

3.3 Water Conservation and Management

OVERVIEW

Fresh water is essential for the daily life of all aquatic and terrestrial organisms, including humans. It is crucial for maintaining ecosystem health, biodiversity and the livelihoods of fishermen, farmers, foresters and those economically involved in recreation and tourism. In urban areas, water facilitates power generation and is a key raw material in mining and industry. It is also the transport medium for sanitation.

Water resources are being degraded and threatened by the impacts of population growth and the associated increase in economic activities, rural to urban migration, as well as climate change. If present trends continue, 1.8 billion people will be living in

countries or regions with absolute water scarcity by 2025, and two-thirds of the world's population could be subject to water stress¹⁰.

The UNEP Global Environmental Outlook (2007) reports that available water resources are continuing to decline as a result of excessive withdrawal of surface- and groundwater, as well as decreased run-off in some areas, the latter attributed to global warming. In other areas global warming is causing more rain and flooding.

Climate change is predicted to further alter the amount and distribution of rainfall as well as evaporation rates. Sixty per cent of the world's largest rivers are greatly fragmented by dams and canals, with the present high rate of dam construction threatening the integrity of the remaining free-flowing rivers in the developing world. One-tenth of the world's major rivers no

longer reach the sea all year round. Severe groundwater depletion is apparent in all regions¹¹.

Water quality degradation from human activities continues to harm human and ecosystem health. Three million people die from water-borne diseases every year in developing countries, the majority of whom are children under the age of five. The deterioration of water quality is being exacerbated by pollutants from land-based sources such as municipal wastewater and contaminated urban run-off.

Water needs careful management and protection because of its vulnerability to overexploitation and pollution. This is particularly the case in South Africa which, in terms of a United Nations definition, is already water stressed, and bordering on water scarce.



Water in South Africa

South Africa is a semi-arid country, with an average rainfall of 450 millimetres per year, about half the world average of 860 mm per annum. Rainfall in South Africa is highly variable, with the eastern and southern parts of the country receiving significantly more rain than the northern and western regions. The surface water resources in South Africa are already highly developed, with dams and reservoirs capturing about 66% of the total mean annual rainfall. About 20% of this runoff needs to remain in the rivers and estuaries to support natural ecosystems - the Instream Flow Requirement or 'Reserve' as provided for by the National Water Act.

Freshwater quality is constrained by pollution from irrigation return flows, urban drainage and industrial and mining activities. Invasive alien vegetation also depletes available water by

absorbing about 3% of the mean annual runoff, with stream flows in some areas reduced by up to 10%. Urbanisation adversely affects water quality and availability due to pollution from urban run-off and the increase in impervious surfaces. Hardening of surfaces (roofs, roads) in water catchments both reduces groundwater recharge and speeds up the water cycle by increasing peak storm flows and resulting in flooding.

Climate change has the potential to make a significant impact on the availability of water in South Africa, due to rising temperatures and increasing variability of rainfall, increasing drought in some regions and floods in others. An overall decrease in rainfall of 5-10% is expected. Development decisions need to take into account the potential effects of climate change on water resources and extreme weather events.

The ecosystem and human users of water need to be considered when assessing the water requirements of South Africa and its neighbouring territories. Within the water cycle, there are complex interactions between surface and ground water and between the water and sediments, stream banks, animals, plants, and microbes in rivers, dams, and wetlands: all these have to be taken into account in water management.

The Department of Water Affairs and Forestry (DWAF) is the custodian of the nation's water resources, and aims to manage water resources so as to promote equity, sustainability, and efficiency of water use. The National Water Resource Strategy states that minimisation of water use at source is the first priority, followed by maximised re-use and recycling.¹⁴

“Per capita availability of freshwater is declining globally, and contaminated water remains the greatest single environmental cause of human sickness and death.”

UNEP, 2007. GEO 4

¹⁰ UNEP, 2007 Global Environmental Outlook 4: Environment for Development

¹¹ UNEP, 2007 Global Environmental Outlook 4: Environment for Development

¹² DEAT, 2006 South African Environment Outlook

¹³ DEAT, 2006 South African Environment Outlook

¹⁴ DWAF, 2004 National Water Resource Strategy

WATER RELATED LEGISLATION

- The National Water Act, (Act 36 of 1998)
- Water Services Act, (Act 108 of 1997)
- Municipal Water By-laws e.g. City of Cape Town (CCT) Water By-law, 2006
- National Water Sector Programme, 2008

Sporting events and water

Consumption of water at sporting venues is associated with facilities for irrigation, ablution, catering, cleaning of venues and accommodation facilities, air conditioning, and landscaping. Golf courses have a particularly high water demand and responsible water management could enhance the image of such sports. Rugby and soccer grounds and cricket pitches also have a relatively high demand for irrigation and the large numbers of spectators attending games use significant quantities of water for catering and ablution.

Water quality is important for water-based sports such as canoeing, windsurfing, surfing, and angling. Poor water quality already impacts on our water sports on inland dams that are negatively affected by urban run-off and sewage disposal.

OBJECTIVES

Given the relative scarcity of water in South Africa, there is a need to manage the increased water demand created by major sporting events, with key objectives being:

1. Minimisation of water usage
 - reduce, reuse and recycle
2. Protection of water resources and avoiding pollution
3. Raising awareness and promoting behavioural change

Objective 1:

Minimisation of water usage

At the preliminary stage of planning a sports event, a Water Management Plan should be developed in partnership with government departments, local authorities and venue managers. Information on water use for the sporting activity/venue should be gathered and ways to reduce consumption, identified.

Key areas to address include the con-

struction or retrofitting of venues with water efficient fittings, systems for the use of harvested rainwater, and sustainable landscaping and irrigation practises. Sports facilities often have large surface areas where rainwater can be harvested (parking areas, stadium roofs and playing fields) for use on site for irrigation, venue cleaning and toilet flushing. Many new technologies have developed recently for the storage of water below ground, under paving or sports fields. A number of the 2006 FIFA World Cup™ stadia playing fields - Berlin, Frankfurt, Nuremberg and Stuttgart - were constructed with large scale underground storage cisterns below them contributing to an 18% reduction in water use in the stadia.¹⁵ In Berlin, Frankfurt and Munich, additional rainwater infiltration systems were built to recharge ground-water and promote a near-natural water cycle. Further measures for the purposes of sustainable rainwater management

were carried out, including the de-sealing of land, the use of permeable paving for open spaces and the greening of roofs. The greening of roofs attenuates stormwater, reducing peak flow rates, and reducing pressure on urban infrastructure.

Initiatives for water conservation are already well-established in the tourism industry internationally. Locally, initiatives such as Heritage SA and GreenStaySA are environmental rating systems that are currently being further developed for the hospitality sector in South Africa. Linking with such initiatives will ensure water conservation at accommodation venues. Further information can be found in Section 3.8.1 on accommodation.

Objective 2: Protection of water resources and avoiding pollution

Major sporting events such as the 2010 FIFA World Cup™ may include the

construction of large stadia where stormwater management would have a significant impact on the urban drainage system as well as effluent flows. The large spaces surrounding sports stadia that were conventionally paved with impermeable surfaces to cater for high traffic use, both pedestrian and vehicular, should be replaced with pervious 'Sustainable Urban Drainage Systems' (SUDS). For further information on SUDS visit: www.ciria.org.uk/suds

Water extraction from natural systems for sports facilities may be governed by legislation to ensure that ecological systems remain functional; this may be a limiting factor for the development and/or operations of sports facilities such as golf courses. Provincial or local authority approvals may be conditional on the application of water demand management within a facility. Golfing in particular has the potential to play a leading role in developing water

conservation strategies and technologies.

Water quality is important for water-based events such as yachting, canoeing, and windsurfing. Since it is in the interest of the sport and its participants, ongoing contribution to the monitoring of water quality can easily be motivated. The sporting body could act as a 'watchdog' of water quality for local communities. See the case study of Ekurhuleni Swim and Triathlon Series on page 33.

¹⁵ FIFA, 2006 Green Goal Legacy Report





The Midmar Mile swim

Case Study Ekurhuleni 1200 Swim and Energade Triathlon Series

The City of Ekurhuleni hosts the Ekurhuleni 1200 Swim and the Energade Triathlon Series at different natural venues in the city. The Ekurhuleni 1200m Swim is an annual event organised by the Sport & Recreation Division, the Germiston Swimming Club and Gauteng Lifesaving. It is the second largest open water swimming event (Midmar Mile is the largest) and attracts approximately 2000 competitors. The Gauteng leg of the Energade Triathlon Series is the largest triathlon in the area with approximately 2500 participants taking part in the event in 2007.

These events are both held at the Germiston Lake. The Lake Park is managed by the Metro Parks Division of the Environmental Development Department of the City of Ekurhuleni. The City is responsible for the monitoring of the **water quality** of the Lake which is impacted by pollutants in the different feeder rivers. Various tests are done on a monthly basis and test results are made available to users of the Lake before each event. The natural vegetation in the Lake is also managed by the City through a management plan which includes monitoring of the current fish population (Chinese grass carp) and other species.

Sporting events may provide an opportunity to support the conservation of water resources in the region, such as the rehabilitation of wetlands or removal of invasive alien vegetation. Event organisers could work with local authorities and conservation organisations to promote the conservation of wetlands or estuaries near the event site.

Objective 3: Raising awareness and promotion of behavioural change

A significant percentage of water is wasted due to lack of awareness. At the Sandton Convention Centre during the World Summit on Sustainable Development (WSSD), 2002, water use in the kitchen was reduced by 70% in two weeks, simply by raising staff awareness about water efficiency and installing a water meter in the kitchen to monitor use. Going beyond raising awareness to training of staff and volunteers in water conservation techniques would be a further commitment.

Sporting heroes and the inspirational power of sporting events should be used to promote water conservation in combination with other relevant environmental issues.

STRATEGIES

Recommended strategies for each of the objectives outlined in the previous section, are as follows.

1. Minimisation of water usage

- Develop and implement a Water Management Plan for the event and each venue. Focus efforts on the main water demand activities, e.g. catering, cleaning, cooling of buildings, and landscaping.
- Conduct water audits of existing venues to identify water uses and consumption levels and identify areas for improvement.
- Design or retrofit venues to maximise water efficiency, including the use of water efficient technologies:
 - Install equipment which promotes water efficiency e.g. Infra-red controlled taps,

waterless urinals, low-flush or dual flush toilet cisterns, low flow shower heads, tap aerators, spray taps and self closing taps.

- Harvest rainwater from roofs – stadia roofs provide particularly large areas – and use for irrigation or toilet flushing; store this water in above ground tanks or below ground storage units.

- Use recycled greywater for toilet flushing and irrigation.

- Employ ecological sanitation systems on site, e.g. biological or reed bed filtration of sewerage, with water produced used for irrigation.

- Install drip irrigation for landscaping.

- Adopt water management plans on construction sites, as part of Environmental Management Plans. Use recycled water or rainwater for vehicle washing, dust settlement, and toilet flushing on construction sites.

- Select drought tolerant plants for gardens and landscaping.

- Use non-potable water for irrigation,

e.g. non-potable wells, municipal treated effluent, and recycled grey-water.

- Monitor and maintain water systems regularly to avoid losses through leakage. Install sub-meters to enhance identification of high use areas.

Publish the data or display on electronic noticeboards.

2. Protection of water resources and avoiding pollution

- Work with local conservation organisations to promote the conservation of natural wetlands or estuaries near the event site.

- Use porous or permeable paving to allow stormwater infiltration, groundwater recharge and on-site storage, in implementing the principles and technologies of Sustainable Urban Drainage Systems (SUDS) in and around stadia.

- Connect temporary toilet facilities to the established sewer network wher-

ever possible to reduce use of chemicals.

- Construct stormwater swales (ditches) to maximise stormwater infiltration on site.

- Divert rainwater into ponds or rivers or build retention dams on site.

- Provide special washing areas for sporting equipment to avoid pollution.

- Monitor the quality of water effluent from sports facilities to ensure that regulations are complied with.

3. Raising awareness and promoting behavioural change

- Launch an awareness-raising campaign on water efficiency for staff, participants, volunteers and public. Provide information on how to achieve water conservation through behavioural change, and tips on how to be water-efficient. Provide feedback on water saved during the event.

- Train event and venue staff to use water efficiently - for example, watering

plants during the coolest time of the day, and sweeping or mopping floors instead of hosing down.

MONITORING AND EVALUATION

Project-specific Indicators for the success of each objective will need to be identified. Examples of indicators that could be used to measure success in achieving stated water related objectives are provided in the following Table.

OBJECTIVE	INDICATOR	TARGET	RESULT	COMMENT RE SUCCESS
Minimising water usage	% reduction in water use from baseline study before event	20%	25%	Very successful due to water fittings retrofit and behavioural change
	% of non-potable water used at venue (greywater, rainwater, treated effluent) of total water used for event	25%	12%	Moderately successful. Challenges: high cost of water storage units
Protecting water resources and avoiding pollution	Area of wetland conserved	10ha	8ha	Successful due to strong partnership with conservation NGO
	% reduction of stormwater discharged to municipal stormwater	30%	20%	Moderately successful. Challenges: design did not accommodate extreme flood event
Raising awareness and promoting behavioural change	% of water savings attributed to behaviour change	10%	20%	Very successful due to enthusiastic response from venue cleaning and catering staff. Competitive spirit was encouraged through an award scheme



3.4 Sustainable Procurement

OVERVIEW

Eco procurement is one of the most powerful tools for enabling change, because it is linked to a specific action and decision at a specific point. Through clear procurement guidelines decisions can be made to avoid or reduce wastage through smart purchasing or appointing the right service providers. Purchasing energy efficient appliances will reduce the need for energy use over the long-term. Procurement can also be used to support the local economy in a proactive way and to encourage social upliftment through supporting fair-trade products.

From planning through to the implementation of large sporting events, there are many opportunities to consider the principles of eco-procurement in a

range of ways, which can make a significant difference over the long-term. Whether it is the construction of a new venue or the appointment of service providers for catering or even the agreements with sponsors, there are many ways to ensure that environmental concerns are taken into account in procurement decisions. From energy and water, through to transport; all these elements are “procured” and can be influenced in a positive way.

To be really effective, it does however have to be supported from a strategic perspective and included into the main agreements around sponsorship and service providers for the event. Even though eco-labelling is not as common in South Africa as it is in European countries, there are products and principles that can be supported.

Procurement in South Africa has a strong focus on Local Economic

Development and support of Black Economic Empowerment (BEE)¹⁶ which is driven by legislation and regulation. An integral part of the BEE Act of 2004 is the balanced scorecard, which measures companies’ empowerment progress in four areas:

- Direct empowerment through ownership and control of enterprises and assets.
- Management at senior level.
- Human resource development and employment equity.
- Indirect empowerment through:
 - Preferential procurement,
 - Enterprise development, and
 - Corporate social investment - a residual and open-ended category.

Procurement decisions need to consider two particular issues over and above the BEE requirements: 1) Environmental issues such as energy efficiency, water conservation and waste reduction; and 2) Prioritisation of goods manufactured

locally - firstly within the region where the event is being hosted and secondly within South Africa.

“During the 2007 Rugby World Cup the Congress of South African Trade Unions (Cosatu) had called for a boycott after learning that the SA rugby gear had been imported. Brimstone Investment, a part owner of rugby kit maker Canterbury South Africa, has agreed to make most of its replica jerseys and other memorabilia in South Africa, as well as procuring more goods and services locally. “We all as South Africans need to stand together to remove joblessness, and we must take each and every opportunity to do so,” said Brimstone's Fred Robertson.”

BBC News, 13 September 2007

¹⁶ http://www.southafrica.info/doing_business/trends/empowerment/bee.htm