashton, *et al*, 2001: xxix). They further observe that across the African continent, the geometric (spatial) average annual rainfall amounts to some 650mm, which is almost 24% less than the world average annual rainfall of 860 mm.

The climatic characteristics of southern Africa, especially as far as rainfall is concerned, as outlined briefly above, indicate very clearly that the average quantity of water available at a given time and place will be a finite amount. Years of above-average rainfall will provide short-term relief in the form of additional water, whilst lower rainfalls during drought conditions will cause, or accentuate, water shortages.

#### **3.3.4.2 Mining activities**

Southern Africa is rich in minerals. According to Ashton, *et al* (2001: xlix), the surface effects of underground mining are mostly associated with localised subsidence, sinkholes, rock bursts and earth tremors, whilst roof collapse of shallow underground pillar coal mine seams may promote spontaneous combustion in the residual coal. Some of the older coal workings in the Witbank area of South Africa have continued to burn for many years and have resulted in unplanned surface collapse as well as ground and surface water contamination through acidification and salinization of local aquifers and streams (Ashton, *et al*, 2001: xlix). Further environmental effects associated with coal dump and fires in current Zambian and Zimbabwean coal workings include sulphur dioxide emissions and associated acid rain.

Mining operations often have several negative hydrogeological impacts, including changes to the local (and sometimes regional) groundwater dynamics, in terms of both the quality and quantity of water, and its flow direction.

The locations of many southern African mining operations in or close to dolomite formations is often of particular concern to urban populations who rely on these dolomitic water resources for

regular and emergency water supplies (Ashton, *et al.* 2001: xlix). Most of the changes in groundwater quantity that are attributed to mining are linked to dewatering activities, where the mines extract large volumes of good quality water to ensure safe and economical mining operations. The environmental effects of dewatering include lowering of water tables, the formation of sinkholes and localised subsidence (Ashton, *et al.*, 2001: xlix).

Ashton, *et al* (2001: 1) further observe that mining and milling processes result in the release of environmental pollutants like acid rock drainage where the exposure of reactive ores to oxygen, water and bacteria leads to the formation of deleterious leachates that have significant environmental impacts. Sulphide minerals oxidise to acidic sulphate solutions with low pH values and high sulphate and total dissolved salt concentrations. Potential sources of acid mine drainage include surface runoff from open cast mining areas, seepage from leach ponds, runoff from residue dumps or ore stockpiles and drainage from underground workings (Ashton, *et al.*, 2001: 1). The following mining sources generate a diversity of contaminants that have been shown to have adverse effects of varying intensity on surface waters, groundwater, aquatic plants, surface water biota and submerged sediments in southern Africa:

- underground stopes;
- surface rock and sand dumps;
- slimes dams and delivery pipelines;
- coal discard dumps;
- coal fines;
- rehabilitated opencast pits;
- Plant areas; and
- Explosives residues (Ashton, *et al.*, 2001: 1)

### **3.3.4.3 Governance and management**

As already argued, the problem of potable water supplies discussed above is not simply a scarcity or water stress issue. As put forward by Savenije (1998: 1), thirst, is not a problem of water scarcity per se:

It is a problem of water management. There is enough water, virtually everywhere in the world, to provide people with their basic water needs: drinking, cooking and personal hygiene. Shortage of water for primary purposes (essentially household water) is much more a problem of lifestyles and poor management than of water availability. As a result of the 'sanitary revolution' of the Victorian age, drinking water is mainly used to convey our waste over large distances to places where we then try to separate the water from the waste. This way of sanitation, which probably was highly efficient at the beginning of this century when there was no scarcity of water nor an environmental awareness, is now highly inefficient in terms of energy consumption, money and water alike. An extra-terrestrial visiting the Earth would be very surprised to see that clean and meticulously treated drinking water, which is considered a precious and scarce commodity, is used for the lowest possible purpose: to transport waste. Subsequently, the waste is removed through a costly process, after which the water is often pumped back and re-treated to be used again. We need a new sanitary revolution ... to restore this obvious inefficiency.

WWAP/UNESCO (2006: 29) concurs. It argues that a basic insight, which has not yet garnered enough attention, is that the insufficiency of potable water supply and sanitation is primarily driven by inefficient services delivery rather than by water shortages. This is often due to mismanagement, corruption, lack of basic geohydrological water management knowledge and expertise, lack of appropriate institutions, bureaucratic inertia and a shortage of new investments in building human capacity, as well as physical infrastructure. Water shortages and increasing pollution are to a large extent socially and politically induced challenges. The water crisis is thus increasingly about how people, as individuals, and as part of a collective society, govern the access to and control over water resources and their benefits.

According to SADC (2005b: 8) and Mwangi (2008: 4), there are a number of institutional, technical, economic, social and environmental factors which, to one degree or another, constrain effective management of the region's water resources. These include:

- weak legal and regulatory framework;
- inadequate institutional capacity of national water authorities, and regional or river basin organizations;
- weak policy framework for sustainable development of national water resources;

- poor information acquisition, management and dissemination systems;
- low levels of awareness, education and training with respect to economic, social, environmental and political issues related to water resources development and management;
- lack of effective public participation by all stakeholders particularly women and the poor; and
- infrastructure is inadequate and unable to meet the growing demand for service.

As captured by Mwangi (2008: 6), the Africa Water Vision 2025 launched by a number of UN agencies and African regional bodies at the Second World Water Forum in 2000 identifies a number of natural and human threats to water security in Africa. As already observed above, the natural threats are primarily associated with Africa's extreme climate and rainfall variability, and these are worsening as a result of climate change. Some of the observed impacts include growing water scarcity, shrinking of some water bodies, and desertification.

Mwangi (2008: 9) identified the human-related threats to water security in sub-Saharan Africa as follows:

- inappropriate governance and institutional arrangements in managing national and transactional water basins;
- depletion of water resources through pollution, environmental degradation, and deforestation;
- failure to invest adequately in resource assessment, protection and development; and
- unsustainable financing of investments in water supply and sanitation.

Mwangi (2008: 13) argues that it is significant that while Africa's difficult hydrology and vulnerability to natural disasters contribute to water scarcity, it is human action, or inaction, that presents the greatest challenge in harnessing the existing water resources to improve the livelihoods of the majority of Africans. Mwangi (2008: 13) further quotes the 2006 human development report that argues 'the scarcity at the heart of the global water crisis is rooted in power, poverty and inequality, not in physical availability'.

SADC (2005b: 8) outlines the challenges to water governance in the region as follows:

- The mismatch between water availability and demand because areas of highest water demand happen to be in the water scarce semi-arid zones of the region, posing a challenge in terms of the allocation of available water resources to various users, particularly with respect to transboundary water resources.
- The high variability of available water resources, which impacts on reliability. Investments in storage dams, inter-basin transfers and large scale water distribution networks are needed to ensure water security for multi-purpose uses under varying climatic and hydrological conditions.
- Shared watercourses which cut across political jurisdictions and cover several countries with different socio-economic conditions and complex water rights serve as a potential source of conflict unless managed in a coordinated, integrated and equitable manner, yet at the same time, shared watercourses serve as potential sources of regional cooperation and economic integration.
- The widespread poverty is a serious challenge in the region.
- Weak inter-sectoral linkages and coordination hamper comprehensive and integrated development.
- Another problem is low access to safe drinking water and adequate sanitation, primarily as a result of inadequate infrastructure, and poor operation and maintenance of facilities.
- Weak policy linkages at regional and national levels, particularly weak implementation mechanisms at national level, mean that plans at regional level do not have an effective impact at national level.
- There is a potential challenge to sharing benefits of water allocation between watercourse states. Account needs to be taken of historically uneven development of water resources which require joint assessment, planning and understanding of resource availability and utilisation.
- Poorly developed formal dispute resolution mechanisms, particularly the delay in the establishment of the SADC tribunal.

- Finally, the prevalence of HIV/AIDS brings challenges for the capacity, sensitivity and requirements of water resources management in the region.

In conclusion, therefore, the problems of potable water supply and sanitation today and tomorrow are as much a consequence of poor governance as they are of absolute scarcity. If people do not find ways of preserving the precious common pool resource, they may wake up to find the world dry and uninhabitable. Despite more than 40 years of worldwide development of agency projects and programmes, there are still not enough drinking water services to provide all people with at least a minimum quantity of safe drinking water (WWAP/UNESCO, 2006: 3). Service access is least available to poor populations who are most vulnerable to the negative consequences of insufficient and poor drinking water in southern Africa (Van Vuuren, 2010: 27).



**Figure 3.23: Girl collecting water from a community supply, Abidjan, Côte d'Ivoire**

(Source: WWAP/UNESCO, 2006: 13)

### **3.4 SUMMARY**

There is sufficient freshwater in the world for everyone's essential personal and domestic needs. However, lack of distribution networks and working systems to extract groundwater or harvest rainwater; exclusion from these services or facilities; inequitable allocation of water resources; and pollution, limit people's access to sufficient clean water. In some cases excessive extraction and contamination of groundwater limit domestic use and threaten long-term use.

In rural areas, many people collect water of dubious quality from unprotected wells, often a great distance from their homes, deterring them from collecting sufficient water. Toilets are often seen as unnecessary or unaffordable. In urban areas, low-income groups often lack access to adequate water supply and sanitation. Piped water supplies and sewers seldom cover informal areas. This means that people living in these areas access water from a variety of generally inadequate water supply options, such as wells built close to latrines or small-scale water providers, such as door-to-door water vendors, whose water supplies may be of dubious quality.

The main challenge is neither water stress nor scarcity. It is one of poor governance and attitude. Water stress and scarcity are symptoms of sub-standard governance of public and natural resources. Lack of basic services is often because of mismanagement, corrupt and apathetic officials and financial limitations. This in turn translates into inappropriate institutions, a shortage of adequately skilled staff and poor physical infrastructure that does not have the capacity for efficient service delivery. Water shortages and increasing pollution are socially and politically induced challenges. These are issues that should be addressed by changes in water demand and use and through increased awareness, education and water policy reforms. The water crisis is increasingly about how we, as individuals, and as part of a collective society, govern the access to and control over water resources and their benefits.

The next chapter looks at IWRM. It examines the legislative and legal frameworks governing global and SADC potable water supply governance and explore the extent to which these frameworks have impacted on the potable water supply legislative and policy changes in Zimbabwe and South Africa.