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GOOD INTERSECTORAL WATER GOVERNANCE - A SOUTHERN AFRICAN DECISION-MAKERS GUIDE

Chapter on ***Health and Water***

By

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"We shall not finally defeat AIDS, tuberculosis, malaria, or any of the other infectious diseases that plague the developing world until we have also won the battle for safe drinking water, sanitation and basic health care." Kofi Annan, United Nations Secretary-General

The National Water Resource Strategy of South Africa (NWRS, 2004) expresses the need for Integrated Water Resource Management (IWRM) and the sustainability principle, "some for all, forever", underlined by the Constitution of South Africa. IWRM can only be successfully achieved if various government departments and water agencies work together. However, working across sectors is notoriously difficult and requires flexibility, understanding and excellent communication from all concerned. This chapter will provide insight on the complex inter-relationship between the water and health sectors. The chapter will also give a brief overview of the different roles and responsibilities of these sectors in terms of IWRM. In addition, it will describe the needs and the challenges faced within and between these sectors, the impact of IWRM on the health sector, as well as the role the health sector can play at local and national levels to accomplish IWRM through effective intersectoral water governance.

INTRODUCTION

Recent outbreaks of cholera in the South African provinces of Mpumulanga, Kwa-Zulu Natal and the Eastern Cape since 2000 and the more recent typhoid outbreak earlier this year (Department of Health, 2005) in Delmas, served as a wake up call with regards to the immense challenges still facing the health sector in terms of achieving IWRM through effective intersectoral governance. The extent of the outbreaks served as a direct indication of the severity of the backlogs in basic services and underlined the fact that, in the environmental health sector, instead of prevention and control, curative measures are the norm (SAHR, 2002). In addition, it highlighted the importance of access to improved water and sanitation services and the urgent need for inter-departmental cooperation.

In 2000, South Africa experienced one of the worst cholera epidemics in the country's recent history. By the end of the year, the cholera outbreak had spread to eight of South Africa's nine provinces, with a total of 106 3899 reported cases of cholera and 229 reported deaths (Department of Health, 2003 The majority of the reported cases and reported deaths occurred in rural communities of KwaZulu Natal and the Eastern Cape. The spread of outbreaks was contained and controlled by efficient surveillance, quick reporting and rapid response. Instituting preventive measures, both short and long-term, form the backbone of control of outbreaks. The local government, the Provincial Health Department and the National Department of Health is responsible for instituting prevention and control measures in case of outbreaks or potential outbreaks. However, a multi-sectoral approach becomes necessary in case of larger epidemics as well as in prevention through provision of adequate infrastructure. As in any extraordinary situation collaboration is what is necessary. Outbreaks constitute an extraordinary situation. Collaboration between and within departmental efforts is an essential ingredient for success.

The typhoid epidemic in Delmas also illustrated how inter-departmental collaboration is necessary to deal with a public health problem. The Departments of Health and Social Services, Water Affairs and Forestry, Local Government and Housing, Department of Agriculture and Land Administration and Delmas Local Municipality put additional systems in place in order to deal with the response (Department of Health, 2005). Provision of safe and clean drinking water and hygiene awareness education resulted in a decline in the number of new diarrhoea cases. Intensive monitoring of the borehole water at source and after treatment took place. One of the boreholes was found to contain *Salmonella typhii*, the bacterium that causes typhoid.

One of the lessons learned from these water-borne epidemics is that the provision of water supply should be closely linked to the provision of sanitation, and health and hygiene education, as they all have an impact on public health. Sanitation has traditionally been regarded as a programme aimed at providing infrastructure only. The health impact was therefore limited. Since then, inter-sectoral collaboration has been accepted as a basic principle. Initiatives have been taken to collaborate with the departments of education, health and housing under the leadership of the DWAF (Sinanovic et. al, 2005).

Water-related diseases

Many different infectious diseases are related to water in a variety of ways. These can be grouped into four categories, namely water-borne, water-washed, water-vectored or water-based diseases. Among the most typical water-related disease are gastroenteritis, amoebiasis, salmonellosis, dysentery, cholera, typhoid fever and hepatitis. Although there has been a general decline in mortality rate as a result of diarrhoea over the last half century, diarrhoea remains one of the most important causes of morbidity and mortality in children (WHO, 2003).

Diarrhoea or gastroenteritis can be caused by numerous agents, including viruses, bacteria, parasites and toxins, and it is a symptom of many of the illness caused by the various pathogens that might be involved in water-related disease.

Non-specific diarrhoeal disease is more frequent and causes more deaths globally than cholera, typhoid, giardiasis and amoebiasis combined (WHO 1995). More than 1.6 million people die every year as a result of unsafe water and sanitation, with 90% of that burden is on children under five years of age (WHO, 2004).

Faecal pollution of drinking-water may be sporadic and the degree of faecal contamination may be low or fluctuate widely. In communities where contamination levels are low, supplies may not carry life-threatening risks and the population may have used the same source for generations. However, where contamination levels are high, consumers (and especially the visitors, the very young, the old and those suffering from immuno deficiency-related disease, for instance through malnutrition or AIDS, may be at a significant risk of infection.

Links of poor water and sanitation services to poverty

In addition to direct health effects, the United Nations Millennium Declaration confirmed the central role of water and sanitation in **sustainable development** and the major contribution expanded access to safe drinking water and adequate sanitation can make to **poverty alleviation** (WHO, 2004). The poor bear the brunt of inadequate water services more than those with money in financial terms too. They pay high prices where water is sold, yet often

have unreliable supplies, and so do not get value for money as do the rich. The poor are also less able to adopt strategies to lower risk where water supply is unreliable, such as investing in storage or treatment technologies [Bosch *et al*., 2001].

Poverty effects of inadequate access to safe water include:

- *Health:* Pressure on health services and low school attendance due to diarrhoea, which causes some 2.2 million deaths each year, particularly among children [WHO/UNICEF, 2000].
- *Time:* Where safe water is at a distance from the home, much time is spent collecting the water, which diverts time away from production and schooling; some 40 billion hours per year in Africa alone [UNICEF, 1992].
- *Gender:* The burden of water collection is borne disproportionately by women. Easing the burden of water collection means more time for leisure and production (Bosch et al, 2001)

Education is also affected by lack of water and sanitation. School children are particularly prone to parasitic infections and this together with diarrhoea and other water-related diseases result in significant absences from school. In addition, an impact is seen as a result of illness on learning ability. The contribution of water and sanitation programmes may not be immediately obvious with regards to **gender equality**; however the impact of access to private safe and sanitary toilets is enormous. The burden of water hauling is known to be a tedious and time-consuming physical chore which reduces the time available for other more productive activities such as attending school. Less discussed are the impacts of poor sanitation. Women and girls may only be able to relieve themselves in the dark for the sake of privacy, risking their safety and health.

Costs and Benefits of Improved Water and Sanitation Supplies

According to a WHO report on cost benefit analysis (2004) achieving the water and sanitation MDG target, by using simple technologies, from a health point of view, would lead to a global average reduction of 10% of episodes of diarrhoea. Choosing more advanced types of technologies such as provision of regulated in-house piped water would lead to massive overall health gains, but it is also the most expensive intervention. The burden of disease associated with lack of access to safe water supply, adequate sanitation and lack of hygiene is concentrated on children under five in developing countries. Accordingly, emphasis should be placed on interventions likely to yield an accelerated, affordable and sustainable health gain amongst this group. The present analysis points to household water treatment and safe storage as one option of particular potential. This intervention results in high health improvements while incremental costs remain low compared to other types of interventions.

Based on the present analysis, achieving the water and sanitation MDG target would definitely bring economic benefits, ranging from US$3 to US$34 per US$ invested, depending on the region. Additional improvement of drinking-water quality, such as point-of-use disinfection, in addition to access to improved water and sanitation would lead to a benefit ranging from US$5 to US$60 per US$ invested. According to the SIWI assessment (2005), 1.47 billion people stand to benefit if the MDG for sanitation is met. The economic benefits could be as high as USD 65 billion annually, with the greatest proportion of the benefits expected to accrue to the poorest regions in the world.

A compelling argument in support of further resource allocations to improving access to water and sanitation services is made when evaluating the **health and the socio-economic benefits**

and the additional benefits of improving access to safe water supply and sanitation helps to support rational and informed decision-making, for resource allocation. Among the many possible and valid criteria, the ratio of economic costs and benefits of different intervention options is critically important. Also important in assessing costs versus benefits is that a ministry of health or water affairs would be unlikely to consider costs and benefits which have implications arising to other ministries, despite the importance of these costs and benefits (WHO 2000). The implication of this is that when adopting one particular ministry perspective in evaluating cost effectiveness the true efficiency of many environmental health interventions is not measured, resulting in a cross-sectoral misallocation of resources (WHO, 2000).

Acts and laws related to water quality in South Africa

Legislation exists to ensure that all South Africans have access to safe water. However, we are not always able to assess whether water is safe. There is a crucial need for scientifically sound answers to the problems of contamination of water sources with potential hazardous agents – microbial and chemical, and the assessment of the risks posed by such pollution.

Since 1994, four key policy documents with respect to water and sanitation have been produced. They are: Water Services Act (Act 108 of 1997), National Water Act (Act 36 of 1998), White Paper on Basic Household Sanitation (DWAF 2001), and Draft White Paper on Water Services (DWAF 2002a). The National Water Act and the Water Services Act are the two important water-related acts in South Africa. In addition, we have the Bill of Rights and the Constitution, which advocate the right of everyone to an environment that is not harmful to his or her health or well-being and to have that environment protected for the benefit of present and future generations (sustainability).

The National Water Act focuses on the management of the water resources in the natural environment. The main area of focus of the Water Services Act is on ensuring that water is provided to the population, with a particular emphasis on the previously disadvantaged and un-provided sector of the population. The emphasis of the two acts is different, with the National Water Act focusing on the water in the river or dam, and the Water Services Act focusing on the water as soon as it is extracted from the river or dam as a water supply.

The main area of focus of the Water Services Act is on ensuring that water is provided to the population. The quality of potable water, taken or discharged into any water service or water resource system in terms of section 9(1) (b) of the Act, is described in clause 4 as follows:

Quality of potable water

(1) The quality of potable water provided to consumers must comply with SABS Code 241: Water for Domestic Supplies.

(2) A water service provider who is at any time, unable to provide potable water in compliance with SABS Code 241: Water for Domestic Supplies, to consumers, must inform the Minister and the Province and take reasonable steps to inform its consumers-

(a) that it is unable to provide potable water of the prescribed quality;

(b) of the reasons therefore;

(c) any precautions to be taken by the consumers; and

(d) the time frame, if any, within which it may reasonably be expected that the prescribed quality will be provided.

The Act, however, does not explain the impact of water and sanitation on health, and the importance of health promotion and hygiene education. The role of DWAF is, therefore, changing from being a direct provider to being a sector leader, supporter and regulator. Its responsibilities include policy-making and strategy formulation, legislation, allocation of funds, grants and assistance, the setting of minimum standards, the preparation of guidelines, monitoring and evaluation, and the supply authority of last resort. Sanitation is not the responsibility of one government department. The Department of Health is responsible for public health and water quality monitoring.

Water Quality Monitoring

With regards to water quality monitoring, there are at least three different organisations or government departments in South Africa that provide water quality guidelines, namely DWAF, WRC (Water Research Commission), and the South African Bureau of Standards (SABS), now named South African National Standards (SANS).

Guidelines to assess the safety of water

The main aim of water quality guidelines is to protect public health. According to the World Health Organisation (2004), the potential consequences of microbial contamination are such that its control must be of paramount importance and must never be compromised. Generally the greatest microbial risks are associated with ingestion of water contaminated with human and animal excreta. Water must, as the first line of defence, be protected from contamination by human and animal waste.

The methods used to determine whether water is safe vary according to guidelines and standards. According to the majority of international guidelines and standards, water intended for human consumption should be safe, palatable and aesthetically pleasing. This implies that the water should ideally be free of pathogenic microorganisms and other substances that may present a health risk. Similarly, guidelines exist for all other uses of water, namely agricultural water use, industrial water use, recreational water use, etc.

At present, a number of South African water quality guidelines and specifications are available, and are used by all concerned at their discretion. South African water quality guidelines are currently not legally enforceable.

The SABS 241 2001 "Standard Specification for Drinking Water"

These guidelines specify three classes of water in terms of physical, microbiological and chemical quality, as follows:

Class 0 - an *ideal* standard that is closely comparable to current international standards;
Class I - water which is known to be *acceptable* for whole lifetime consumption; and
Class II - water considered to be *maximum allowable* for short term consumption (usual and continuous daily consumption for periods not exceeding one year).

With respect to microbiological parameters, 3 groups are provided for:

the limit which must be met in 95% of samples;

the 4% maximum limit; (in other words, the limit which may be exceeded in 4% of samples) and

the 1% maximum limit (the limit which may be exceeded in 1% of samples)

The DWAF Water Quality Guidelines (1996)

The South African Water Quality Guidelines are divided into different volumes for the various water uses:

Volume 1: Domestic Water Use
Volume 2: Recreational Water Use
Volume 3: Industrial Water Use
Volume 4: Agricultural Water Use: Irrigation
Volume 5: Agricultural Water Use: Livestock Watering
Volume 6: Agricultural Water Use: Aquaculture

These guidelines make use of the "fitness for use" concept. The "fitness for use" of water is a judgment of how suitable the quality of water is for its intended use. Several volumes of these exist for the different water uses i.e., The characteristics of water use involve determining and describing those characteristics which will help determine its significance as well as those that dictate its water quality requirements. Target water quality ranges are given for various constituents. The DWAF guidelines generally specify target ranges that fall into the *"No Effect Range"* which is the range of concentration at which the presence of the constituent would have no known or anticipated adverse effect on the fitness of water for a particular use. These ranges were determined assuming long-term continuous use and they incorporate a margin of safety.

The guidelines were developed so that they could as far as practically possible serve as a source of information for water resource managers to make judgments about the "fitness for use" of water for different domestic purposes. A total of 42 parameters are presented in the DWAF 1996 Guideline. No attempt was made to prioritise the various parameters that should be assessed.

The DWAF, DoH &WRC (1998) Assessment Guide

The Assessment Guide is a user-friendly guide designed for assessing water supplied for ***domestic use***. It involves a simple colour-coded classification system and information is presented in a simplified format so that a wide spectrum of users will be able to understand the underlying concepts of water quality as it affects the domestic user.

This guideline prioritises the substances according to four different groups (Group A – D substances, Table 1). The Group A substances are the general indicators of water quality and potential problems within the water supply system. These substances (electrical conductivity (EC), faecal coliforms, pH, turbidity and free residual chlorine) require continuous monitoring (sampling and analysis) at all points within the water supply system (e.g., from source (river), through treatment facility, bulk water supply, the reservoir, to the point-of-use where the end-user will access the water). Group B substances should be determined before the water is supplied (depending on the source and treatment applied), Group C substances require testing at the point-of-use where soft water of a low pH value is used and Group D substances should at least be analysed for when assessing the quality of water for the first time.

The Assessment Guide makes use of a classification system where water is classified into one of 5 classes, as follows:

Table 1: Colour-coded classification of water for domestic use

Class / Colour	Description
Class 0 (Blue)	***Ideal*** water quality - Safe for domestic water use
Class 1 (Green)	***Good*** water quality - Safe for domestic use
Class 2 (Yellow)	***Marginal*** water quality - Safe for use, but may affect certain sensitive groups
Class 3 (Red)	***Poor*** water quality - May be used for short-term emergency use where no other supply is available
Class 4 (Purple)	***Unacceptable*** water quality - Water is unsafe without treatment

Indicators of Health- Related Water Quality

Ideally drinking water should not contain any known pathogenic microorganisms and it should be free from bacteria indicative of pollution with excreta. To ensure that a supply of drinking water satisfies these guidelines of bacterial quality, it is important that water be examined regularly for indicators of pollution (WHO, 2004).

It is impossible to routinely test the water supply for all pathogens related to water-borne diseases because of the complexity of the testing and the time and cost related to it. Therefore, indicator systems which are able to index the presence of pathogens and related health risks in water are used.

Typically, an indicator organism should fulfil the following criteria:

- it should be present when the pathogen is present and it should be absent in unpolluted water;
- it should be present in numbers greater than the pathogens it indicates;
- its survival in the environment and resistance to treatment processes should be comparable to that of pathogens;
- it should not be harmful to human health; and
- it should be easy to identify and isolate.

At present *there is no single indicator which complies with all the above criteria*. The traditional indicators of drinking water quality include the coliform group. The faecal coliforms, or thermo-tolerant coliforms, and *E. coli* have been differentiated from the total coliforms as being more specific indicators of faecal pollution. The standard or heterotrophic plate count is also used in many countries, including South Africa, as a useful parameter in the quality control of water and water treatment processes.

Exceptions where pathogen presence is set in water quality guidelines.

Because the potential presence of pathogens in water cannot be predicted solely by faecal indicators, it may be necessary under certain circumstances to monitor for the presence of pathogens in addition to routine indicators - provided that the facilities are available. The World Health Organization (2004) has recommended that, under certain circumstances, it is necessary to monitor for *Salmonella spp., Shigella spp., Vibrio cholera, Yersinia enterocolitica, Campylobacter fetus,* enteropathogenic *E. coli and* enteric viruses. In Australia it has been recommended to monitor for *Salmonella sp., Vibrio cholerae, Shigella*

spp., Yersinia, Leptospira, Legionella, Giardia, Naegleria fowleri, enteric viruses, nematodes, cestodes and trematodes. The EEC specifies that water intended for human consumption should not contain pathogens and, if it is intended to supplement the microbiological analysis of water intended for human consumption, the samples should be examined for pathogens including *Salmonella*, pathogenic staphylococci, enteroviruses and faecal bacteriophage.

How HIV/AIDS and Water Quality are Related

The number of HIV/Aids and other immuno-compromised individuals is increasing, which will require strict control of our water quality. Current estimates are that up to 25% of the South African population are HIV positive, in particular age sectors. These immuno-compromised individuals are particularly susceptible to waterborne infections. This may cause a heavy burden of disease in South Africa. With the health services under pressure in terms of patient number staffing and finances, a reduction in patient load through preventative measures is crucial.

HIV/AIDS is one of the most prominent emerging infectious diseases, which is often associated with a host of other opportunistic intestinal pathogens. AIDS indirectly impacts on water quality because many AIDS patients shed large numbers of parasites and other diarrhoeal related microorganisms in their faeces. Sewage treatment works mostly do not function optimally and provision for the removal of the emerging parasites is lacking. These organisms end up in sewage effluents and eventually in other water sources; dams and rivers and ground water. Control measures, which will ensure optimal functioning of sewage treatment works, should be identified and applied to consequently minimize the ever-increasing contamination of our source waters. The poor management of sewage treatment works ultimately has an effect on drinking water treatment methods, costs, and the economy of the health of the population.

Whilst the roles and responsibilities of all the stakeholders are clearly spelt out, with the DWAF being a lead department for sanitation that oversees and co-ordinates the fulfilment of these roles and responsibilities, there is a lack of integration between government departments in delivery of sanitation services. The 2000 cholera outbreak highlighted the importance of sanitation and the need for inter-departmental cooperation:

Responsibilities for Water Supply and Water Quality Monitoring in South Africa – where does the health sector fit?

The overarching role of the Health sector is the health of people and the environment; related to the various uses of water, i.e., drinking, agriculture, recreation, industry, etc. Water is a basic human right and in order to achieve this goal, there are three basic concepts that are of utmost importance in terms of Section 27 of the Constitution of South Africa (Act 108 of 1996):

- Accessibility
- Availability
- Acceptability

Inherent to these principles should also be the principle of sustainability. Once available, water should be managed so that it is available for future generations.

Table 2 provides a summary of the roles and responsibilities of the different stakeholders involved in drinking water quality management. DWAF recently developed "A Drinking Water Quality Management Framework for South Africa" which provides detail on the

different types of involvement (policy development *vs.* monitoring) of each of the stakeholders at different levels (provincial *vs.* national, etc).

There are a number of players in the *delivery* of water supply in South Africa. This includes both governmental and non-governmental, para-statal and private organisations. However, water supply is not directly linked to water quality *monitoring.* The responsibility for water supply can be split between different organisations. Where the Department of Water Affairs and Forestry and Water Boards (Water Service providers) traditionally deliver bulk supplies, it is local government, and in some cases community based organisations who implement water supply projects in rural areas. Also, the various responsibilities of supply and monitoring are split between government departments. The following table illustrates the numerous government departments and their respective responsibilities with regards to water supply and safety.

Table 2: Responsibilities of government departments in addition to department of water affairs in the water and sanitation sector

Stakeholder	**Responsibility**
Department of Provincial and Local Government	• promoting the development of the municipalities • ensuring that provincial and local government have the capacity to fulfil their functions • coordination and provision of financial support
Department of Health	• providing access to affordable, good quality health care • creating demand for sanitation services through health and hygiene awareness and education programmes • developing norms and standards relating to health aspects of sanitation and water supply • co-ordinating interventions when a crises poses a regional or national health risk • providing a systematic approach to the proposition of sanitation facilities in clinics, hospitals and other health institutions
Department of Housing	• developing norms and standards in respect of housing development (e.g. the minimum level of service prescribed for sanitation is a VIP per household)
Department of Education	• jointly with the Department of Health, developing of curricula and guidelines relating to health, hygiene and sanitation • providing school facilities, including toilets and other sanitation facilities (provincial departments responsibility)
Department of Public Works	• ensuring that adequate provision is made for sanitation facilities in government and public buildings
Department of Environmental Affairs and Tourism	• developing policies and guidelines relating to the impact of sanitation systems on the environment
National Dept of Finance	• Funding for water and sanitation services

Source: White Paper on Basic Household Sanitation (DWAF 2001) and White Paper on Water Services (DWAF 2002a), Sinanovic et al, 2005.

Traditionally, the Department of Water Affairs and Forestry (DWAF) was in charge of supplying water and the Department of Health (DoH) was responsible for ensuring that the water was of good quality. It is the Environmental Health Practitioner (EHP) that is responsible for the monitoring of domestic water quality. This is only one of numerous functions that they must perform. Others include food and dairy inspections, monitoring of restaurants and other hospitality locales, as well as implementation of health, hygiene awareness and education campaigns (SAHR, 2002). Pro-active community-level health and hygiene awareness campaigns together with timely water quality monitoring can limit outbreaks of diarrhoeal and other diseases. Water quality monitoring will be discussed later in the chapter.

Access to water and sanitation in South Africa

South Africa has a population size of 44 million people, of which 52% are estimated to be living in the rural areas. It is estimated that in South Africa more than 12 million people do not have access to adequate and safe water supplies. In the rural areas more than 80% of poor households have no access to water or sanitation. In addition, 74% of these rural households must fetch water on a daily basis. In general, only 21% of South African households have piped water indoors. Since 1994 after the new democratic government was formed, it has supplied approximately 11 million rural people with basic water supply (DWAF, 2004a; DWAF, 2004b)..

Provision of basic services (water, sanitation, electricity and waste management) is the main responsibility of municipalities (SAHR, 2002; DWAF, 2005). However, due to a lack of resources and poverty, especially in rural areas, some communities have no access to these services.

In the developing world today, poor access to safe water and adequate sanitation continues to be a threat to human health (WHO, 2004). According to the WHO, in 2003 1.6 million deaths were estimated to be attributable to unsafe water and sanitation, including lack of hygiene. Unfortunately, this is concentrated on children under five years of age who bear over 90% of this burden, mostly in developing countries. The impact on health is compounded by the fact that although mortality as a result of many waterborne diseases is generally low, their socio-economic impact in both the developed and developing world is severe. Overall it is ranked 5th regarding 'years life lost' or YLL with an estimated 452 827 life years lost as a result of deaths from diarrhoea.

In 2001 a significant proportion of the world's population remained without access to improved water and sanitation. An estimated 1.1 billion people were without access to improved water sources and 2.4 billion people lacked access to improved sanitation. Expanding this access is essential to reduce the burden of water-related diseases and to improve the well-being of a large part of the world's population. It is also vital for economic development and poverty alleviation. Getting on track to meet the target Millennium Development Goals for both drinking water and sanitation will mean better health, longer lives and greater dignity for billions of the world's poorest people. It will also make a significant contribution to the achievement of other Millennium Development Goals (WHO & UNICEF, 2004).

The situation is equally poor in South Africa, where a total of 16,000 people die every year from diarrhoeal disease (the numbers have significantly changed over the last decade as a result of AIDS) (MRC, 2003). It is estimated that more than 50% of Africans suffer from water-related diseases such as cholera and infant diarrhoea (UN Millennium Project, 2005).

For children under 5 years of age in South Africa diarrhoea is the third most important cause of death, after HIV/AIDS and low birth weight representing 10% of all deaths in that age group or 10,786 deaths (MRC, 2003). The incidence of diarrhoea for children under 5 years of age, was 133 per 1 000 population in 2002 (Health Systems Trust 2003).

It is estimated that the treatment of diarrhoeal diseases costs South Africans **R3.4 billion every year** (Pegram et al, 1998). These are estimates based on the *direct costs* of the 3 million cases of diarrhoea that need treatment every year, with a total number of 24 million diarrhoeal cases per annum estimated for South Africa.

Whether the estimates are accurate or not, the impact of water-related and diarrhoeal disease remains indisputable. Improvements in wastewater disposal, protection of water sources and the treatment of water supplies have reduced the incidence of water-related diseases in many developed countries. However, in South Africa with its mix of urban and rural areas, the problem still remains.

How Can the Health Sector Contribute to the Process of IWRM at the Local and National Levels?

The Health sector should play an integral part to accomplish IWRM. The overarching aim of IWRM is sustainability. Health of people and health of the environment is an outcome of IWRM through sustainability.

It is clear that IWRM cannot be effectively accomplished if all sectors and stakeholders aren't involved in and throughout the whole process. The Health sector should develop a framework of integration and co-operation with the other stakeholders and should plan towards this process. The process of IWRM should feature as part of their priority list of duties, with time and finances allocated for meetings and collaboration. The Health Sector should understand the importance of IWRM and specifically the role they play in the whole process. They should advocate the process of IWRM and involve civil society by means of education campaigns, media etc. People should be made aware of the role they play in establishing the process. Table 3 summarises the challenges facing the health sector for effectively supporting IWRM.

It is clearly evident that many challenges exist to ensure that health is adequately addressed to contribute towards the goals of integrated water resource management. If these challenges are not overcome it is doubtful that we will be able to reach the Millennium Development Goal to reduce by two thirds the mortality rate of children under five years of age.

Table 3: Challenges Facing the Health Sector for Effectively Supporting IWRM

Challenge	**Description**
Role definition	Environmental health is one of the most neglected spheres within health management, with a lack of clearly defined environmental health strategies, standardised health indicators and effective reporting systems.
Shortage of personnel	Appointment of new EHP's was suspended at provincial level because of pending transformation of environmental health functions to municipalities. In addition, at municipal level, many posts remained frozen.
Capacity building	Employees should be informed of new initiatives undertaken by the department and training should be provided that is in line with a shift in focus or priority.
Reactive vs. Pro-active assessment	Shortage of personnel and increased work loads lead to reactive inspections and monitoring instead of pro-active health and hygiene education campaigns
Wasting of limited resources	Water quality is monitored by DWAF officials, municipal technical departments and by EHP's. Reports are often prepared in parallel, for different authorities, without adequate integration or assessment of their implications for broader development planning. Scarce resources are therefore wasted.
Integrated and cross-sectoral monitoring	Monitoring of water supply quality at the source is not enough – water coming out of a communal tap may be clean, but frequently contamination occurs while water is being carried home, or in the home itself. A cross-sectoral and integrated monitoring framework is needed to ensure water quality is monitored and safeguarded at every stage of the supply chain; this must be complimented with user education at every stage of the pipeline.
Communication networks	Liaison and communication networks need to be strengthened within and between departments
Sound information systems	Requires that a minimum set of manageable and usable data must be defined to ensure that essential information for tracking of problems, prioritising interventions and impact assessment becomes available
Cross-sectoral information sharing (Technology transfer)	Statistics on the prevalence of diarrhoea in a particular settlement need to be cross-referenced against water quality and provision of adequate water and sanitation services
Information must inform planning and provision of water sources	Effective planning would identify essential health priorities which could assist in prioritisation of water and sanitation projects, and guide remedial interventions where necessary

Source: From SAHR, 2002; Chapter 6: Environmental Health.

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