



The Gateway to Endless Opportunities

Water Management Plan



DEPARTMENT OF INFRASTRUCTURE,
WATER AND
TECHNICAL SERVICES

Version 3/2019



INTRODUCTION

Namibia is a semi-arid country, with the lowest average rainfall in the Southern Africa region. Droughts are frequent occurrences, which require appropriate water management to assist in the successful bridging thereof, while making every effort to sustain development, social and economic goals throughout periods of water supply challenges.



As a drought is a naturally occurring phenomenon each drought can be different. It is therefore not considered practical to develop a set of hard-and-fast rules to apply to all droughts. Furthermore, water demand management cannot be applied only during times of droughts as the required response heavily relies on public support which takes time to acquire. As a result, these guidelines are intended to provide a framework for continuous water management and a timely drought response while maintaining flexibility to respond to unique water supply challenges. These guidelines are intended to assist the Windhoek City Council (the Council), through the Department of Infrastructure, Water and Technical Services, in making decisions water demand management linked to the prevailing supply conditions. The Council may adjust or refine the response based on actual conditions at the time.

This Water Management Plan aims to outline guidelines the City of Windhoek will use to manage water supply and water use during varying supply situations. The guidelines are designed to maintain the health, safety and economic vitality of the community; to avoid adverse impacts to public activity and quality of life for the community; and to consider individual customer needs as much as possible.

Windhoek as the capital city and seat of government also comprises the largest urban and industrial development in the country. The bulk potable water supply scheme serving the city is owned and operated by NamWater as the national bulk supplier of water in the country. The so-called “three dam system” transferring water to the Von Bach Water Treatment Plant (VBWTP), located near the town of Okahandja, comprises the bulk of the NamWater supply scheme for the Central Areas of Namibia, including Windhoek. Other supply sources include the Windhoek reclamation scheme and groundwater in the Windhoek and northern aquifers.

Given the supply system to Windhoek described above, and the varying supply conditions from the aforementioned system which is mainly caused by a deficit in precipitation and subsequent runoff to the three main surface dams, continuous water management is crucial to achieve the set objective earlier referred. Unfortunately, no one can predict future precipitation, how long drought conditions will continue once they begin or how frequently they will occur which all the more raises the importance of early action in line with a defined strategy. This Water Management Plan consists of the following components:

- **Supply Situation Indicators** – Varying supply scenarios as announced by the NamWater as the bulk supplier.
- **WDM Response Actions** – Guidelines for managing water demand according to varying supply situations.
- **WDM Program Elements** – Guidelines for water uses according to the varying supply situations.



Contents

INTRODUCTION 1

SUPPLY SITUATION INDICATORS (SSI)..... 3

WDM RESPONSE INDEX (WDMRI) 5

DROUGHT IMPACT FACTORS AND CONSIDERATIONS 7

WDM RESPONSE ACTIONS..... 10

WDM RESPONSE INDEX (WDMRI) – DESCRIPTIONS 16

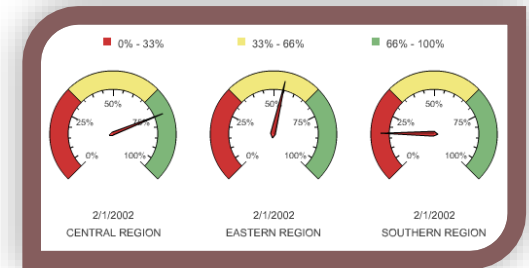
WDM PROGRAM 23





SUPPLY SITUATION INDICATORS (SSI)

Given the heavy reliance of the water supply to the Central Areas on the three dams, dam contents are a major factor impacting on supply. Dam levels at the end of a rainy season are the bottom line result of various factors affecting supply, including weather, precipitation, runoff, evaporation, collection system limitations and water use. Despite the weighting of the dams in the overall supply an integrated approach is followed in the determination of the prevailing supply situation at the end of each rainy season. This is done by NamWater using the CA computer model to develop the most likely supply scenario for the following two years in the Central Areas of Namibia (CAN) supply scheme, given the available supplies and the various built in statistical model parameters.



Although Supply Situation Indicators can generally be based on a number of occurrences, for the purposes and intent of this document it will be based on the results obtained from the CA model. The aforementioned provides an indication of the period for which water is available to sustain the present demand given available resources at varying rates of utilisation. The principle objective of the forecast modelling is to bridge two rainy seasons considering a worst case scenario without any inflow into the main dams.

With the aim to link the supply scenario as prepared and announced by NamWater to the WDM actions applied by the CoW for the ensuing period and hence provide the consumer with a complete understanding of the need for WDM a number of likely scenarios or outcomes were defined as captured in the table below.



Category	Classification	Description
A+		Demand can be met with available supply from dams and recycled water only for two rainy seasons as from May
A	Normal	Demand can be met with available supply from dams, recycled and groundwater sources utilised at a sustainable level for two rainy seasons as from May
B	Water Alert	Demand can be met with available supply from dams, recycled and groundwater sources utilised at a non - sustainable level for two rainy seasons as from May
C	Scarcity	Demand can be met with available supply from dams, recycled and full emergency groundwater sources utilised at a non -sustainable level for two rainy seasons as from May
D	Severe Scarcity	Demand can be met with available supply from dams, recycled and full emergency groundwater sources utilised at a non -sustainable level for one rainy season as from May
E	Water Crisis	Demand can be met with available supply from dams, recycled and full emergency groundwater sources utilised at a non -sustainable level for less than one rainy season as from May

Table 1: Supply Situation Indicators (SSI) - Categorisation of likely water supply scenarios as predicted by NamWater’s CA-Model



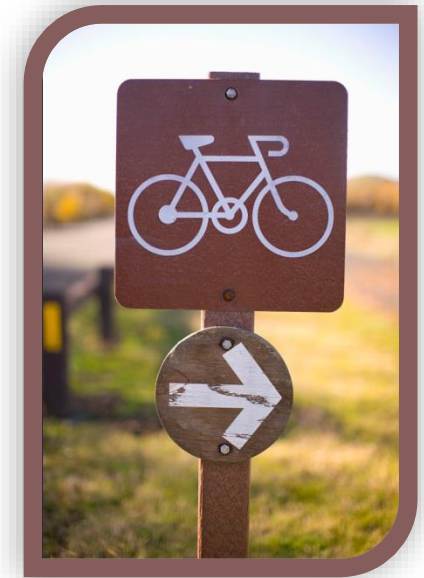


WDM RESPONSE INDEX (WDMRI)

Accordingly, these supply scenarios are categorised into six (6) categories to match a five (5) stage Water Demand Management categorisation as depicted below. The best supply scenario was labelled A+ as this represents a mostly theoretical supply situation with all three the supply dams at or near full capacity at the end of a given rainy season. Gradually increasing demand, in particular in Windhoek, will eventually see this possibility disappear. The second category was therefore labelled **A – Normal** progressing up to category **E – Water Crisis** which was colour coded (green to purple) to match the water demand categories in **Table 2** below.

Annually, the City of Windhoek (COW), Department of Infrastructure, Water and Technical Services will consider Supply Situation Indicators as provided by NamWater in announcing the appropriate demand management category in line with the WDM Response Index (**Table 2** below). The **Water Demand Management Program** section indicates how the WDM Response Index aligns with the suggested WDM response framework.

NOTE: The feedback at the annual NamWater CAN Workshop in May will be utilized by the City of Windhoek to announce the Water Demand Management category (DMI) at the end May for the following year.





Normal	Supply Alert	Scarcity	Severe Scarcity	Water Crisis	
	> 5%	> 10%	> 15%	> 20%	
Use water wisely	Reduce consumption	Mandatory water savings	Increased mandatory water savings	Possible water rationing	Category
Public Engagement	Public Engagement	Enforced Restrictions	Enforced Restrictions	Enforced Restrictions	A/A+
					B
					C
					D
					E

Table 2: WDM Response Index (WDMRI) - The City of Windhoek demand management categories





DROUGHT IMPACT FACTORS AND CONSIDERATIONS

1. Political, Social and Economic Indicators

Consumer response to calls for saving water may be influenced by public perceptions about the water supply situation, the WDM response activities of other water consumers in the Central Area, as well as news media and political responses. Although political, social and economic indicators may not always be quantitative; they can be monitored to some extent and described for consideration in the Council's decisions about the appropriate WDM response.

2. CAN Workshop

Stakeholders forming part of the Central Areas Water Supply Scheme meet annually during May, after the rainy season. They weigh (analysis and forecast using the CA computer model) the available water resources in relation to the water demand of the Central Area to determine the availability of water for the coming 24 months (two rainy seasons). Based on the outcome of such analysis a prediction including utilisation framework is agreed upon and established in the WDMRI.

3. Media Response

Much of the information customers receive about a particular supply challenge comes from traditional and social media outlets. Members of the news media can be very helpful in conveying factual information to customers, and they also play a key role in shaping public perception of the prevailing supply situation.





4. Political Response

Political response to any supply challenge can take many forms and can depend on the constituents affected. For example, the Ministry of Agriculture, Water and Forestry, Board of NamWater or the Windhoek City Council could guide the political decision regarding due process and WDM support programs.

5. Economic Impacts

One of the key principles guiding the City of Windhoek's WDM response is to maintain economic vitality of the community to the best extent possible. Water restrictions imposed in response to a supply situation can potentially affect businesses in different ways. As part of its public outreach efforts, the City of Windhoek will continue to carefully coordinate restriction programs with water-based industries so that customer needs are accommodated as far as reasonable possible. The primary program is to apply consumption control by introducing appropriate tariff programs. Water rationing is considered as last resort, since such rationing will impact on the integrity of infrastructure and have a negative impact on essential services.

6. Environmental Effects

Reduced stream flows and more particular lower dam levels caused by a drought can affect the environment, recreation and the natural ground water recharge. The City of Windhoek monitor dam levels, wastewater quality and ground water levels so that environmental effects are taken into account in WDM response decisions.

7. Uncertainty Associated with Forecasts

The City of Windhoek's WDM Response relies to some extent on national and international weather forecasts where scientists are limited in terms of their source and the availability of information. Weather forecast therefore has its limitations and is a science of probabilities. Forecasting a drought and



knowing with certainty if one exists can be difficult. When a dry year occurs, for example, it is unknown whether it is the first year of a three-, five- or 10-year drought, or if it is merely a dry year somewhere in a series of average-to-wet years. Even though droughts cannot always be predicted, the City of Windhoek will continue to advise customers of the latest water supply information so they can consider it in their own planning.





WDM RESPONSE ACTIONS

The City of Windhoek Water Management Plan consists primarily of two components; the *indicators/index* which helps the Council decide on an appropriate WDM classification and response, and the corresponding *actions* recommended for that response. This plan delineates five stages or categories. Each stage is based on water supply indicators, as discussed earlier.

For each stage, progressively more stringent responses are recommended. Some WDM response measures, particularly those designated for mild episodes of supply challenges, require minimal customer / consumer effort. However, measures can become mandatory, more costly and sometimes intrusive as a the supply situation worsens.

In short, the basic recommended responses are as follows:

- During a **Normal** situation consumer awareness is maintained and realistic demand monitored;
- A **Supply Alert** requires increased communication on supply conditions;
- A **Scarcity** classification implements mandatory restrictions;
- A **Severe Scarcity** classification intensifies mandatory restrictions, and
- A **Water Crisis** classification could result in the rationing of water supplies for essential uses only.

To activate a particular WDM stage, the City of Windhoek will declare a WDM category following the announcement of the applicable supply scenario by NamWater and adopt an effective date for imposing applicable restrictions. Because the severity of a supply scarcity (relating to the above description) could involve mandatory restrictions, they are incorporated into the COW water tariffs and operating rules and become enforceable pursuant to the COW Municipal Regulations and provisions in the COW's water service agreements.

At the onset of Severe Scarcity, it is recommended that a "Coordinating Committee" will be formed. This committee should monitor supply conditions and evaluate the effectiveness of the WDM response. Recommendations for adjusting the response will be communicated. As conditions can vary throughout a response period, the Committee will refine WDM response actions based on actual conditions and levels achieved.





1. Increasing Water Supply

In addition to managing water use during a drought, City of Windhoek will increase its supplies by increasing production from the aquifer and by optimising the Goreangab Reclamation water supply. In addition, NamWater will engage the pumping of ground water sources, considered as Scarcity Supply sources. Each augmentation option could present unique challenges in relation to the prevailing supply conditions.

2. Reducing Water Demand

The City of Windhoek's primary response to supply shortages is to reduce water demand so that supplies will be available for the most essential uses for the duration of the supply scenario through Water Demand Management. A variety of actions, rather than one single approach, is generally more effective at creating an overall atmosphere that promotes water use reductions. The actions discussed in the sections that follow include: ***water use education and enforcement, monitoring and evaluation, water scarcity tariffs, restrictions.***

Generally speaking, restricting the number of days and times allowed for watering landscapes can be an effective method for reducing water use. Other methods, such as drought water tariffs and public information efforts, complement those watering restrictions. Other restrictions may not substantially reduce water use but may eliminate indiscretionary uses of water or heighten public awareness of a certain supply situation.

3. Water Scarcity Tariffs

Pursuant to demand management and to encourage water savings standard step tariffs are adjusted and pricing increased according to the applicable supply scenario. Water scarcity tariffs are designed to increase awareness of the supply situation with the intent of defining a targeted contribution to save water through pricing incentives.

Water scarcity tariffs are different from the regular tariff structures for water services in that it is temporary in nature. The WDM category announced will define the criteria for implementing and removing water scarcity tariffs once the status of the situation has changed.

City of Windhoek will consider several guiding principles in developing water scarcity tariffs:

- There is a relationship between price and demand. However, the cost of water for the basic water demands should remain reasonable.
- Water scarcity tariffs should not be used alone, but should be incorporated into an overall program to increase customer awareness of the supply situation and the importance of saving water.
- Public communication is the most important element of WDM awareness and water saving efforts.
- Water scarcity tariffs generally apply to domestic consumers. However during a severe water scarcity or a water crisis all other consumers have to be controlled as well.



- Water scarcity tariffs should match the severity of the situation and associated response philosophy.
- Water scarcity tariffs must be reasonable in so far as that consumers who save water are not affected.
- Water scarcity tariffs should motivate investment in water saving technology.
- Public information is important in helping customers understand water scarcity tariffs.

4. Water Use Education and Enforcement

City of Windhoek has a water use education and enforcement program to educate customers about efficient water use, to enforce water waste rules and water restrictions, and to save water. During a supply shortage, inspectors and law enforcement officers will patrol the Windhoek service area looking out for customers who are not complying with drought response calls. The goal of the program is to educate and inform customers, not to merely penalize violators.

The Ministry of Education, Arts and Culture, in particular schools, are considered an imported public communication channel for awareness rising and to implement a sustainable drought awareness and water saving program. Their active support and participation is crucial in the quest for public cooperation.

During supply shortages, a community awareness program is engaged to address the community at various platforms including communal gathering places such as shopping centres and markets. Information regarding water saving methods and the severity of the supply shortage is shared.

Dedicated City of Windhoek personnel will distribute educational materials, help customers reduce their water use and answer questions about the supply situation. Customers are also able to report water waste through a City of Windhoek hotline, Web page and social media outlets connected to the organisation. Violators are to receive written warnings and may be fined for repeat transgressions. Flow restrictors may be installed at properties with repeat violations or supply temporary suspended pending corrective action. The resident (owner or occupant of the property) is responsible for complying with WDM restrictions and emergency terms.

For practical reasons, WDM awareness is seen as a public responsibility and public programs are strongly motivated. Pursuant to this all private and public cooperation programs are fully supported and are considered essential for public cooperation.

5. Restrictions

Once Council has declared a WDM category, the City of Windhoek will activate the corresponding set of recommended responses. The City of Windhoek's goal for WDM response is to maintain the health, safety and economic vitality of the community to the extent possible in the face of



the prevailing water shortage. The City of Windhoek follows the basic principles indicated below in so far as is possible when restricting water use during a drought:

"Clear communication is essential. Communicate the supply situation and only the relevant restriction program."

Avoid irretrievable loss of natural resources.

- Allow for watering of trees if possible.
- Avoid damaging perennial landscaping if possible.
- Motivate the introduction of hardy and indigenous plants to reduce water demand for gardens and parks.
- Restrict the time of watering, to minimise evaporation losses.

Restrict less essential uses before essential uses.

- Curtail outdoor water use (except for trees and shrubs) before restricting domestic indoor use.
- Eliminate water waste.
- Restrict car wash operations, to allow only such operations that comply with the environmental, sewer and water saving regulations.
- Stop the watering of public lawns with potable water.

Affect individuals or small groups before affecting large groups or the public as a whole, allowing as much public activity as possible to be unaffected.

- Have a dedicated water quota program for public spaces watered by semi-purified water to allow those customers to prioritize water use for heavily-used landscapes.
- All private pools shall be closed with a pool cover, if not in use.
- Preserve public pools before residential private pools. To shorten the open period of the pool, to raise public awareness and save water.

Minimize adverse financial effects.

- Be respectful of water-based businesses that will be financially affected by restrictions.
- Engage in ongoing dialogue with the landscaping industry to obtain input and to allow these businesses to plan for future dry months.
- Consider long term planning to implement and manage suitable landscapes and gardens which address low water demand.





Implement extensive public information and media relations programs.

- Inform customers about conditions and actions they can take to reduce water use.
- Have open, clear and consistent messaging and communication.
- Maintain the trust of customers and stakeholders.
- Communicate the WDM Response Index applicable and define the relevant requirements.

Integrated development planning

- Inform building industry customers about supply conditions and actions to reduce water use.
- Restrict water intensive building programs
- Plan water efficient developments by integrating water efficient technology and related programs.
- Consider decentralisation for economic benefits and stability.

6. Monitoring and Evaluation

When a supply shortage emerge, City of Windhoek staff will intensify its monitoring and evaluation activities. The monitoring and evaluation program will track information such as precipitation, reservoir levels and weather forecasts. In addition, water usage and its corresponding revenue will be compared to normal use and supply situation expected use. If water-reduction goals are not being met, the Committee may increase public outreach and/or the level of WDM response.

7. Recycled Water

The City of Windhoek has fully adopted the principle of total re-use of water which has been implemented to a large extent.

Currently three reclamation plants are being operated by the City of Windhoek for the purpose of providing:

- i. Treated water for irrigation and non-potable use;
- ii. Treated water for potable use;
- iii. Treated water for commercial irrigation projects





Semi-purified irrigation water has a lower quality than potable water. In periods of water shortage, re-usable water may be more or less abundant than other water supplies. In recognition of these potential differing circumstances, the Committee may adopt specific supply restrictions for semi-purified water customers depending on conditions.

The recycling of water for industrial purposes is supported by the City of Windhoek. In some consumer applications, the recycling of water is acceptable and may reduce water consumption.

8. Use of Water Not Provided by the City of Windhoek

Some customers in the City of Windhoek service area have access to water sources that are not owned, controlled, or provided by City of Windhoek. Though the use of such water is not under the direct control of the City of Windhoek, those customers will be subject to restrictions in the operating rules related to avoidance of contamination of the potable water system and prevention of water waste. In addition, the City of Windhoek reserves the right to restrict the use of such water sources, if such sources are over consumed to the negative effect of fellow users or as otherwise determined.



WDM RESPONSE INDEX (WDMRI) – DESCRIPTIONS

Supply Alert:

Conditions requiring public awareness to avoid water wastage and achieve minimal targeted savings

Description:

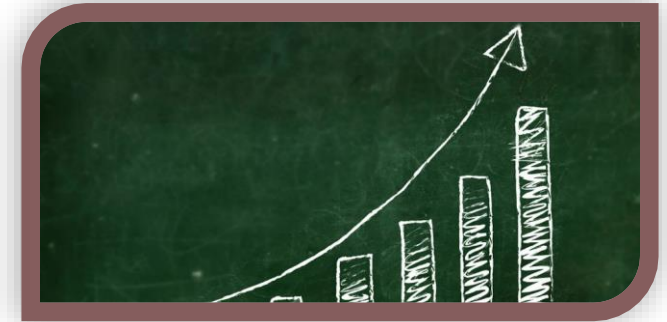
A Supply Alert will increase communication to customers to alert them that water supplies are below ideal, conditions are dry and continued dry weather could lead to mandatory watering restrictions. A minimal saving to stretch supplies is likely to be announced.

Indicators:

- Projected usable water supplies correspond to **Category B** (See **Table 1**).
- Watershed characteristics such as precipitation, wind and soil moisture indicate abnormal and possible prolonged dryness.
- Service-area precipitation indicates abnormal and possible prolonged dryness.
- News media are sending messages that imply drought may be pending.
- Customers believe a Water Scarcity and its corresponding actions are appropriate.
- Elected officials are suggesting the City of Windhoek adopt a Water Scarcity or similar response.

Responses:

- Increase communication and outreach to customers and stakeholders to explain we may be beginning to see indicators of drier period.
- Encourage customers to continue to use water efficiently and provide suggestions for reducing water use in order to reduce the risk of progression to mandatory restrictions.
- Warn of and prepare for the possibility of mandatory watering restrictions.
- Enhance the water use education and enforcement program.
- Targeted savings is monitored with continuous feedback.





Scarcity:

Water supplies showing strain due to abnormal weather conditions or otherwise

Description:

A water Scarcity imposes mandatory watering restrictions and requires more effort on the part of customers. Corresponding watering restrictions will appear in the City of Windhoek operating rules.

Indicators:

- Projected usable water supplies correspond to **Category C** (See Table 1).
- Watershed characteristics such as precipitation, wind and soil moisture indicate definite current and possible prolonged dryness.
- Customers believe that mandatory watering restrictions are appropriate, to save water.
- Government and Regional water officials are engaged in drought response activities.
- Circumstances warrant possible adverse impacts on water-dependent businesses involved in outdoor water use.
- Targeted savings is monitored with continuous feedback.

Responses:

1. Use Reduction Target

A reduction of greater than 10% based on the ideal/realistic demand. This target is generally suggested to be met with approximately a 10 percent decrease in indoor use and a 25 percent decrease in outdoor use.

2. Restrictions

Below is the required garden watering schedule for this WDM response.

- Single-family residential properties with odd-numbered addresses: Saturday, Wednesday
- Single-family residential properties with even-numbered addresses: Sunday, Thursday
- All others (multi-family, High density, commercial, industrial, government): Tuesday, Friday



Consciousness of indoor water use

3. Water Pricing

A WDM pricing program may be instituted to increase awareness of the drought's severity, assist in meeting water-use reduction targets through pricing signals and/or maintain the financial health of the Council as service provider.

4. Strategic Water Reserve(s)

The Committee may make water from the borehole water reserve available for use during a water Scarcity. Such action could reduce the severity of restrictions, to delay or eliminate a Severe Scarcity response.

5. Fixed-Amount Water Contracts:

Water deliveries to customers who receive semi-purified or potable water under contracts may be restricted as follows:

- For agreements with provisions allowing the City of Windhoek to reduce supply under water scarce conditions, supply will be reduced by proclaimed percent from normal use to save water.
- For agreements without these provisions, the Committee may adopt drought pricing or other methods to reduce water consumption as necessary to provide an adequate water supply to the people of Windhoek.





Severe Scarcity:

Water supplies severely strained

Description:

A Severe water Scarcity imposes compulsory water savings on City of Windhoek's customers. Severe Scarcity restrictions are severe and will likely result in damage to or loss of landscapes.

Indicators:

- Projected usable water supplies correspond to **Category D** (See Table 1).
- Watershed characteristics such as precipitation, wind and soil moisture indicate extreme dryness.
- The CAN Workshop has enacted or are advocating severe restrictions on outdoor water use.
- Customers believe that severe water-use restrictions are appropriate.
- Government/Regional water officials are taking drought emergency preparatory actions.
- Bans on most lawn watering justify prohibitions on some water-dependent businesses.
- No tolerance to leaks and open water features as well as extensive watering of lawns, common believes that no unnecessary consumption can be tolerated.
- Targeted savings is monitored with continuous feedback.

Responses:

1. Use Reduction Target

A targeted reduction of 15% or more based on a predetermined quantity. This target is generally suggested to be met with approximately a 15 (proclaimed) percent decrease in indoor use and a 50-75 percent decrease in outdoor use.

2. Water Pricing



The water pricing program is likely to be intensified to increase awareness of the severity of supply conditions, assist in meeting water-use reduction targets through pricing signals and/or maintain the financial health of the Council as service provider.

3. Strategic Water Reserve

The Committee may (high probability) make water from the underground reserves available for use during a Severe Scarcity. Such action could reduce the severity of restrictions, or it could be used to delay or eliminate a Water Crisis response.

4. Fixed-Quota Water Contracts

Water deliveries to customers who receive semi-purified water or potable water under contracts will be restricted as follows:

- For non-domestic consumers with provisions allowing reduced supply under conditions of supply shortages, the amount supplied shall be reduced by the water saving percent from normal use.
- For domestic consumers the water tariff structure will be further adjusted for a lower consumption quantity.
- For agreements without these provisions, the Committee may adopt drought pricing or other methods to reduce water consumption as necessary to provide an adequate water supply to the people of Windhoek.





Water Crisis:

Insufficient Water Supply

Description:

A Water Crisis will be associated with severe water restrictions and may activate a rationing program for the City of Windhoek's consumers. *Conditions that would lead to a Water Crisis are highly unlikely, but possible.* However, if conditions warrant, the City of Windhoek may implement a rationing program for an indefinite period of time to ensure, to the extent possible, that there is adequate water for essential uses. No outdoor watering will be allowed and indoor water use will be restricted. Water Crisis restrictions will affect the quality of life in the City of Windhoek's service area, including the long-term damage or loss of landscapes.

Indicators:

- Projected usable water supplies correspond to **Category E** (See Table 1).
- Watershed characteristics such as precipitation, wind and soil moisture indicate exceptional and prolonged dryness.
- News media are sending message that we are in a water crisis situation.
- Customers believe we are in a water crisis situation.
- Elected officials are saying that water rationing is appropriate.
- The State declares a drought emergency.
- The situation suggests that severe impacts to water-dependent businesses are unavoidable.
- No tolerance to leaks and no filling of water features and pools as well as no potable water use for landscaping, common believe that no unnecessary consumption can be tolerated.

Response:

1. Use Reduction Target

A reduction of 20% or more based on a predetermined quantity.

2. Water Pricing

A water scarce water pricing program is maintained and likely to become more severe.





3. Strategic Water Reserve

Because of the severity of the situation, the Committee will likely make any remaining water reserves available for essential uses during a Water Crisis.

Challenges:

- To maintain an operational state of water availability, to guaranty a minimum water supply.
- To ensure a fair distribution of water to maintain sustainability and operations during water crisis conditions.
- To obtain public support and understanding at all levels for the implementation of this Water Management Program.
- Not to run out of water. In such a case, water supply can no longer be maintained.
- To motivate immediate, albeit short term decentralization to reduce water demand.
- Motivate a change in perspective, to consider alternative production, cleaning or operations which do not require water.

Decentralisation of operations:

- Government institutions could decentralize their operations by moving workers and offices out of the water crisis area.
- Businesses could divert operations and office out of the water crisis area.
- To close selected water intensive operations and businesses.
- To minimize and stop operation of water infrastructure where significant water losses occur.

Halting non-essential construction:

- Government to consider delaying construction until water becomes available.
- A business to consider the delay of construction until water is available.
- Private developments and renovations to be put on hold, to save the water during the water crisis.





WDM PROGRAM

The program table below is meant to be a guide to water users under various levels of supply scarcity related to the WDM Response Index (WDMRI).



	Normal Category A	Supply Alert Category B	Scarcity Category C	Severe Scarcity Category D	Water crisis Category E	
1	Outdoor watering and Irrigation					
a	Turf grass	Maximum of three days/week of customer's choice.	Maximum of three days/week of customer's choice.	Two days/week per mandatory schedule based on customer address.	Public: Only semi-purified Private: once weekly only	No watering allowed. Restricted semi-purified
b	New seed and sod (lawn establishment)	Allowed. Written approval for establishment of more than 20m ² .	Allowed. Written approval for establishment of more than 20m ² .	Allowed, but not recommended. Written approval for establishment of more than 20m ² .	Not allowed	Not allowed
c	Co-Watering	Allowed	Allowed	Not allowed, Only semi-purified watering	Not allowed, Only semi-purified watering	Not allowed, restricted semi-purified watering
d	Trees, shrubs and perennials	May be watered by hand-held hose or low-volume non-spray on any day, not between 9 a.m. and 6 p.m. Summer, 10 a.m. and 4 p.m. Winter	May be watered by hand-held hose or low-volume non-spray on any day, not between 9 a.m. and 6 p.m. Summer, 10 a.m. and 4 p.m. Winter	May be watered by hand-held hose or low-volume non-spray on assigned days only, not between 9 a.m. and 6 p.m. Summer, 10 a.m. and 4 p.m. Winter	Existing trees and shrubs may be watered by means of a hand-held hose or low-volume non-spray irrigation no more than once per week on scheduled day.	Not allowed.
e	Flowers, vegetables, and community gardens	May be watered by automatic system and by hand-held hose or low-volume spray on any day, not between 9 a.m. and 6 p.m. Summer, 10 a.m. and 4 p.m. Winter	May be watered by automatic system and by hand-held hose or low-volume spray on any day, not between 9 a.m. and 6 p.m. Summer, 10 a.m. and 4 p.m. Winter	May be watered by means of a hand-held hose or low-volume non-spray irrigation only on the assigned watering days, , not between 9 a.m. and 6 p.m. Summer, 10 a.m. and 4 p.m. Winter.	Existing plants may be watered only twice a week on assigned days by means of a hand-held hose or low-volume non-spray irrigation. , not between 9 a.m. and 6 p.m. Summer, 10 a.m. and 4 p.m. Winter	No watering allowed.



		Normal Category A	Supply Alert Category B	Scarcity Category C	Severe Scarcity Category D	Water crisis Category E
f	Athletic, sport and playing fields (incl. golf courses)	No waste of water.	No waste of water.	Irrigation limited to every second day only unless non-potable water is used.	No watering with potable allowed. Only Semi-Purified water	No watering with potable allowed. Restricted Semi-Purified
g	Irrigation taps not covered by other rules	No waste of water.	No waste of water.	Same as Trees, shrubs and perennials.	Same as Trees, shrubs and perennials.	Same as Trees, shrubs and perennials
2	Washing Events					
a	Cars – washing at home	With bucket or hand-held hose with shut-off nozzle.	With bucket or hand-held hose with shut-off nozzle.	With bucket or pressure Sprayer. NO hand-held hoses.	Not allowed. Must use certified commercial car washes.	Not allowed.
b	Cars – commercial car washes	Only certified commercial car washes	Only certified commercial car washes	Only certified commercial car washes	Only certified commercial car washes	Only certified commercial car washes. Car wash operations may be halted by the Committee
c	Fleet vehicle washing	Must use a certified car wash and use approved equipment	Must use a certified car wash and use approved equipment	As before, but maximum once per week.	Once per month only for health and safety at certified car washes only.	Not allowed.
d	Charity events (car wash)	On case-by-case basis.	On case-by-case basis.	Approval needed.	Not allowed.	Not allowed.
e	Street cleaning equipment	Obtain water from semi-purified source only.	Obtain water from semi-purified source only.	Obtain water from semi-purified source only.	Obtain water from semi-purified source only.	Extreme health and safety reasons only;
f	Washing impermeable surfaces	Use dry clean-up methods prior to washing. No waste of water.	Use dry clean-up methods prior to washing. No waste of water.	Use dry clean-up methods only. Washing for health and safety reasons only.	Use dry clean-up methods only. Washing for health and safety reasons only.	Use dry clean-up methods only. Washing for health and safety issues only.
3	Water Features					
a	Unlined ponds	Not allowed.	Not allowed.	Not allowed.	Not allowed.	Not allowed.
b	Swimming pools	Cover pool	Cover pool	Cover pool	Cover pool, Single-family residential pools shall not be filled or refilled from public supply.	Cover pool, No filling of private pools from public supply.
c	Public pools	Water saving	Water saving	Water saving	Reduced opening period	Reduced opening period. Possible closure of pools
d	Other water features (fountains, waterfalls etc.)	No construction of new water features not incorporating water saving measures	No construction of new water features not incorporating water saving measures	Customers are highly encouraged not to operate any existing outdoor fountain or waterfall that sprays water into the air.	Customers are prohibited from operating any existing outdoor fountain or waterfall that sprays water into the air. No new features allowed.	No filling or operation of water features. No new water features allowed.
e	Misting devices	N/A	N/A	Restricted to commercial application.	Not allowed.	Not allowed.





	Normal Category A	Supply Alert Category B	Scarcity Category C	Severe Scarcity Category D	Water crisis Category E
4	Commercial/Industrial Processes				
a Lodging (Hotel/B&B/Guesthouse/other)	Advertise and encourage water savings programmes	Advertise and encourage water savings programmes	Laundry restrictions. Advertise and encourage water savings programmes	Laundry restrictions. Enforce water savings programmes	Laundry restrictions. Enforce water savings programmes
b Barber and hairdresser	N/A	N/A	Water saving	Water saving	Water restrictions
c Construction water	Best management practices; no water waste. Utilise semi-purified water for earth works.	Best management practices; no water waste. Utilise semi-purified water for earth works.	Best management practices; no water waste; Utilise semi-purified water for earth works, building/construction Building permit rescinded for violations.	Best management practices; no water waste; Utilise semi-purified water for earth works, building/construction Building permit rescinded for violations.	On case by case basis; best management practices, no water waste; Only semi-purified water for earth work, permit rescinded for violations. Construction projects postponed/halted.
d Commercial water reuse	Recommended water re-use where possible	Recommended water re-use where possible	Water re-use where possible encouraged	Re-use of water encouraged	Re-use of water/Restrictions or reduced production
e Hydrant permits	For fire emergency only	For fire emergency only	For fire emergency only	For fire emergency only	For fire emergency only
5	Tariff Program				
a Residential block tariff	Four level block tariff, level 3 at >30 kl/m level 4 at >50 kl/m	Four level block tariff, level 3 at >30 kl/m level 4 at >45 kl/m	Four level block tariff, level 3 at >25 kl/m level 4 at >40 kl/m	Four level block tariff, level 3 at >25 kl/m level 4 at >30 kl/m	Four level block tariff, level 3 at >20 kl/m level 4 at >30 kl/m. Disconnection at 40 kl/m
b Water Leak Rebate	Two month leak rebate	Monthly meter logging required Two months leak rebate	Weekly meter logging required One month leak rebate	Daily meter logging required No leak rebate	Daily meter logging required No leak rebate
c No tolerance for water leaks	Monthly water leak management	Monthly water leak management	Weekly leak management Isolate for all leaks	Weekly leak management Isolate for all leaks	Daily leak management Isolate for all leaks
d Commercial block tariff	N/A	N/A	Two level block tariff. Normal average annual consumption - % saving required. Apply fourth level residential tariff for exceeding limit	Two level block tariff. Normal average annual consumption - % saving required. Apply fourth level residential tariff for exceeding limit	Two level block tariff. Normal average annual consumption - % saving required. Apply fourth level residential tariff for exceeding supply limit.
e Close main supply during prolonged times of no use	N/A	N/A	Consider	Apply and reduce flow during operations	Apply and reduce flow during operations





	Normal Category A	Supply Alert Category B	Scarcity Category C	Severe Scarcity Category D	Water crisis Category E	
6	Community Awareness Program					
a	Publications and pamphlets	Basic awareness campaign	Basic awareness campaign	Dedicated awareness campaign related to % water savings	Intensive Awareness campaign, % water savings and consumption barometer	Intensive Awareness campaign, % water savings and consumption barometer
b	Water saving law enforcement.	Warnings & Fines	Warnings & Fines	Warnings & Fines	Fines & disconnection	Fines & disconnection
c	Education program	Ministry of Education, Arts & Culture	Ministry of Education, Arts & Culture	Dedicated programme targeting schools and public institutions and public campaign	Dedicated programme targeting schools and public institutions and public campaign	Dedicated programme targeting schools and public institutions and public campaign
d	Public Sector water awareness program and communication	Basic Awareness	Implement intensified awareness. Monitor savings target. Top 50 Consumer programme.	Full drought awareness program, % water savings. Monitor savings target. Top 50 Consumer programme.	Intensive Awareness campaign, % water savings and consumption barometer. Top 100 consumers identified and consulted on a monthly basis	Intensive Awareness campaign, % water savings and consumption barometer Top 250 consumers identified and consulted on a monthly basis
e	Water Meter management	Weekly reading recommended	Weekly reading recommended	Weekly reading required	Weekly reading required, recommend daily reading	Daily reading required
f	Leak management	Required	Required	No leaks tolerated	Isolate water leaks immediately, no leaks tolerated	Isolate water leaks immediately, no leaks tolerated
g	New water installations	N/A	N/A	N/A	N/A	May be prohibited.
h	Water for water intensive construction work	N/A	N/A	Cannot be provided with water, unless semi-purified water is available	Cannot be provided with water, unless semi-purified water is available	Cannot be provided with water, unless semi-purified water is available
i	No sewer water contamination	No contamination allowed	No contamination allowed	No contamination allowed	Critical to ensure reclaimed water availability	Critical to ensure reclaimed water availability

Notes:

- Water connections for new installations larger than 20mm, should reflect a manageable installation plan that supports easy control to isolate water leaks.
- All such installations have to comply with water saving infrastructure and equipment in line with the Water Supply Regulations.
- For water supply applications, where water recycling is possible, such options may be permitted. An appropriate agreement may apply.