Water Demand Management Study of Namibian Tourist Facilities

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Abstract

The Water Demand Management Study of Namibian Tourism Facilities is a two-year project funded by the Water Research Fund for Southern Africa (WARFSA). It will test the effectiveness of different water demand management approaches within the tourism industry using water audits. The results will help formulate water demand management guidelines for the Namibian tourism industry.

Prior to obtaining WARFSA funding, a one-year preliminary survey of water use in twelve tourist camps was conducted by the Department of Water Affairs. It found that visitors only use a fraction of the water, while most is used by staff, on gardens or is lost due to leaks. It recommended that to increase water use efficiency at tourist facilities, water demand management should be implemented at all levels. The preliminary studies have shown that efficient water use can be achieved if the facility management is in control of the daily water use and is interested in water demand management approaches. This project aims to guide and monitor water management at four study sites. It will implement suitable water demand management approaches and test the effectiveness of these through regular water audits. The water audits serve as a tool to gather data on water use and to provide feedback to management on their progress. This paper summarises the research results of the first eight months of this project, discusses the problems and successes experienced with the data gathering methods to date and lists the activities planned for the remainder of the project.

Introduction:

Namibia is the driest country in sub-Saharan Africa, yet the concept of water demand management is not well established. The country has an ever-increasing water requirement to meet development needs and to keep up with rapid population growth of more than 3 %, a rate at which the population doubles every twenty years. Good planning and engineering are important to ensure increased water supplies, but they alone cannot provide assured access to more water. The implementation of sound water demand management strategies are important to control the demand for water and ensure more efficient and sustainable water use now and in the future.

In this project Water Demand Management (WDM) is defined as: 'A management approach that aims to decrease water demand by promoting efficient water use through economic, educational and technological means'. It is based on the one used for the IUCN Country Study (IUCN Water Demand Management Namibian Country Study, 1999).

The IUCN Namibian Water Demand Management Country Study was conducted in 1998 to establish and assess the current status of WDM in different user sectors nation-wide. The study concluded that very little WDM existed (with notable exceptions from the Windhoek Municipality, Namibia Breweries and Etendeka Mountain Camp) and recommended that suitable practices need to be tested and implemented in the various sectors, through pilot projects. As a direct result, the

present Study of Namibian Tourist Facilities was initiated. During the preliminary data gathering phase in 1999, the water use in twelve tourist facilities was monitored. After funding became available from WARFSA for the main project, four of these twelve facilities, one for each main category of tourist facility (Table 1) were chosen as study sites. The four sites are: Spitzkoppe Community Camp, Bernabe de la Bat Resort, Ongava Lodge and Swakopmund Municipal Bungalows. The project aimed to implement and test various water saving approaches at each site during 2000 and 2001. The study sites differ in scale, rating, level of luxury and water availability. Two control sites, Skeleton Coast Wilderness Camp and Etendeka Mountain Camp are upmarket ecotourist lodges that have sound water management practices in place and were therefore chosen to serve as comparisons for the study sites. Table 1 lists and describes the different categories and shows where the four study and two control sites fit in.

Table 1: Categories of Namibian tourist sites and examples chosen as study and control sites

CATEGORY	DESCRIPTION	SITES
COMMUNITY CAMP	Basic, small scale, affordable, camping outside Municipal area, on communal land basic water supply, little water use, few staff live on site, limited supply, Erongo region	Spitzkoppe Community Camp
NAMIBIA WILDLIFE RESORTS	Large scale tourism, ranging from economy - VIP outside Municipal area, in Nature Reserve large scale water supply, high water use, staff live on site, Otjozondjupa region, Waterberg	Bernabe de la Bat Resort
LODGES	Luxury accomodation for few, high-paying tourists outside Municipal area, on private land well-established, small scale water supply, staff live on site	Ongava Lodge Skeleton Coast Camp Etendeka Camp
HOTELS	Range of accomodation Economy - Luxury inside Municipal area, urban Municipal water supply connection, no staff live on site, Swakopmund	Swakopmund Municipal Bungalows

One of the main findings of the 1999 preliminary phase was that there is little or no correlation between monthly water use in tourist facilities and visitor numbers (Schachtschneider 2000). Visitors generally used between 4 % and 20 % of water supplied to the facility. Most water in tourist facilities is used by staff, lost through leaks or used on the garden. None of these are directly related to visitor numbers but depend on the level of control over water use exercised by management. While previous tourism water demand management studies in Southern Africa focused on decreasing the water consumption of visitors (Preston 1994), this project focuses on co-operation with facility management to jointly implement appropriate and holistic WDM approaches at each site.

By assisting management staff responsible for tourist facilities to take control of their water use, the water saving potential in all areas of water use can be realised and effectively implemented. Methods to do this include awareness programmes for visitors and staff, tight maintenance schedules, water pricing for visitors and staff members, landscaping of gardens and retrofitting water outlets with water efficient devices. The aim of involving management in the WDM approaches implementation process is to effectively decrease the water use at the study sites over the long term and instill a sense of responsibility.

To monitor water use at the study sites over time, regular water meter readings are essential. As part of the project a water audit, designed according to environmental audit principles, has been introduced as an efficient and precise tool for data gathering.

An environmental audit can be defined as a methodical process to determine if an organisation (or part thereof) is complying to regulatory environmental requirements, internal policies and standards. Strict guidelines to the format and content of environmental audits have been developed (Little, 1987). A water audit is more specific than an environmental audit and is defined as: ' *A water audit is the methodical review of a facility in terms of the water supply and consumption for the purpose of identifying losses and planning for increased efficiency*' (SADC Industrial Energy Management Project 2000, page 14).

These regular water audits keep the researchers and facility managers informed about the water use situation on site, highlights improvements, provides recommendations for future betterment and helps management to set targets to further increase water use efficiency.

This paper discusses the results to date. Problems with data gathering are highlighted and conclusions are made regarding future opportunities and constraints.

Methods:

Water use at each site is measured using water meters. All the water meters installed at the study and control sites are read on a daily or weekly basis by staff members on site. The readings, together with statistics on visitors are passed on to the researcher for evaluation. Regular water meter readings are essential to monitor the water use and to determine any decreases in water use over the study period. While the water meter readings give a good indication of the quantity of water used, it is difficult to interpret the fluctuations.

In an attempt to understand variations in water use, water audits are conducted at the study and control sites every second month. The water audit structure and approach is based on that of environmental audits. Water audits are performed over a 24 hour period and is divided into the following topics:

Water Audit information:

1. General facility background – *visitor and staff numbers on the audit day, size of the facility*
2. Internal controls – *management and staff hierarchy, level of control, existence and nature of Environmental Management Plans, maintenance plans*
3. Water origin – *where does the facility get the water from, water availability*
4. Water quality – *does water quality comply with drinking water standards*
5. Water supply and maintenance – *age, length of piping, water meter accuracy, water loss by leaks*
6. Water use – *water use of the facility over 24 hours, measuring and estimating water use in all areas and for all activities*
7. Conservation efforts – *awareness, economic and technological incentives existing to economise water use*
8. Wastewater disposal – *method and standards of wastewater disposal, reuse of wastewater*

The results are summarised and a report with the main findings and recommendations is prepared for the facility management at the end of each audit. It is left up to management to decide which recommendations to implement prior to the next audit. The audits act as a feedback mechanism to management showing how successful their efforts have been and what works.

The consecutive audit results are compared to each other and to the daily water meter reading data. The management's WDM approaches at each study site are compared to those used at the two control sites.

Results and Discussion:

The strategic approaches to reduce water demand are clear, but no single blueprint can apply to every region, industrial sector or facility. The challenge is to combine the available technologies, laws, educational material, economic and management policies that work best in each setting (Postel 1984).

The research period (May 2000 to March 2001) allows for a slow interactive process during which the facilites' management is able to review all the recommendations and implement and test those that are suitable. The recommendations in the audit reports are phrased in such a way that each facility should reach its optimal water use efficiency by March 2001. Since some recommendations appear too costly or time-consuming to management, they may be left out. This research approach aims to identify the WDM methods that managers of tourist facilities find most suitable. These will be promoted in the guidelines to the rest of the tourism industry prepared at the end of the project. It aims to ensure that the four study sites develop a sound water management system by the end of the project, are putting into practice WDM and can serve as examples to others.

Regular water meter readings are essential to determine short and long term variations in water use at all study and control sites. These results are compared to the number of visitors, temperature changes and recorded incidents of pressure problems or pipe bursts. The impacts of certain water saving steps implemented by management can be traced through regular water meter readings. The decrease in water use for the swimming pool at Ongava Lodge since the covering of the pool is shown in Figure 1.

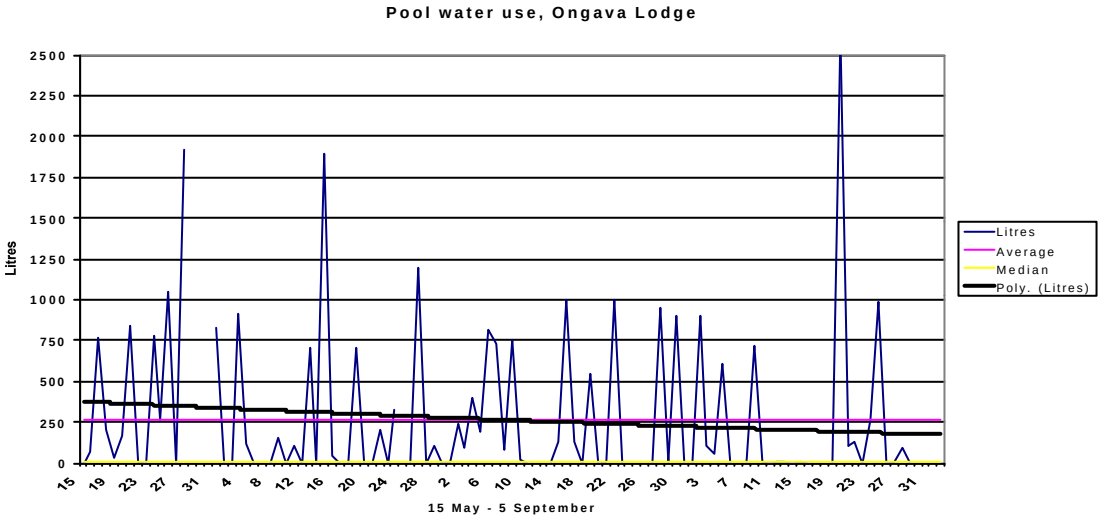

Figure 1: Ongava Lodge daily water meter readings of the water used for swimming pool and gardening shows a slight decrease with the covering of the pool

However, regular readings taken on-site are not sufficient to understand and explain all water use activities. As Figure 1 shows there is great variation in daily water consumption, depending on factors such as staff water use and undetected leaks.

In order to ground-truth the daily water meter readings, 24 hour water audits are done every second month. Regular interaction and feedback to management and staff ensures that they remain informed on the outcomes of their efforts and stay motivated. The audits can reveal changes in management approaches and attention to maintenance. They also indicate the proportional water consumption in different parts of the facility (see Figure 2).

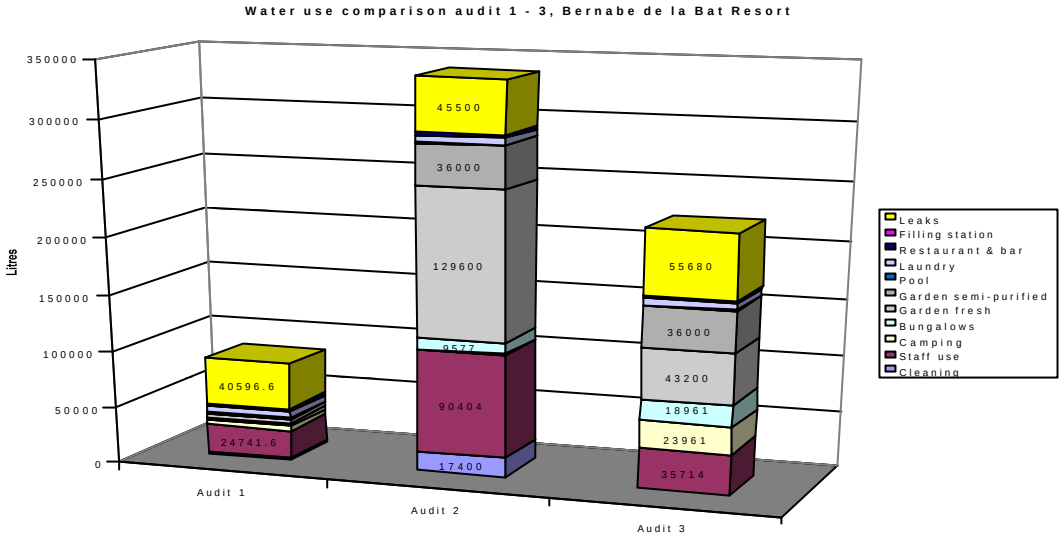

Figure 2: Comparison of three water audit results at Bernabe de la Bat Resort

Results to date show that water use during any 24 hour period is subject to too many variables to use audit data for comparisons either between audits or of water use in any one area. The only comparable constant is water loss from leaks. As shown in Figure 2 there has not been any decrease in leak losses at Bernabe de la Bat. This finding is supported by the water audit observation that there were no maintenance improvements either.

The number of variables influencing water use at a tourist facility make it difficult to determine the level of improvement in water use efficiency. Some variables have been identified and will be integrated in the final data analysis process in 2001. These variables include staff numbers, visitor numbers, recorded unusual events (pipe bursts, pressure problems, construction) and temperature. The most unpredictable variable to work with is visitor and staff water use. Water use behaviour depends on the awareness and attitudes of people regarding water issues and they are likely to respond differently to awareness materials made available to them. Water use where access to water is unrestricted differs from person to person and is neither controllable nor predictable. It is only controllable where water is scarce and therefore rationed. The low values for water use per bednight at Spitzkoppe and Etendeka Camp show this clearly (12.5 and 163 litres respectively).

Table 2: Differences in average water use per bednight sold (total use/ number of bednights)

SITES	Avg litres/bednight
Spitzkoppe Community Camp	12.5
Bernabe de la Bat Resort	2060
Ongava Lodge	1331
Skeleton Coast Camp	232
Etendeka Camp	163
Swakopmund Municipal Bungalows	571

Water use may even increase, despite active WDM practices. Environmental conditions, such as increasing temperatures, evaporation rates and decreasing water availability in the veld may be responsible for an increase in water consumption at the Ongava Lodge water hole, depicted in Figure 3.

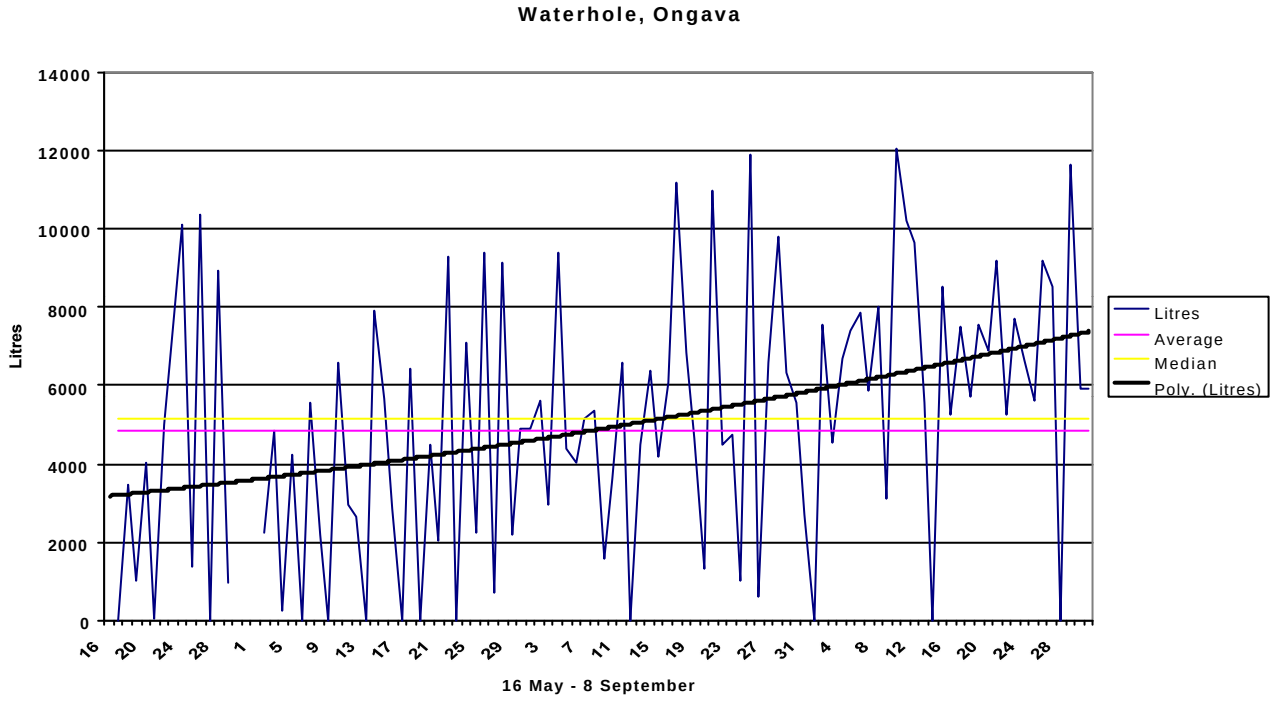

Figure 3: Increasing trend in water consumption at the Ongava Lodge waterhole over the dry winter and spring season, caused by increasing temperatures and resulting higher evaporation rates.

In order to obtain results with significant trends and to meaningfully compare them to all the variables, more data are needed. Data analyses will be performed after the completion of the fieldwork.

The two control sites differ markedly from the four study sites in their scale, level of luxury, water availability, management approach to water and actual water use. As pointed out in Table 1, it is difficult to directly compare the tourist facilities with each other. Therefore the water use at the control sites can only serve as a direct comparison to Ongava Lodge, which fits into the same tourist facility category. However, Ongava Lodge was not initially designed to be water efficient

and has a strong water supply, while the two control sites have been constructed in keeping with scarce water resources. Both control sites are ecotourist sites, that actively market their environmental ethics and advocate sustainable natural resource use in their Environmental Management Plans. They serve as examples for ideal water use and provide standards in the construction and running of ecotourist sites. Their management approach to water use can in future be compared and adapted to the four study sites. The results of this study at the pilot study sites are likely to become the standards for their own categories by the end of the project, providing guidelines to other interested tourist facilities in the future.

Conclusions:

The results reported here reflect the situation midway through the WDM Project of Namibian Tourist Facilities. The four study sites represent the four different categories of tourist facilities found in Namibia. The control sites reflect the ideal combination of sensitive eco-tourism oriented management and location in an area where water is obviously scarce. Under these circumstances tourists, staff and management are all most likely to want to conserve water. Water Demand Management is relatively easy to implement and in fact is taken into account in the planning and design phases of the tourist facility.

More challenging, is working with facilities where water appears to be abundant; maintenance is a low priority, infrastructure is old, the facility was designed with no regard for sustainable utilisation and staff and tourists alike regard water as free. Results to date show that most tourist facilities unfortunately fall into this category, and that merely targeting water use by tourists does not improve water use efficiency. A multi-targeted approach is needed, as is patience and perseverance. This study aims to work with the management staff at four different kinds of tourist facilities through regular feedback, provided by water meter readings and two-monthly 24-hour water audits, to gradually influence change through improved maintenance, better water saving practices, installation of water efficient technologies, xerophytic gardening, staff and tourist awareness so that by the time this project ends, each of the study sites can serve as a model of efficient water use. The lessons learnt can form the basis of guidelines for the rest of the tourism industry.

References:

Postel, S., 1984: Water: Rethinking Management in an age of scarcity, *Worldwatch Paper 62*.

Preston, G. R., 1994: The effects of a user-pays approach and resource saving measures on water and electricity use by visitors to the Kruger National Park, *South African Journal of Science*, Vol. 90, pages 558 - 561.

SADC Industrial Energy Project, 2000: *Water Efficiency Guidebook*, workshop manual of Water Efficiency Workshop, 13 April 2000, Windhoek.

Schachtschneider K., 2000: *Preliminary Survey Report of the Water Demand Management Study of Namibian Tourist Facilities*, draft report, Ministry of Agriculture, Water and Rural Development.

Van der Merwe B. (ed.), 1999: *IUCN Water Demand Management Country Study – Namibia*. Directorate Resource Management DWA, MAWRD and City Engineer (Water Services) City of Windhoek.