

# Water Supply Shortage Response Plans (Restrictions) for the Green Industry in the Rand Water Supply Area in South Africa®

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## INTRODUCTION

Which of the two gardens would you prefer to have?

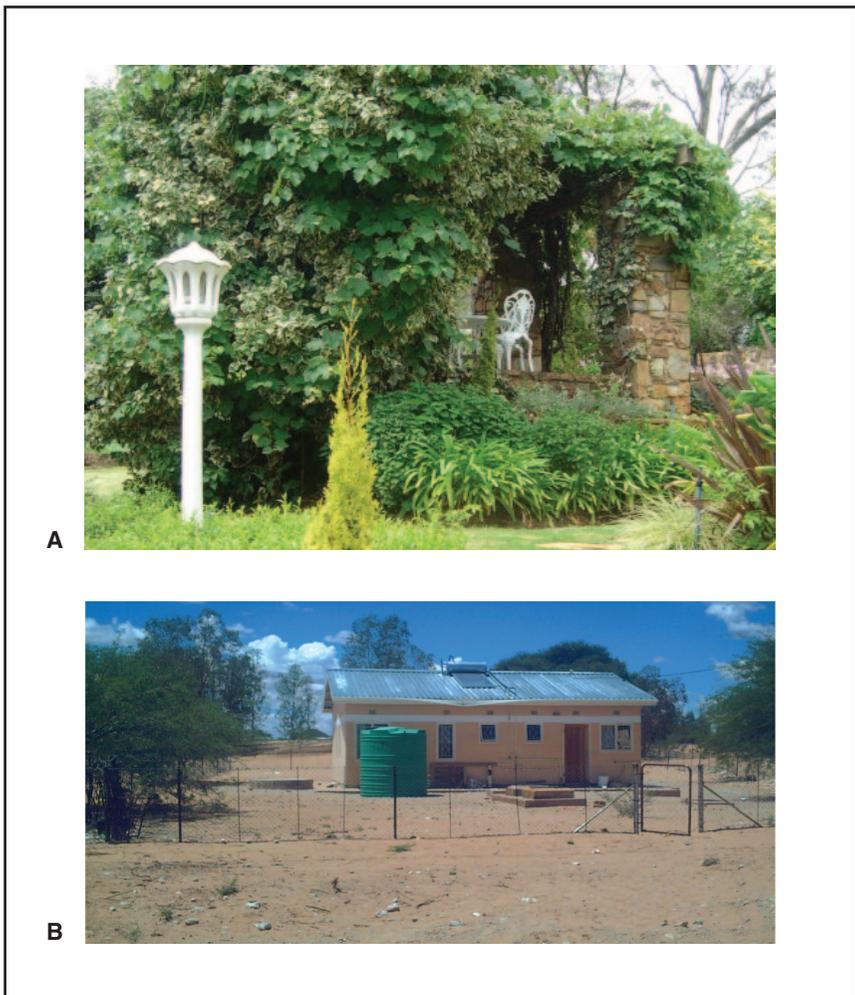


Figure 1. Would you prefer Garden A (L. Hoy) or B (N. Koneight)?

## PROBLEMS THE WORLD IS FACING

To feed the growing world population irrigated lands have increased by 2% per year using more water. In the last few years droughts have been experienced in China, England, U.S.A., Brazil, Australia, India, etc. Parts of the Eastern Cape Province are currently experiencing the worst drought in 100 years. As more people seek greater amounts of water wars are predicted to erupt.

The world in general is becoming warmer. Between 1900 and 1990 the earth's surface has warmed between 0.7 and 0.8 °C. The worst case scenario of global warming could result in sea levels rising by as much as 72 m. Between 1940 and 1989, average summer temperatures in South Africa increased between 0.8 °C and 2.7 °C negatively impacting on evaporation (Ashwell and Hoffman, 2001).

In many areas of Asia and Africa, demand for water has exceeded supply. Simply put the world and South Africa simply don't have enough water to "feed" the ever expanding populations.

**Extracts from the 5th World Water Forum in Istanbul 2009** [(Fauchon, 2009) President of the World Water Council]. "We are, thus, confronted by a major challenge: the demand for water is ever-increasing and, at the same time, we must protect, value, stock, and even re-use water resources. We must establish harmonious sharing of water between man and nature... Sharing water is a difficult task and an essentially political responsibility, for the future of water depends... But to increase indefinitely the water supply is expensive... We can no longer accept to continue to spend more money on producing water that we then waste and dirty... We must say it again loudly and clearly, as we did in Istanbul: The time of easy water is over."

## PROBLEMS THAT SOUTH AFRICA FACES

South Africa faces many climatic and rainfall related problems, including:

- Climate Change.
- Increased frequency of floods and drought.
- Gauteng will experience hotter summers, warmer winters, less rain and increased evapotranspiration.
- 10% to 20% decrease in summer rainfall over the central interior.
- The Cape area could lose as much as 30% of its rainfall.
- The population could be doubling every 20 to 40 years.
- El Niño is in itself a mystery that comes and goes and its specific affects are not clearly understood.
- More and more water storage facilities are required to address assurance of supply. SA has limited ability to build more dams as resources are almost at an end.
- The SA Weather service are currently predicting a dry summer (Nov. 09 to March 2010)
- South Africa's water situation is predicted to move from one of water stress to absolute scarcity.
- South Africans are all familiar with the continuous water problem that are experienced, such as:
  - Water quality problems experienced in many areas.
  - Water supply interruptions.
    - Droughts in some parts of the country while there are floods in others, e.g., Gauteng, Limpopo, Cape Town, and Eastern Cape.

When considering the total estimated available water for the period 1995–2025, the devastating fact is that South Africa’s water situation will move from one of water stress to absolute scarcity. It will mean that available water per capita will reduce from 1266 m<sup>3</sup> (1995) down to 997 m<sup>3</sup> (SADC, IUCN, SARDC, World Bank, 2002).

**Some South African Rainfall and Evaporation Information.**

- The world average temperature is around 860mm/annum
- Average rainfall for SA is 497 mm/annum
- Approximately 65% of SA receives less than 500 mm/annum
- 21% receives less than 20 mm/annum
- Evaporation ranges between 1100 mm to 3000 mm per annum
- In the Upington area evaporation can be as high as 4000 mm/annum (South Africa Department of Water Affairs, 1986)
- Evaporation is therefore on average more than the rainfall received
- Shallow dams with large surface area are therefore also not desirable

Currently George municipality (Dam water levels at only 18.6%) are experiencing a serious drought and very strict water restrictions are in place.

Similarly the Nelson Mandela Bay Municipality are also in a similar situation and the dam levels are only at 45% as the water crisis deepens. They are also currently building a R500 million pipeline from the Orange River, to supply the Nelson Mandela Bay Metro from Gariep Dam near Venterstad (353 km as measured on a straight line).

Because South Africa has such diverse climatic areas stretching across many areas one area may be experiencing drought whilst others excessive rain and flooding.

Where does the water go to (Table 1)? Only 30% of irrigation water (Agricultural water use) from dams is used — the rest is wasted through evaporation, leaking pipes, canals, and poor irrigation methods. Up to 15% of water in Vaal system (which supplies Gauteng with water) is used illegally mostly by farmers. Municipalities, who use 15% of the total water, waste up to 30% of it due to leaking infrastructure, etc.

**Table 1.** Where does the water in South Africa go?

%	Location
48	Agriculture
18	Ecology/ environment
15	Municipalities
8	Industry
7	Forestry
3	Mining
1	Eskom

**Household Water Use Patterns for the City of Cape Town.** The estimated water use in the garden in Cape Town is approximately 35% of the water supplied for domestic purposes (Davies and Day, 1998).

Water Wise has focused on the green industry because studies have pointed to the fact that gardens account for up to 31% to 55% of demand (different sources quote different amounts used), and as a result potential savings are large.

Survey interviews with residents of Alberton (Gauteng province) in 2000 on their **perceived** water use provided some surprising results, such as garden water use accounting for as little as 10% of the total water bill for township residents and 14% middle and upper income groups (Bill and Veck, 2000).

Another important potential water user that needs to be considered in the South African context is golf courses. Some statistics on their water use:

- There are 500 registered golf courses, plus golfing estates in S.A.
- There are approximately 500,000 golfers
- Golf courses use as much water as 1.2 ML to 3 ML/day
- Should 500 golf courses use water at 1.2 ML/day, the annual amount used will amount to as much water in a year as 3,042,000 households (using only the 6,000 L of free basic water), or 24 million people (at the per person rate of 25 L/day, considered the minimum anyone needs).

## **DROUGHT**

Depending on the timing, length, and intensity of the drought it is described differently. The categories of droughts, in ascending order, include

- Meteorological drought
- Agricultural drought
- Irrigation drought
- Hydrological drought
- Socio-economic drought (National Drought Mitigation Center, 2006)

Droughts seem to occur in cycles. Some researchers refer to 7 year drought cycles; others refer to 9–10 year cycles, and still others to 14 year cycles. The fact is that droughts do occur in some form of cycle and are almost impossible to predict in the long term.

### **Some Recent South African Drought Statistics.**

- The drought of 1991–1992 in SA
  - There was a reduction of 1.8% of real disposable income.
  - There was only a 0.5% increase in consumer spending.
  - 49,000 agricultural jobs were lost.
  - 20,000 formal sector jobs lost. (SADC and World Bank).
- Unfortunately no published statistics are available for 1994/95 drought which hit especially Gauteng very hard
- Recent drought in the Cape (2005)
  - 50% less bedding plants sold,
  - Nursery sales were down 15% to 20%
  - Up to 25% of some nursery staff was laid off.

People's reaction to drought can be easily depicted in the Hydrological Illogical Cycle. In this cycle one moves from a period of rain, to apathy, to drought, awareness (that water is decreasing), concern (that the drought is increasing in intensity), and finally panic (when there is absolutely no water left). Once it then rains again the cycle starts all over again.

## **COMMENTS AND OBSERVATIONS FROM THE DROUGHT OF 1994/5 IN GAUTENG**

The following are some of my own comments and observations from the drought of 1994/5 in Gauteng.

- It was only when very little water was left in the Vaal dam water supply system that Government imposed water saving targets of 30% on to Rand Water (RW) and RW then passed this on to municipalities.
- The municipalities also then at the last minute imposed water restrictions onto the end user, these being mainly gardeners and green industry.

- There was also none if any discussion on the actual restrictions and they were unilaterally imposed.
- Very little was done proactively to mitigate the negative side effects on the green industry.
- Similar events occurred in Cape Town in 2004/5.
- The same seems to have been repeated in Port Elizabeth (Nelson Mandela Bay Metro) in 2009/10.

### **RESEARCH PROCESS UNDERTAKEN FOR THIS STUDY**

The study commenced in 2004 and was completed in 2009 through the University of South Africa (UNISA). The title: *A proactive water supply shortage response plan, focusing on the “green industry” in the Rand Water, water supply area.* The two supervisors’ were Prof. J. Hendrick and Prof. L. Brown.

### **Where Does the Green Industry Fit into this Research?**

- Generally the water that is used by the green industry, in the residential and office complex units, is referred to as domestic water use, whilst for wholesale growers; this water usually falls within the agricultural sector use.
- The green industry contributes significant jobs and finances to the South African economy in direct, as well as indirect benefits, such as social wellbeing, physical health, psychological aspects, and many more.

For the purposes of this study the green industry is defined as, “The bodies constituted of and limited mainly to the South African Green Industry Council (SAGIC), but inclusive of the general gardening end users.

- South African Nursery Association (SANA)
- South African Landscapers Institute (SALI)
- Institute for Environment and Recreation Management (Africa) (IERM)
- Landscape Irrigation Association (LIA), amongst others”

The Gardening end users were defined as being — the public that Rand Water serves (supplies water to), with home gardens.

### **My Perceptions on How the Green Industry Is Often Seen.**

- Landscaping, gardens and garden centres are not always regarded as a priority.
- It is often the first to be hit by water restrictions (e.g., domestic water)
- It is often perceived as a disposable industry or luxury that can be done without.

But,

- In 1999 the green industry market in U.S.A. was estimated at \$50.9 billion.
- In 1999 the S.A. ornamental horticulture industry was estimated at being worth R1.3 billion (unpublished figures).
- In 2007 the S.A. industry was re-estimated as being worth R3.3 billion. Although currently no thorough researched estimates are available of size and value of the S.A. Green Industry.

The research process undertaken (Fig. 2) was one of action research and should be seen as an upward spiral.

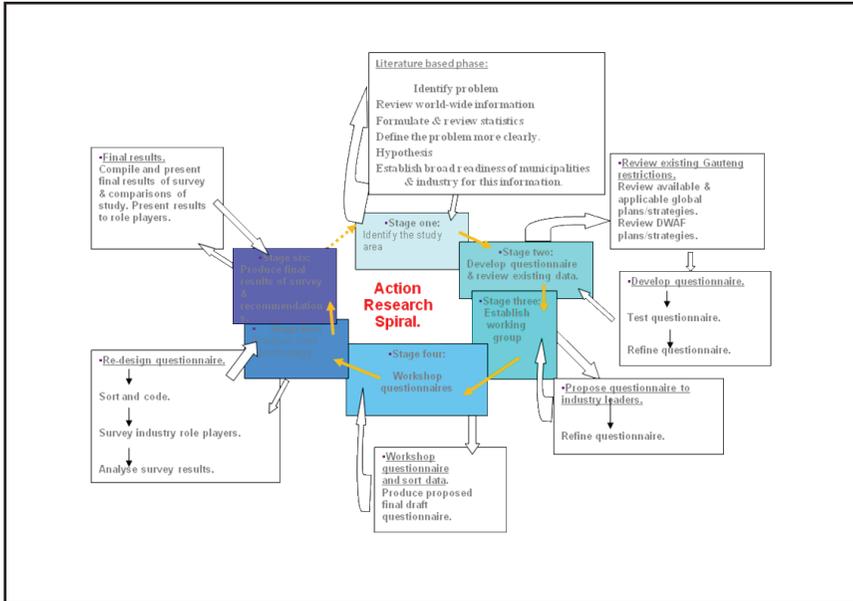


Figure 2. Action research spiral model.

Only limited trends of data are shown, for reasons of time in the presentation (a full copy of the study is available from the UNISA library).

## SOME PERTINENT INFORMATION ABOUT RAND WATER AND IT'S SUPPLY AREA

**Area of Supply.** Rand Water's main area of supply is Gauteng as depicted in Figure 3.

### Some Basic Statistics about Gauteng.

- It covers an area of 1.54% of S.A.
- It generates 40% of S.A.'s GDP (2009)
- It accounts for 10% of Africa's GDP
- 19.1% of S.A. population reside in the province (2001)
- 89% of the province is urbanized (Koh, 1998)
- 9.8% of its population are without running water

Rand Water's water sources come from various sources as depicted in Figure 4.

**Distance Water Is Pumped.** As if Rand Water does not have enough challenges in water source, it still has to transport the water over vast distances and mountain ranges. It is required to pump water 70 km from the purification station to the foot of the Klipriversberg mountains where it is then pumped up over the ridge. The total height pumped is 375 m. Once the water is pumped over this ridge, it is gravity fed for approximately 200km to its furthest municipality.

**Bulk Water Suppliers in South Africa.** When compared to other bulk water suppliers in South Africa, Rand Water's daily supply far outstrips other suppliers. It is therefore a strategic role player in this region (Fig. 5).

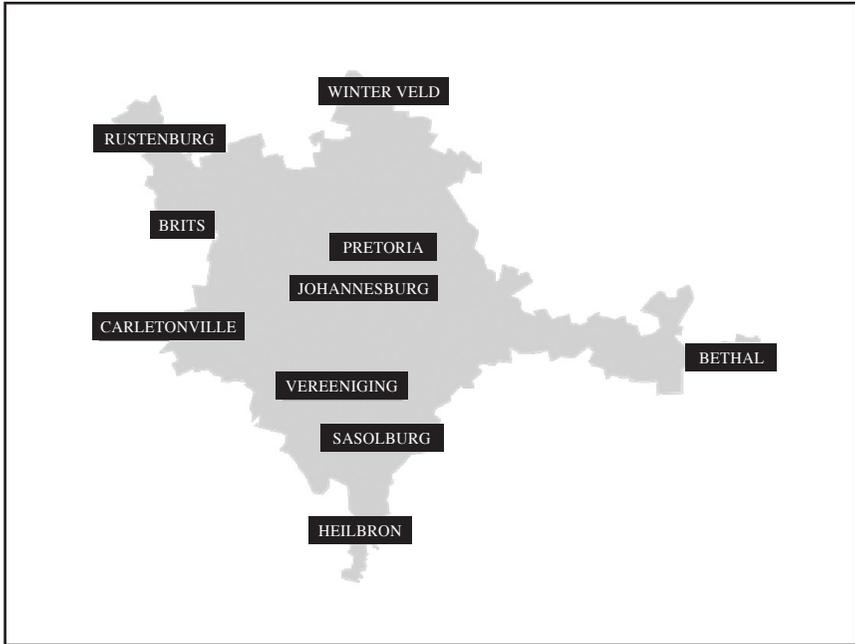


Figure 3. Rand Water’s area of supply.

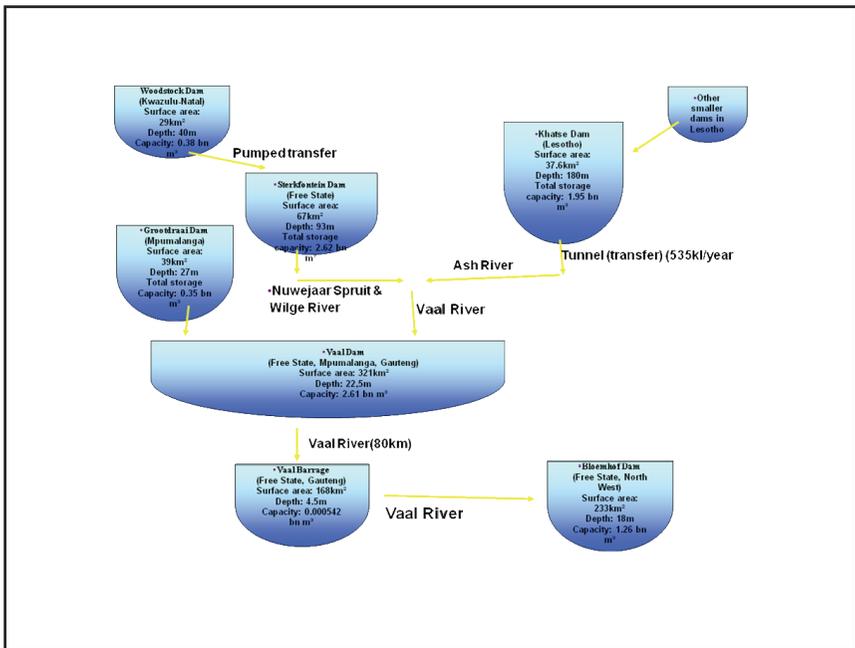


Figure 4. Sources of water for Rand Water.

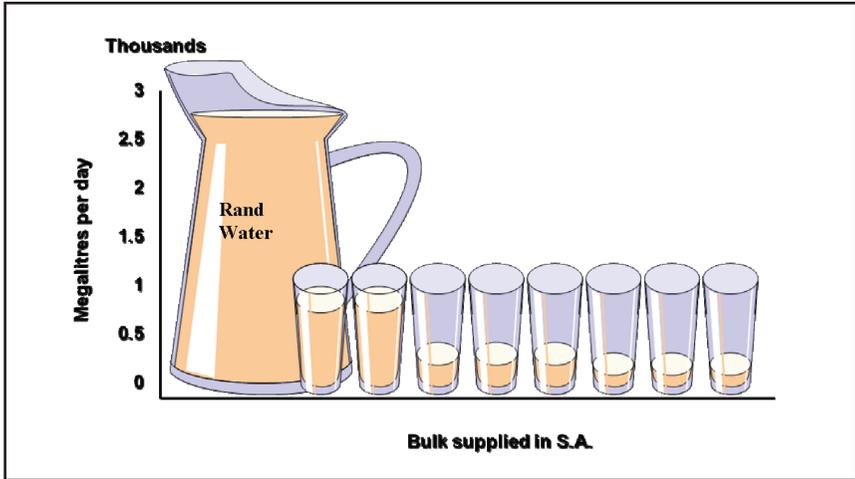


Figure 5. Amount of water supplied by Rand Water in relation to other bulk suppliers.

**RESULTS FROM GAUTENG 1994/5 WATER RESTRICTIONS**

The current restrictions (1994/95) for various municipalities (21 examples were obtained) in Gauteng were used as a basis for comparison in Table 2.

Unfortunately there was not much in common between the restrictions of the different local authorities. Some differences were however only very subtle, but the potential impacts were huge.

Results from Gauteng 1994–1995. Gauteng municipalities only had one level of water restriction introduced at a 30% water saving level.

Table 2. Gauteng-water restrictions traced.

Akasia	Kempton Park / Tembisa
Alberton	Krugersdorp
Benoni	Meyerton
Boksburg	Midrand
Eastern Vaal Metro	Northern Pretoria
Edenvale/Modderfontein Metropolitan substructure	Metropolitan Substructure
Fochville	Pretoria
Gerniston	Randfontein
Heidelberg Town Council	Southern Pretoria Metropolitan Substructure.
Heidleberg	Springs
Johannesburg	Westonaria
Johannesburg Transitional Metropolitan Council	

**Table 3.** Results from Gauteng 1994-1995 nurseries and garden centers.

Criteria of comparability* (Main criteria identified in the by-laws available) description	Total municipalities	Total with this restriction	Municipalities investigated % of total
Surcharges and offences	21	11	52
Period of restrictions	21	2	10
<b>Residential gardens – watering hours and months</b>	<b>21</b>	<b>21</b>	<b>100</b>
Garden hoses	21	13	62
Recreation facilities	21	19	90
Government and municipal parks/facilities	21	17	81
<b>Bona fide nurseries</b>	<b>21</b>	<b>14</b>	<b>67</b>
<b>Bona fide landscapers</b>	<b>21</b>	<b>19</b>	<b>90</b>
Free running water from municipal system	21	16	76
Toilet systems	21	18	86

**Nurseries/Garden Centres (Table 3).** Only 14 of the 21 local authorities (67%) mentioned restrictions for bona fide Nurseries. The number of hours that nurseries were allowed to irrigate, ranged from 14 h (three local authorities or 14%) to 168 h (one local authority or 5%) per week. When considering days to water, all 14 municipalities allowed watering for a total of seven days per week.

**Water Restrictions by Local Authorities That Apply to Residential Gardens (Table 4).** Of the total of 21 local authorities, 10 (48%) permitted residents to apply water for 2 days per week, 9 (43%) permitted 3 days watering, and 2 (10%) permitted watering for 7 days per week.

The inconsistency in this message between the highest and lowest, within one province, is huge (38%). Similarly, 29% of municipalities allowed only 2 h watering per dwelling per week, 29% allowed 3 h watering per week, compared to 9% of municipalities that allowed 48 h watering per week per dwelling.

**Problems with the Gauteng Data.** No consistent common thread can be found across the local authorities' restrictions.

#### **Research Problems Encountered.**

- Access to data was difficult.
- Current municipal staff employed know very little if anything about these 1994/95 restrictions.
- Very few staff who were contacted knew who could help or who to speak to for data.
- The author had more information dating back to 1995 than municipalities themselves.

**Table 4.** Water restrictions by local authorities that apply to residential gardens.

Criteria of comparability* (Main criteria identified in the by-laws available) description	Total municipalities	Total with this restriction	% of total municipalities investigated
Car washing and Commercial car wash facilities	21	21	100
Swimming pools – private	21	18	86
<b>Use of buckets</b>	<b>21</b>	<b>16</b>	<b>76</b>
<b>Sprinklers and drip irrigation</b>	<b>21</b>	<b>13</b>	<b>62</b>
General notice on using water sparingly	21	4	19
Leaking taps	21	7	33
<b>Water use for public and residential gardens by religious groups</b>	<b>21</b>	<b>4</b>	<b>19</b>
Mine dumps	21	1	5
<b>Lawns</b>	<b>21</b>	<b>5</b>	<b>24</b>
Paved areas	21	9	43
Boreholes	21	7	33
Water features	21	4	19

**Current By-Laws.** Currently the by-laws are being rewritten. They do refer to restricting water at the certain times; however no specific reference or addendum is available for drought, drought management plans or even water restrictions.

No reference as to how, when and what restrictions are to be introduced.

With this in mind Gauteng could end up going down the same path again.

## RESULTS FROM INTERNATIONAL WATER DROUGHT RESPONSE PLANTS

Simultaneously to the analysis of the Gauteng restrictions, copies of water restrictions, from six available institutions in the U.S.A. and Australia were chosen.

The reason that these two countries were chosen was that:

- Climatic conditions are similar (in the broad sense).
- They are seen to be the leaders in the field of water conservation strategies.
- They have similar large water storage systems and piped bulk reticulation.
- Intermittent droughts are experienced.
- The green industry in those countries also experience a negative impact, during periods of drought, and
- A fair amount of information on water restrictions is available on the internet.

International examples chosen are found in the following:

U.S.A.	Australia
Poway, California	Sydney
Fort Collins, Colorado	Victoria
Arlington, Texas	South East Water Authority

The International restrictions considered had between 4 to 7 levels. To ensure common assessment, data, including the amount of anticipated water to be saved, some local authorities were collapsed into four levels.

The average maximum water saving being:

- Level 1: 7.9% (rounded to 8%)
- Level 2: 19.2% (rounded to 20%)
- Level 3: 31.1% (rounded to 30%)
- Level 4: 39.5% (rounded to 40%)

It is possible to observe a general trend of reduction in the average numbers of days and hours permitted to water as restrictions progress from Level 2 to Level 4 (Table 5).

**Table 5.** International residential watering hours compared.

Level	Days / week	Hours per week	Hours per day
1	3.1	36	5.14
2	3.5	41.67	5.95
3	1.71	15.33	2.19
4	0	0	0

**Nurseries/Garden Centres and Landscaping Companies.** No evidence was found to indicate that these categories of business are ever included in water restrictions/water shortage response plans.

**Problems Experienced with the International Data.**

- Interpretation of results was not easy.
- Terminology used was not same as that used in South Africa.
- Feedback to questions from international sources was slow and poor.
- Some examples had good detail while others not.
- Funding to engage these sources was limited to email and telephonic discussions.

**RESULTS FROM SOUTH AFRICAN GREEN INDUSTRY SURVEY (2008).**

As part of the research project Green Industry members were surveyed on various factors ranging from water use in 1994, to the affects of the 1994/95 drought, their water conservation habits, and the impact of the Rand Water’s Water Wise campaign.

Some Key Aspects from This Green Industry Survey.

- Survey was conducted in 2008 (completed thesis in 2009)
- Participants were asked questions dating back to 1994/95.

- Respondents (65%) indicated that in some way they were affected by the 1994/95 drought.
  - The Green Industry sector responses were: SANA 51%, IERM 32%, LIA 14%, and SALI 13%.
- Only 19% of respondents thought that in 2008/09, the local authority had water restrictions in place (this is a greater percentage than what the author established).

Additional data received from the Industry is shown in Table 8.

- Only 35% of replies from industry indicated that they had not been affected by the drought at all.
- 58% responses indicated that RW was their bulk supplier, while 32% were not sure.
- Only 33% of supplies received assistance from Rand Water in 1994/5.
- Gardening magazines seem to be responsible for the most successful communication of the water conservation message (55%) followed by newspapers (50%) and radio adverts (45%).
- Fifty seven percent (57%) of respondents feel that The Water Wise® brand assists in the promoting of water conservation.
- Respondents indicated that they mostly make use of; training (27%) to raise awareness about water conservation, followed by displays (23%), newsletters (23%), and talks (23%).
- 94% felt that plants should be sold with instructions on the correct watering.

#### **Problems with Green Industry Survey.**

- The survey was possibly far too long.
- Many respondents did not complete the survey making their data invalid (and could not be used).
- Of the possible 776 names supplied by industry only 85 valid interviews were completed.
- The author tried to measure too many items in the survey.
- The questions were in themselves very complex.

#### **COMPARISON DATA OF ALL THREE DATA SETS**

Once the data from all three data sets was completed they were then analysed against each other. The data sets being; Gauteng 1994/95, International, and Survey of Green Industry 2008.

Each of the three data sets was given the same weighting.

A general trend of reduction on hours of water can be seen in watering of residential gardens, office parks, industrial parks, and all government and municipal grounds and facilities (excluding lawns) as one moves from Level 0 to Level 3 (Table 6).

The data from Watering of new landscapes, nurseries, and garden centres (bona fide) was possibly negatively impacted due to the fact that no international data was available and the 1994/95 restriction were only available in Level 3 (Table 7).

**Table 6.** Watering of residential gardens, office parks, industrial parks, all government and municipal grounds, and facilities (excluding lawns).

	Level	Mean h/day	Mean days/week	Mean h/week
Gauteng	0	n/a	n/a	n/a
International	0	5.14	3.10	15.94
Survey	0	4.46	3.49	15.57
<b>Average comparative total</b>	<b>0</b>	<b>4.80</b>	<b>3.30</b>	<b>15.75</b>
Gauteng	1	n/a	n/a	n/a
International	1	5.95	3.50	20.83
Survey	1	3.09	2.77	8.56
<b>Average comparative total</b>	<b>1</b>	<b>4.52</b>	<b>3.14</b>	<b>14.70</b>
Gauteng	2	2.86	1.19	3.40
International	2	2.19	1.71	3.74
Survey	2	2.65	2.36	6.25
<b>Average comparative total</b>	<b>2</b>	<b>2.57</b>	<b>1.75</b>	<b>4.47</b>
Gauteng	3	n/a	n/a	n/a
International	3	0.00	0.00	0.00
Survey	3	2.08	1.80	3.74
<b>Average comparative total</b>	<b>3</b>	<b>1.04</b>	<b>0.90</b>	<b>1.87</b>

### PROPOSED NEW RESTRICTIONS

Because of the manner in which feedback was given in the survey it was concluded that it is not possible to draw a straight line distinction between the compared data above and the proposed restrictions. Other research factors have also been considered.

#### Recommendations for Rand Water Supply Area.

- There is a need to have four levels of restriction measures making up one response plan.
- The first level is for restrictions that need to be permanently implemented.
- Levels 1 to 3 are to be progressively introduced.

Amount of water that could be saved through introduction of each level of restriction as seen in Table 8.

**Table 7.** Watering of new landscapes, nurseries, and garden centres (Bona fide).

	Level	Mean h/day	Mean days/week	Mean h/week
Gauteng	0	n/a	n/a	n/a
International	0	n/a	n/a	n/a
Survey	0	3.80	4.85	18.42
<b>Average comparative total</b>	<b>0</b>	<b>1.90</b>	<b>2.43</b>	<b>9.21</b>
Gauteng	1	n/a	n/a	n/a
International	1	n/a	n/a	n/a
Survey	1	3.39	4.22	14.29
<b>Average comparative total</b>	<b>1</b>	<b>1.69</b>	<b>2.11</b>	<b>7.15</b>
Gauteng	2	3.46	7.00	24.21
International	2	n/a	n/a	n/a
Survey	2	2.57	3.82	9.81
<b>Average comparative total</b>	<b>2</b>	<b>2.01</b>	<b>3.61</b>	<b>11.34</b>
Gauteng	3	n/a	n/a	n/a
International	3	n/a	n/a	n/a
Survey	3	2.41	3.41	8.20
<b>Average comparative total</b>	<b>3</b>	<b>1.20</b>	<b>1.70</b>	<b>4.10</b>

**Table 8.** Amount of potential water to be saved.

Levels	Amount of potential water to be saved (%)
0	8
1	20
2	30
3	40

**Level 0 (8% Water Saving Required).**

- The following restrictions would be applicable to all levels (0 through to 3),
- Water restrictions must apply to all sources of water — municipal, as well as other sources, such as boreholes and dams.
- Users, who exceed the anticipated percentage of water saving, should pay a heavy fine.
- Users, who do not abide by the water restrictions, should pay heavy fines as determined by municipal structures.
- All surface runoff water must be captured on site and recycled.
- The use of water retention granules and wetting granules by landscape contractors must be enforced.
- Mechanisms such as moisture meters and rain sensors should be compulsory for automated irrigation systems.
- All new landscapes will be zoned into high, medium, and low water use zones.
- Plants must be sold with labels indicating which high, medium, and low water use plants are.
- The use of mulches in new landscapes should be compulsory.
- No watering should be allowed between the hours of 10h00 and 14h00 (October to February).
- The use of grey water is encouraged in the garden!
- In all cases where hosepipes are used, a trigger nozzle must be fitted.
- No washing down of paving.
- Although the watering of residential gardens, office parks, industrial parks, all government and municipal grounds and facilities, recreation facilities (private, commercial, government and local authority), lawns (Inclusive of residential, business, industrial and government), and watering of new landscapes, nurseries and garden centres (bona fide) was addressed in this section it was felt by the researcher that these restriction should not be applied at this stage at this level.

**Level 1 (20% Water Saving Required).**

- All general restrictions from Level 0 to apply.
- Hand held hosepipe should be used.
- Watering of residential gardens, office parks, industrial parks, all government & municipal grounds and facilities (excluding lawns), for 3 days per week for a total of 5 hours per day and no more than 15 h/week.
- Watering of recreation facilities (Private, commercial, government, and local authority), for 3 days/week for a total of 7 h/day and no more than 21 h/week. [This includes Bowling greens, playing surface/turf, golf course fairway, golf course green, golf course rough, cricket outfield, cricket pitch, athletics tracks/fields, horse racing tracks, tennis court (Grass).]
- Watering of lawns (Inclusive of residential, business, industrial, and government), for 3 days per week for a total of 5 h per day and no more than 15 h/week.

- Watering of new landscapes, nurseries, and garden centres (Bona fide), for 4 days/week for a total of 2 h/day and no more than 8 h/week.
- Use of watering systems (all nurseries, landscapes, lawn, recreation facilities) except for drip irrigation systems, are prohibited.
- Car washes and washing of cars to be restricted.
- Filling of new swimming pools to be restricted.
- Refilling of existing swimming pools to be restricted.
- Use of water features and fountains to be restricted.
- Use of watering systems (all nurseries, landscapes, lawn, recreation facilities) to be restricted, except for drip irrigation systems. (This restriction may best be suited at Level 2) .

**Level 2 (30% Water Saving Required).**

- All general restrictions from Level 0 to apply.
- Use of bucket and watering cans must be introduced.
- Environmental rehabilitation projects including mine dumps to be restricted.
- Watering of residential gardens, office parks, industrial parks, all government and municipal grounds and facilities (excluding lawns), for 3 days/week for a total of 2 h/day and no more than 6 h/week.
- Watering of recreation facilities (Private, commercial, government, and local authority), for 3 days/week for a total of 4 h/day and no more than 12 h/week.
- Watering of lawns (Inclusive of residential, business, industrial, and government), for 1 days per week for a total of 2 h/day and no more than 2 h/week.
- Watering of new landscapes, nurseries, and garden centres (bona fide), for 4 days/week for a total of 2 h/day and no more than 8 h/week.

**Level 3 (40% Water Saving Required).**

- Watering of residential gardens, office parks, industrial parks, all government and municipal grounds and facilities (excluding lawns), for 1 day/week for a total of 1 h/day and no more than 1 h/week.
- Watering of recreation facilities (private, commercial, government, and local authority), for 1 day per week for a total of 1 h/day and no more than 1 h/week. (This includes artificial turf)
- Watering of lawns (Inclusive of residential, business, industrial, and government), for 1 day/week for a total of 1 h/day and no more than 1 h/week.
- Watering of new landscapes, nurseries, and garden centres (Bona fide), for 2 days per week for a total of 1 h/day and no more than 2 h/week.

**Water Restrictions Should Not Be Static.** Water restrictions should not be seen as static, but rather as a flexible range that could move from Level 0, to Level 1, to Level 3, then back down to 2 and possibly even back up to Level 3 before rains come and it starts moving down to Level 0. The example of this can be seen in the City of Santa Fe (U.S.A.). Levels of restrictions should be variable depending on the available water in the system. They may also need to change on a year by year basis.

### **BENEFITS OF A SINGLE MANAGEMENT PLAN FOR THE RAND WATER SUPPLY AREA**

- All stakeholders are able to buy-in up front.
- All stakeholders can be informed what is expected.
- All stakeholders know the measures to be implemented and the different levels.
- Customers receive one focused message.
- GIC & others are able to be proactive about their own industry.
- By doing this we as citizens are proactive in securing our future water resources.
- It will reduce existing confusion amongst municipal employees regarding what water restrictions are and how to impose them.

### **SOME CHALLENGES STILL TO BE ADDRESSED**

- How the mindset of people in general will be changed with the introduction of the proposed restrictions?
- Policing of the steps especially those in Level 0.
- What mechanisms will be used to implement the system?
- Some of the recommendations for Level 0 may not be practical and could be changed/reduced.
- Currently the Department of Water Affairs only announce restrictions at 30% level and their “announcing” system will need to be adapted/ changed to accommodate this.
- How announcements are and will be made may also need to be addressed.
- A final Level 4 of zero watering may have to be imposed at some stage!

### **PROPOSED WAY FORWARD**

I believe that what is produced provides a very sound basis to take that matter further in a manner that will benefit the Green Industry, Municipalities, Water Boards, Government and the environment that we live in.

This proposal:

- Has been presented to municipalities at RW forum and received a positive response.
- Currently I am busy addressing industry for additional buy-in.
- Once this is completed it will be taken to Local Government (Gauteng Legislature) for input and comments.

Thereafter it is proposed to take it to the Department of Water Affairs for further processing.

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