

# A COMMUNICATION STRATEGY FOR WATER RE-USE IN SOUTH AFRICA

*Volume II:*

*Communication strategy and toolkit development*

*Sarah Slabbert and Nadja Green*

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# **A COMMUNICATION STRATEGY FOR WATER RE-USE IN SOUTH AFRICA**

## **VOLUME II: COMMUNICATION STRATEGY AND TOOLKIT DEVELOPMENT**

Report to the  
**Water Research Commission**

by

**Sarah Slabbert and Nadja Green**



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This report forms part of a series of two reports. The other report is:

Volume I: A communication strategy for water re-use in South Africa – situational analysis and stakeholder engagement report (WRC Report No. 2805/1/20)

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## EXECUTIVE SUMMARY

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### BACKGROUND

The National Water and Sanitation Master Plan of the Department of Water and Sanitation notes that South Africa can avoid a projected 17% water deficit by 2030 by taking bold action. As part of its action plan, the Master Plan promotes the diversification of the water resources mix to include alternative sources such as water re-use. Lack of public acceptance is a major barrier to the implementation of water re-use, particularly direct potable re-use. Research findings have shown a correlation between public knowledge and public acceptance: the better the public understands the concept of the water cycle and treatment technology, the more likely they will support and accept responsible water re-use. In the light of these findings, the National Strategy for Water Re-use (annexure to the National Water Resources Strategy (2012)) calls for a communication strategy for water re-use to address public knowledge. The need for such a communication strategy has become more urgent over the past few years as national water and sanitation planning is looking towards water re-use as a mechanism to augment current water resources.

### AIMS AND OBJECTIVES OF THE STUDY

The following were the aims of the study:

1. To review and analyse local and international perception studies on water re-use, as well as best practice in water re-use communication strategies and campaigns.
2. To consult widely with relevant stakeholders in the water sector on their needs and requirements for a communication strategy for a public education programme for water re-use.
3. To develop a communication strategy and test a toolkit for a public education programme for water re-use.

### A CONSULTATIVE PROCESS

The communication strategy for water re-use captured in this report aims to meet this need. The strategy was developed in consultation with the Department of Water and Sanitation and a range of stakeholders from the water sector. Stakeholders included communication managers from government departments, Metro's, Rand Water and water-intensive businesses. From the discussions, it was clear that stakeholders agreed that:

- It is important that the South African public is informed of water re-use and related aspects
- A communication strategy for water re-use is therefore imperative
- The communication strategy must be practical and easy to implement, and
- Public knowledge of water re-use and related aspects must be sustained and the communication strategy must therefore address sustainability.

Two critical questions emerged from the stakeholder consultations:

- What should the public know about water re-use and related aspects?
- What does the South African public currently know about water re-use and related aspects, in other words, what is the point of departure or the baseline for this communication strategy?

The following knowledge aspects were identified in the literature review and the stakeholder consultations as knowledge that the public should have:

- Knowledge of terminology such as 'wastewater', 'treatment', 'greywater' and 'water quality standards'
- Knowledge of the water cycle
- Knowledge of water and wastewater treatment and municipal responsibilities in this regard
- Knowledge of *de facto* water re-use
- Knowledge of safety aspects of water re-use
- Common myths and misconceptions
- Knowledge of the effect of climate change on the availability of water
- Knowledge of South Africa as a water-scarce country, and
- Knowledge of different types of water re-use.

## **BASELINE STUDY TO ESTABLISH PUBLIC KNOWLEDGE ON WATER RE-USE**

As public knowledge of these aspects was unknown, a national survey was conducted to establish a baseline for the strategy. The questionnaire of the baseline survey was designed to cover the above-mentioned knowledge aspects. The baseline study concluded that a communication programme to educate the public should target all demographic groups. The distribution curve of the knowledge index score, which is a composite score for the knowledge aspects listed above, shows that most scores are clustered between 10 and 13 out of 20, which means that public knowledge of these simple, basic facts is between 50% and 65%. Demographic differences were small, indicating that this limited knowledge cuts across all demographic groups. The report of the baseline study is available on the WRC's website at [http://www.wrc.org.za/wp-content/uploads/mdocs/TT807\\_final%20web.pdf](http://www.wrc.org.za/wp-content/uploads/mdocs/TT807_final%20web.pdf). It is proposed that the public education programme for water re-use cover these knowledge aspects as a starting point. Not only do they provide a clear focus, but by aligning the knowledge aspects tested in the baseline survey with the focus of a public education programme, one will also be able to track progress.

## **PRINCIPLES AND ELEMENTS OF THE COMMUNICATION STRATEGY**

To define a broad outcome for the communication strategy and specific objectives, the concept of water re-use literacy was adopted from health education where it has been successfully applied. The broad outcome was hence defined as: "Citizens who are so well informed on water re-use and related aspects that they can contribute meaningfully to scientific debate and decision making regarding the sustainable management of water resources at all levels of society". "Scientific debate" is defined as discussions and decisions that are based on facts that can be scientifically verified. Scientific debate can be conducted at different levels, depending on the level of scientific knowledge of the group participating in the debate. The strategy focuses on a public education programme to lay a foundation for public knowledge of water re-use. This foundation is essential if the South African public is to understand and accept water re-use as part of the water resources mix. It is also essential for the successful implementation of water re-use projects. If the public understands the basics of the water cycle, water and wastewater treatment, water quality standards and different types of re-use, project-specific communication can focus on the details of the project and the unique needs and circumstances of the community where the project will be implemented.

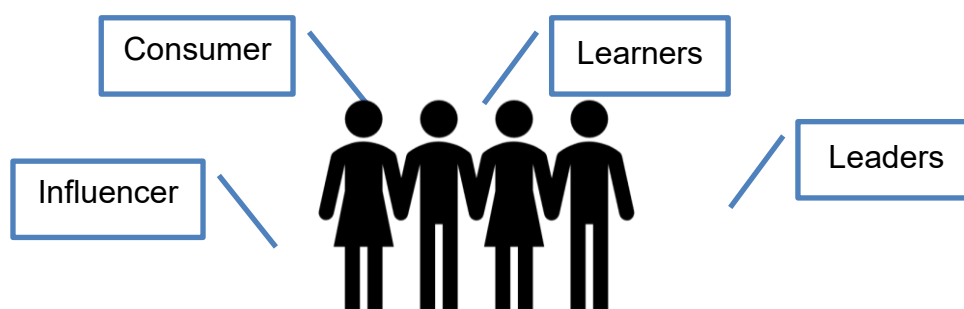
With the broad outcome in mind, two objectives were defined for the communication strategy:

- 1) a water re-use literate public, and
- 2) sustainability.

Sustainable public knowledge in the context of water re-use management was defined as "knowledge, values and behaviour that have become entrenched in the fabric of a society and which are transferred to future generations".

To ensure that the communication strategy has the potential to be successfully implemented, the following approach was followed:

1. SMART objectives: Each objective was scrutinized according to the SMART principles: is it specific, measurable, assignable to an implementing institution, relevant and time-based?
2. A multi-layered approach to target audiences (see Figure 1 below): Citizens are targeted in the many roles that they fulfil, ranging from municipal consumer, head of a household, learner, councillor, member of a social media community, decision maker, to influencer. For each of these roles/target audiences, the communication strategy proposes activities and channels, implementing institutions and a time frame.



**Figure E-1: Individuals in different roles in society<sup>1</sup>**

3. A core content framework. It is important to note, though, that the identification of knowledge needs has to be a dynamic two-way process, which allows the public to also voice their knowledge needs. The content of what the public needs and wants to know is furthermore not closed. It will evolve and expand as new research and development uncover and discover new information.
4. Water re-use literacy messages tailored for specific target audiences and applying multiple modalities to deliver these messages.
5. A social marketing approach to framing messages: In a country with a looming water deficit, responsible water re-use is for the benefit of all and should be promoted as such.
6. Clear monitoring and evaluation mechanisms against which progress can be measured: The report identifies indicators of success for each target audience and proposed activity, and suitable evaluation mechanisms. It is proposed that the baseline study be repeated every two to five years to test if public knowledge is improving.

#### **TAKING THE STRATEGY INTO ACTION**

To kick-start implementation, a toolkit of resource material was developed. The material was shared with stakeholders for input. It was evident in the feedback that there is an urgent need for a central hub of resources from where all implementing institutions and the public can download and use educational material. Such a central hub would also be a platform on which institutions can share their own resources and get peer feedback. The hub could also be useful as a forum to engage with the public. These engagements could be extended to social media channels.

Instead of a single implementing institution, the strategy proposes several implementing institutions. Implementing institutions were selected to align the proposed activities with their existing water-related education and communication activities. For example, the Department of Water and Sanitation runs a School Interventions Programme and the Water Research Commission has recently signed a MoU with the Department to support this Programme. The programme is ideally positioned to include water re-use as a topic in its competitions and other activities. The Department also runs annual national water awareness campaigns on radio and television. Water re-use can easily be added as a topic to these annual campaigns. Successful implementation relies on the buy-in of these institutions. The research team and the WRC consulted extensively with representatives of the proposed implementing institutions and substantial progress has been made in forming partnerships.

It was evident from the discussions with stakeholders that scientists and decision makers in the water sector take the need to diversify South Africa's water resource mix seriously and that they want to make it work. The research team is therefore confident that these scientists and decision makers can successfully implement a programme to educate the South African public so that they understand and support responsible and safe water re-use.

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<sup>1</sup> Figures and tables without sources have been developed by the authors.

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## ACRONYMS & ABBREVIATIONS

AE	Aqua Enduro
AMR	Automatic meter reading
BLM	Baswa le Meetse
CAPS	Curriculum Assessment Policy Statements
CMA	Catchment Management Agency
COGTA	Department of Cooperative Governance and Traditional Affairs
COVID-19	Coronavirus disease 2019
CPUT	Cape Peninsula University of Technology
DBE	Department of Basic Education
DBSA	Development Bank of South Africa
DWS	Department of Water and Sanitation
FET	Further Education and Training
GEEF	Gauteng Environmental Education Forum
IP	Intervention Project
LM	Local Municipality
NGO	Non-governmental organisation
NW&SMP	National Water and Sanitation Master Plan
NWRS	National Water Resources Strategy
PR	Public relations
QCTO	Quality Council for Training and Occupation
SAASTA	South African Agency for Science and Technology Advancement
SAICE	South African Institution of Civil Engineering
SALGA	South African Local Government Association
SAYWP	South African Youth Water Prize
SDGs	Sustainable Development Goals
SETA	Sector Education and Training Authority
SWPN	Strategic Water Partners Network
TVET	Technical and Vocational Education and Training
UNESCO	United Nations Educational, Scientific and Cultural Organisation
WESSA	Wildlife and Environmental Society of South Africa
WHO	World Health Organisation
WISA	Water Institute of South Africa
WRC	Water Research Commission
WSI	Water Services Institution
WSP	Water Services Provider
WWET	Water Wise Education Team

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## CHAPTER 1: INTRODUCTION

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### 1.1 CONTEXT

With a fast-growing population and recurring droughts, it has become critical for South Africa to plan for an increasing water demand. A water deficit of 17% is projected for the country by 2030 (DWS, 2018).

The National Water Resource Strategy (DWS, 2013) proposes water re-use as one of the strategies to supplement South Africa's water resources. The National Water and Sanitation Master Plan (NW&SMP) (DWS, 2018) takes this proposal up in its call for a diversification of the country's water resource mix to include surface water, groundwater, re-use and desalination (DWS, 2018: 52). Water re-use is to be increased on an ongoing basis (DWS 2018:12). A detailed National Strategy for Water Re-Use (DWS, 2011) features as Annexure D of the National Water Resources Strategy (NWRS). According to the strategy, there are five key considerations when water re-use is contemplated as an option to supply or supplement water:

- Water quality and security of supply
- Water treatment technology
- Cost relative to other water supply alternatives
- Environmental considerations
- Social and cultural perceptions.

The Water Research Commission (WRC) has done most of the research groundwork on the technical, financial and water quality aspects of water re-use (for example, Osunmakinde *et al.*, 2013, Patterson, 2013, Ilemobade *et al.*, 2011, Swartz *et al.*, 2015). The WRC has also done several studies on social and cultural perceptions of water re-use (Muanda *et al.*, 2017a; Tayob *et al.*, 2015), **but it has not yet addressed the public's awareness and understanding of water re-use.**

Lack of understanding of the water cycle and treatment technology is cited in the literature (Dolnicar & Hurlimann, 2009; Marks *et al.*, 2008; Nancarrow *et al.*, 2009; Macpherson & Slovic, 2008; Macpherson and Snyder, 2012) to be correlated to negative perceptions on water re-use, and thus a major barrier to the implementation of water re-use, particularly direct potable re-use. More details appear in Chapter 2, section 2.4. A good public communication and participation programme can lead to increased public awareness, public acceptance, commitment and support for water re-use (European Commission, 2015). However, good public communication and participation presuppose a clear communication strategy. The idea of a communication strategy for a public education programme on water re-use in South Africa is not new, but such a communication strategy has not yet been developed.

The National Strategy for Water Re-use (DWS, 2011) calls for the development of a communication strategy for water re-use and gives priority to addressing the lack of understanding of the water cycle and treatment technology mentioned above when it defines the objective of such a communication strategy for water re-use as: "to develop and entrench awareness of the different facets of water use and specifically water re-use" (DWS, 2011:12). It is envisaged in the National Strategy for Water Re-use that awareness will lead to understanding, which, in turn, will promote informed decision-making regarding water re-use. In a similar vein, the *National norms and standards for domestic water and sanitation services* (Government Gazette 41100, 2017) calls for an effective and sustained communication initiative to raise awareness and increase users' knowledge about the benefits of re-using wastewater. Such a communication initiative should consider users' socio-cultural value systems, needs and expectations.

Public communication on water re-use and related aspects usually fall into one of the following two categories:

- Category 1: programmes that focus on sustainable public communication to lay the foundation of public knowledge and understanding of water re-use.

The National Strategy for Water Re-use (DWS, 2011) refers to Category 1 when it outlines a broad communication strategy for water re-use which should focus on:

- A **sustained public education programme**, which addresses the diversity of perceptions and opinions, as it relates to indirect or direct water re-use
  - Appropriate material to inform the public and stakeholders
  - Mechanisms that will facilitate active communication and debate on the topic
  - Targeted media coverage (for example, success stories; water re-use champions; news stories about new technologies).
- Category 2: public consultations and communication campaigns as part of the implementation of specific water re-use projects.

Several South African studies on water re-use stress the importance of Category 2 public communication as part of the implementation of water re-use projects (Swartz *et al.*, 2015; Muanda *et al.*, 2017b, Van Niekerk & Schneider, 2013, Tayob *et al.*, 2015). Some of these studies developed guidelines for public communication that could be integrated into the implementation plan for a specific water re-use project. Aspects of these guidelines will be useful for a public education programme as well.

This study takes up the call for a communication strategy for water re-use that focuses on a sustained public education programme (Category 1). The communication strategy aims to lay the foundation of public knowledge and understanding of water re-use in South Africa, on which implementing organisations can base public communication campaigns for specific projects (Category 2).

## 1.2 PROJECT AIMS

The aims of the study as captured in the project contract reflect the focus on public education:

1. To review and analyse local and international perception studies on water re-use, as well as best practice in water re-use communication strategies and campaigns
2. To consult with relevant stakeholders in the water sector on a communication strategy for a public education programme for water re-use
3. To develop a communication strategy for a public education programme for water re-use and a toolkit.

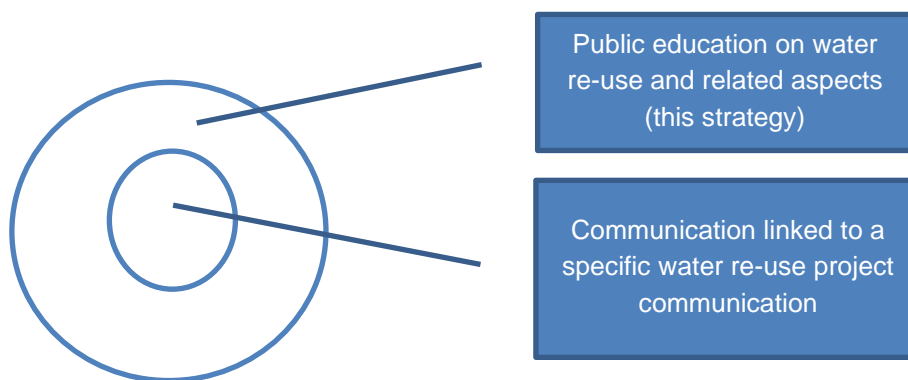
## 1.3 CONTEXT OF THIS REPORT

The methodology to achieve research aims 1 and 2 is discussed in Volume I, which comprises the literature review and the stakeholder engagement. Research aim 3 is addressed in this report. The research team used the literature review, the stakeholder input and the findings of the baseline survey to develop the communication strategy for a public education programme. In addition, a toolkit of communication material on different facets of water re-use was developed to support implementation and is presented as Volume III. Chapter 2 sets out the communication strategy and also makes reference to the baseline survey conducted. Chapter 3 outlines the material that was developed for the toolkit. This report concludes with a chapter on how the strategy can be taken into action.

## CHAPTER 2: A COMMUNICATION STRATEGY ON WATER RE-USE

### 2.1 INTRODUCTION

The communication strategy focuses on a public education programme for water re-use and related aspects. It is the aim of the strategy to lay a foundation for public knowledge of water re-use. This foundation is essential if we want the public to understand and accept water re-use as part of the water resources mix. It is also essential for the successful implementation of water re-use projects. Project-specific communication should be embedded in the established public knowledge; it cannot be the starting point. Figure 2-1 below illustrates this relationship.



**Figure 2-1: Project communication embedded in a sustained public education programme**

In developing a draft communication strategy, the research team adapted the basic steps of communication strategy development (Figure 2-2) (Mefalopulos, 2008).



**Figure 2-2: Steps to develop a communication strategy for a public education programme (Adapted from Mefalopulos (2008))**

The content discussed in the sections below derives from the literature review and the stakeholder consultations.



## 2.2 DEFINING OUTCOME AND OBJECTIVES

### 2.2.1 Revisiting the problem

An informed and knowledgeable public is the foundation of the successful implementation of water re-use as part of a diversified water resource mix for the following reasons:

At local and national level, public acceptance is needed to implement water re-use projects. The literature review has highlighted misconceptions and cultural and religious sensitivities about water re-use that have been identified in local research. Several research studies have cited negative public perceptions about the direct re-use of treated wastewater for drinking purposes that hampered or even stopped re-use projects. International research has indicated that public acceptance and support are associated with awareness and knowledge.

Also, not all types of treated wastewater are suited to all types of uses. Certain types of re-use are unsafe for humans. The public therefore needs to be well educated about the safety risks of water re-use and the appropriateness of each type of re-use. The baseline study has indicated that South Africans in general do not have a good understanding of the basic terminology and the concepts that are needed for a meaningful discourse on the subject and responsible decision-making.

### 2.2.2 Outcome and objectives

In view of the above problem statement, what do we want to achieve with a communication strategy for a public education programme for water re-use? An educated public, but what does this mean? And is this the objective?

The literature does not provide specific guidance; public education is stressed, but no clear objectives or content are given. The National Strategy for Water Re-use (DWS, 2011) refers to "awareness of the different facets of water use and specifically water re-use". Most stakeholders were also rather vague when asked what the public must know or be able to do. More useful guidance came from the literature on health and science literacy which describes an educated public as a literate public, be it health literate, science literate or water re-use literate. Nutbeam (2000) points out that health, science, or water re-use literacy can be the objective of a public education programme, but it cannot be the main **outcome**; it is one of the measures to achieve the outcome. But what then is the desired outcome?

In this study, the desired outcome of a public education programme for water re-use is defined as **citizens who are so well informed on water re-use and related aspects that they can contribute meaningfully to scientific debate and decision making regarding the sustainable management of water resources at all levels of society**. All groups of society, irrespective of their education, should have the basic scientific knowledge of water re-use and related aspects to participate in an informed debate. For the purpose of the outcome, "scientific debate" is defined as discussions and decisions that are based on facts that can be scientifically verified. Scientific debate can be conducted at different levels, depending on the level of scientific knowledge of the group participating in the debate.

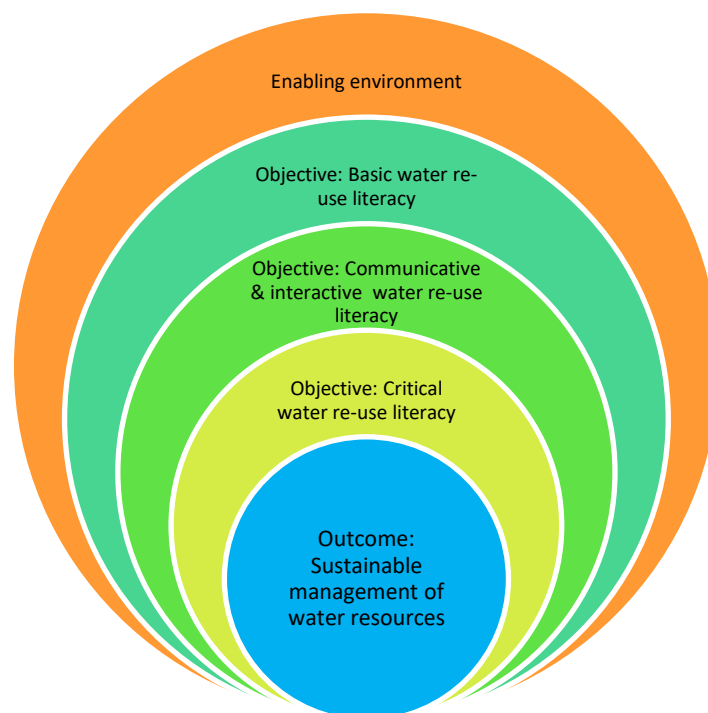
The relationship between objective and outcome is not a simple one of cause and effect: if you have achieved the objective; you have also achieved the outcome. As the public become more water re-use literate, it does not necessarily follow that citizens will contribute meaningfully to scientific debate and decision-making. An enabling socio-economic, political and policy environment in which citizens can freely

and without prejudice participate and contribute to decision-making would be a prerequisite for a water re-use literate public to achieve the outcome described above.

Literacy comprises different levels of skills.

- Basic or functional literacy – the ability to process basic information
- Communicative or interactive literacy – more advanced cognitive and social skills that enable you to extract information and apply it in new circumstances, and
- Critical literacy – the ability to analyse information critically and interrogate underlying messages.

The **objective** of a water re-use literate public comprises therefore these three sub-objectives: functional literacy, communicative or interactive literacy and critical literacy. In the communication strategy that follows each of the three sub-objectives will be further analysed and associated with specific target audiences and communication activities. The relationship between outcome, objectives (water re-use literacy at the three levels) and an enabling environment is depicted in Figure 2-3 below.



**Figure 2-3: The relationship between outcome, objectives and an enabling environment**

### 2.2.3 Sustainability as an objective

The literature and the stakeholder interviews emphasise sustainability as an objective a communication strategy for a public education programme for water-re-use. "Sustainability" in the context of water resource management means knowledge, values and behaviour that have become entrenched in the fabric of a society and which are transferred to future generations (definition as developed in the literature review).

## 2.3 SMART OBJECTIVES

Mefalopulos (2008) requires that the overall objective of a communication strategy be translated into SMART objectives (see Figure 2-4 below). The subsections that follow will do this exercise for each of the two objectives: to grow a water re-use literate public and to do so in a way that ensures sustainability.



Figure 2-4: SMART objectives (Mefalopulos, 2012)

### 2.3.1 Objective 1: To grow a water re-use literate public

Interpreting 'growing a water re-use literate public' in terms of SMART objectives looks like this:

**Specific: What does it mean for the public to be water re-use literate?**

As mentioned above, this objective comprises the three levels of literacy, which have been translated for water re-use literacy as follows (Liem, 2005):

Sub-objective 1: Functional water re-use literacy

This sub-objective will be achieved if the public:

- is aware that water re-use is one of a diversified water resource mix that we could use to meet increasing demand on freshwater resources
- understands key scientific concepts and the principles of the water cycle, water and wastewater treatment and water re-use options, and
- recognises the safety risks and limitations and the mechanisms available to mitigate this risk.

Sub-objective 2: Communicative and interactive water re-use literacy

This sub-objective will be achieved if the public uses scientific knowledge and scientific ways of thinking for individual and social purposes when negotiating meaning and applying water re-use at home, at work and in their communities.

Sub-objective 3: Critical water re-use literacy

This sub-objective will be achieved if the public uses scientific knowledge and scientific ways of thinking when analysing information on water re-use critically and interrogating underlying messages.

<p><b>Measurable: Is the extent of water re-use literacy measurable? How?</b></p> <p>Sub-objective 1: Functional literacy</p> <p>General improvement in functional water re-use literacy can be measured against the findings of the baseline study.</p> <p>If, as will be proposed below, water re-use literacy at all three levels is added to the curricula of different learners, the assessment activities will show if a particular level of literacy has been attained. However, indicators for communicative literacy and critical literacy for the other target groups are not easy to define in measurable terms, as one relies on measuring actual output against planned output. Guidelines are provided in section 2.10.</p>
<p><b>Assignable: Who must develop/grow/establish this literacy?</b></p> <p>The answer is at this stage still open and will have to be decided when the draft communication strategy is presented to stakeholders. This communication strategy makes recommendations on implementing institutions.</p>
<p><b>Relevant: Is it relevant for the public to be water re-use literate?</b></p> <p>Yes, as described above.</p>
<p><b>Time-based: By when must the public be water re-use literate?</b></p> <p>No dates have been suggested by any stakeholder. To be in line with the end date for the current Sustainable Development Goals (specifically Goal 6 – ensure availability and sustainable management of water and sanitation for all), South Africa’s National Development Plan 2030 and the NW&amp;SMP, 2030 is proposed as the date by when the South African public must be water re-use literate.</p> <p>For the specific activities proposed in the communication strategy, a statistical analysis of probable impact over time, will be useful to determine a specific time frame within the broader 10-year period. Several stakeholders noted the need to fast-track public education in certain circumstances, for example a severe drought in a municipal area or the implementation of a water re-use project. This will be addressed in the proposed activities and channels.</p>

### 2.3.2 Objective 2: To ensure that water re-use literacy is sustainable

<p><b>Specific: What does it mean?</b></p> <p>Given the proposed time frame of 2030, it would mean that water re-use literacy improves continuously at all levels over the next 10 years.</p>
<p><b>Measurable: Is sustainability measurable?</b></p> <p>Yes, if the improvement in water re-use literacy is measured at regular intervals, for example, every five years. In a basic education environment, assessment would take place continuously.</p>
<p><b>Assignable: Who must ensure sustainability?</b></p> <p>Sustainability will be integrated into the selection of target audiences and the proposed activities. Roles and responsibilities will therefore be the same as for Objective 1.</p>
<p><b>Relevant: Is sustainability relevant?</b></p> <p>Yes, promoting water re-use literacy is aimed at ensuring the sustainable management of water resources for the future.</p>

**Time-based: By when must sustainability be achieved?**

If water re-use literacy improves steadily over the next 10 years, one could say that sustainability has been achieved.

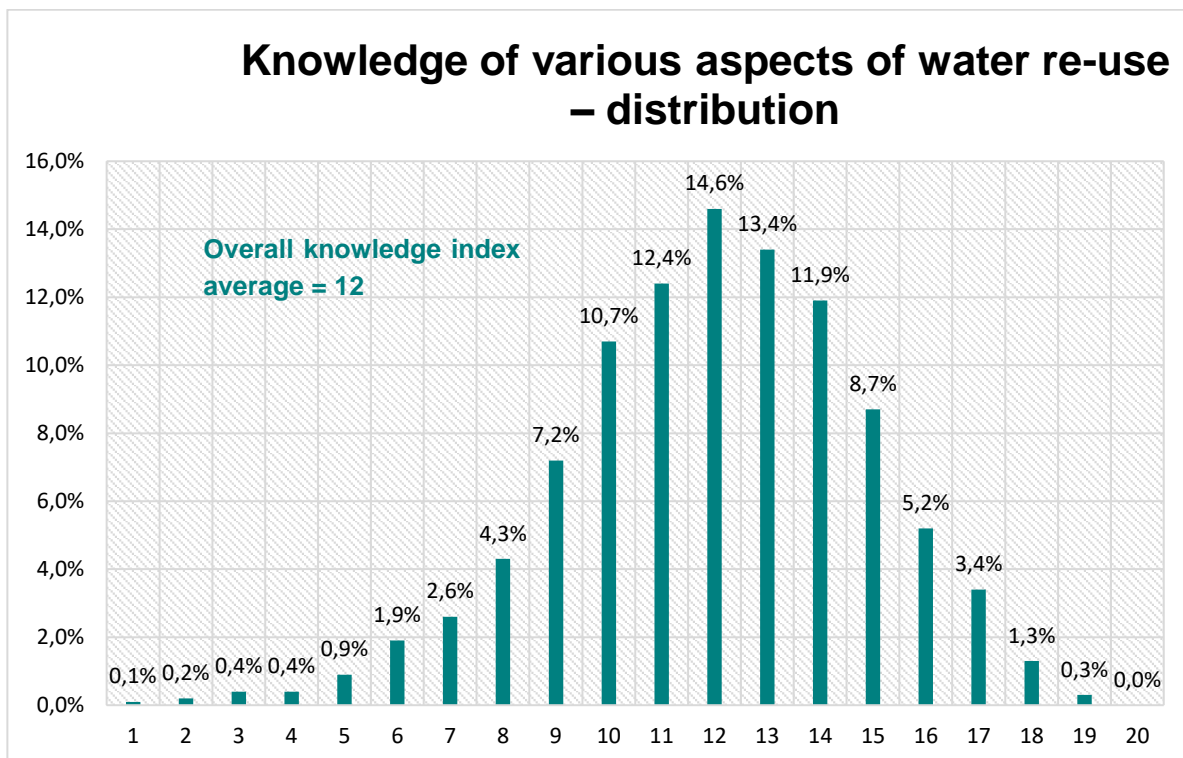
**2.4 A NATIONAL SURVEY TO ESTABLISH A BASELINE**

**2.4.1 What does the public know?**

In 2019, a WRC study was conducted to establish a baseline of public knowledge on water re-use and related aspects. The survey was done as part of the Nielsen OMNIBUS syndicated survey. The OMNIBUS survey covers adults, aged 15 years and over, from all race groups. An area-stratified, probability sample of 3 319 households was drawn from the Nielsen Company’s Customized Research computerised dwelling unit census. The sample included 1 661 females and 1 658 males. In each household, the male or female to be interviewed was chosen using a random selection grid. The sample included 2 519 urban respondents (Metro and other urban) and 800 rural respondents. "Urban" is defined as areas of a community size of 8 000 and above. This includes cities, large towns and small towns.

The report, *Water re-use – what does the public know?* is available on the WRC’s website at [http://www.wrc.org.za/wp-content/uploads/mdocs/TT807\\_final%20web.pdf](http://www.wrc.org.za/wp-content/uploads/mdocs/TT807_final%20web.pdf).

Figure 2-5 shows that South Africans scored on average 12 out of 20 on questions about water re-use and related aspects.



**Figure 2-5: Knowledge of various aspects of water re-use – distribution**

Even the most educated and sophisticated lacks basic knowledge: The highest LSM groups (8-10) scored on average 13,05 out of 20 (Figure 2-6 below); people with a post Grade 12 qualification scored on average 12,65 out of 20 (

Figure 2-7 below). A communication strategy for water re-use must therefore target all demographic groups.

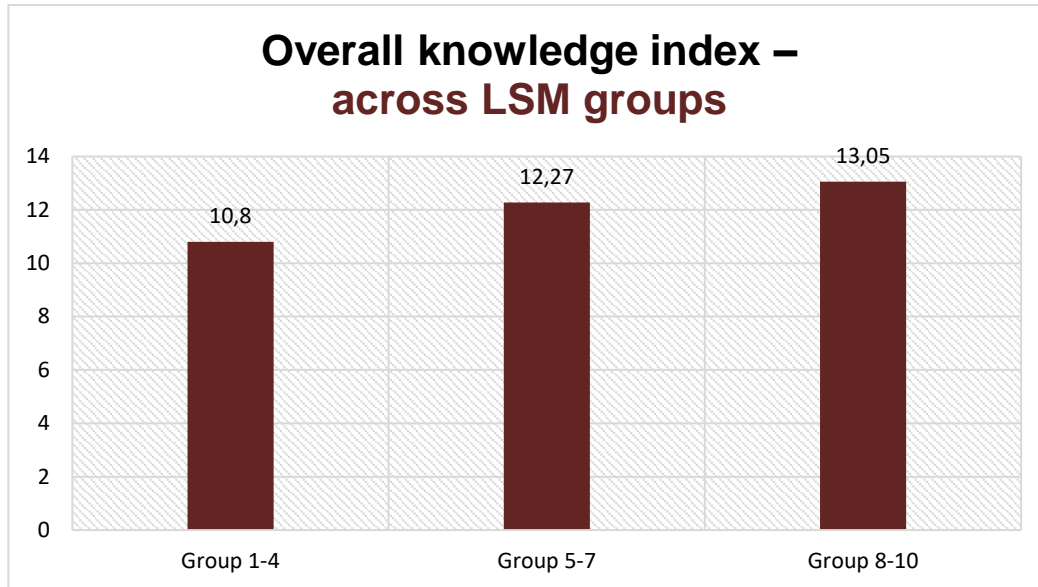


Figure 2-6: Overall knowledge index – across LSM groups

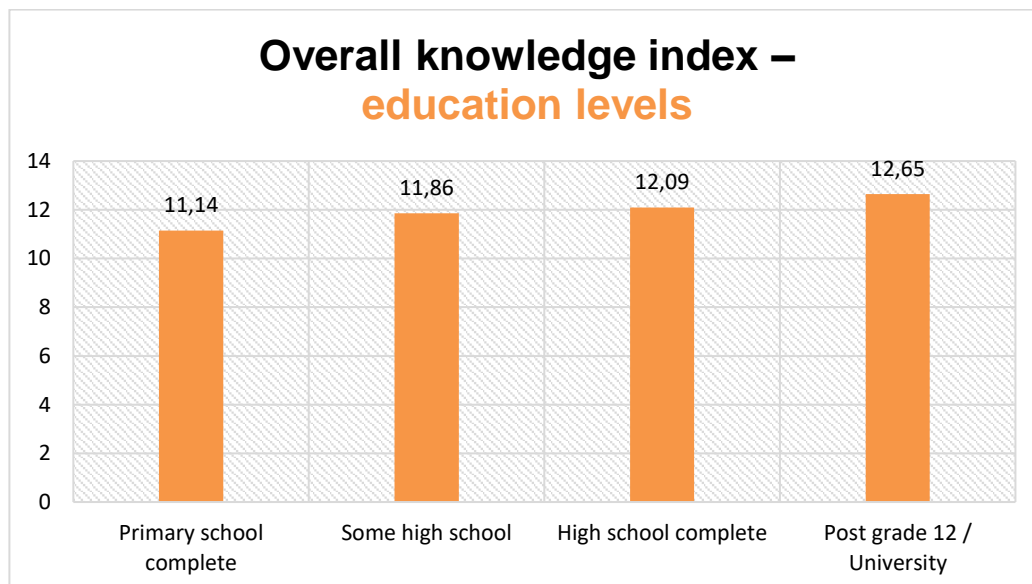


Figure 2-7: Overall knowledge index – education levels

South Africans across all demographic groups would support water re-use in a severe drought situation, including direct potable re-use. Figure 2-8 shows that 48,5% mentioned direct potable re-use as one of the actions that they would support in a severe drought situation.

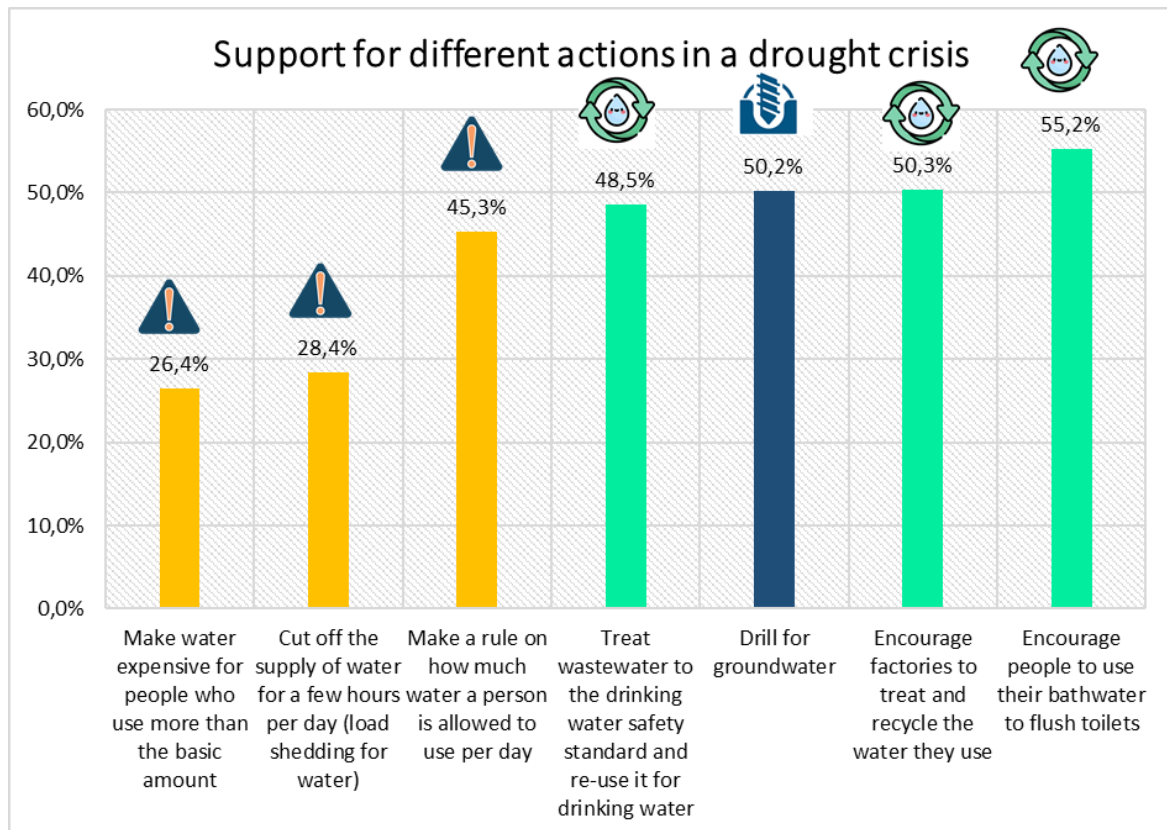


Figure 2-8: Support for different actions in a drought situation

## 2.4.2 What must the public know?

### 2.4.2.1 Knowledge aspects identified for the baseline study

The questionnaire of the baseline survey was designed to cover the following knowledge aspects, which were identified in the literature review and the stakeholder consultations as knowledge that the public should have:

- Knowledge of terminology such as 'wastewater', 'treatment', 'greywater' and 'water quality standards'
- Knowledge of the water cycle
- Knowledge of water and wastewater treatment and municipal responsibilities in this regard
- Knowledge of *de facto* water re-use
- Knowledge of safety aspects of water re-use
- Common myths and misconceptions
- Knowledge of the effect of climate change on the availability of water
- Knowledge of South Africa as a water-scarce country, and
- Knowledge of different types of water re-use.

It is proposed that the public education programme for water re-use cover these knowledge aspects as a starting point. Not only do they provide a clear focus, but by aligning the knowledge aspects tested in the baseline survey with the focus of a public education programme, one will also be able to track progress.

#### 2.4.2.2 Knowledge aspect that stakeholders added

Stakeholders suggested the following additional aspects that they believe the public should know:

- Successful re-use in other countries and cities
- The concept “Day Zero”, and
- Other terms: blackwater, water reclamation, direct and indirect re-use.

#### 2.4.2.3 Emerging knowledge needs

It is important though that the identification of knowledge needs is a dynamic two-way process: Dr Esper Ncube, a Reference Group member, noted in her feedback on the draft communication strategy that the strategy should include a channel through which the public can continuously express knowledge needs to the scientific community and the implementing organisations of this strategy. The content of what the public needs and wants to know is furthermore not closed. It will evolve and expand as new research and development uncover and discover new information. The issue of updating the content of what the public must know will be addressed in proposed activities and channels.

## 2.5 TARGET AUDIENCES

### 2.5.1 Objective 1: water re-use literacy

In the baseline assessment, the distribution curve of the knowledge index score, which is a composite score for the knowledge aspects listed above, shows that most scores are clustered between 10 and 13 out of 20. In addition, demographic differences were small, indicating that a public education programme should target all demographic groups. On the other hand, there is agreement in the literature that messaging is more effective when it is tailored to a specific target audience, because they can address the background, culture, religious beliefs, preferences, and existing behaviours among individuals in the target audience(s). It was noted in the literature review that research evaluating public awareness campaigns found that using multiple modalities to deliver several related campaign messages have a greater positive impact than a single message delivered in one format. This means that target audiences need to see or hear a campaign’s message in multiple, diverse ways over time before they will acquire the knowledge, change attitudes and adopt the desired behaviour.

### 2.5.2 Objective 2: sustainability

Most stakeholders proposed that for sustainable the strategy should put special emphasis on basic education learners. Below are a few quotes that capture the reasoning behind their proposals:

*Children should definitely be targeted for the education programme to be sustainable.*

*Children are important because we’re going to hand over this world to them.*

*Children are quick to absorb... they will make the change and are willing to learn.*

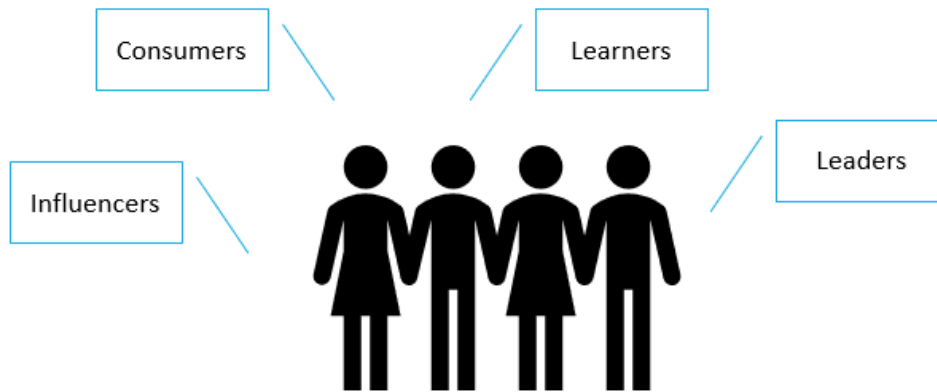
*We call them Abashintshi, the game changers.*

*Children disseminate information quickly to their parents and could therefore change attitudes in this way.*



### 2.5.3 Targeting the public in different roles – a multi-layered approach

The literature emphasises that knowledge acquisition is not instant. Messages need to be reinforced in different formats and channels and repeated over time before they will become intrinsic knowledge. For this reason, a multi-layered approach is proposed whereby individuals are targeted in their different roles in life (Figure 2-9). For example, Lebogang Maletswa is a consumer of Madibeng Local Municipality; she is also a Councillor of the LM and a leader and influencer in her community.



**Figure 2-9: Individuals in different roles in society**

Roles also change across time as depicted in Figure 2-10. Children are basic education learners; beyond school, they become college and university students. As professionals, they become lifelong learners. Some individuals play a specific role in society which is associated with a specific learning programme, for example SALGA’s councillor induction programme.



**Figure 2-10: Changing learner roles across time**

### 2.5.4 Proposed target audiences

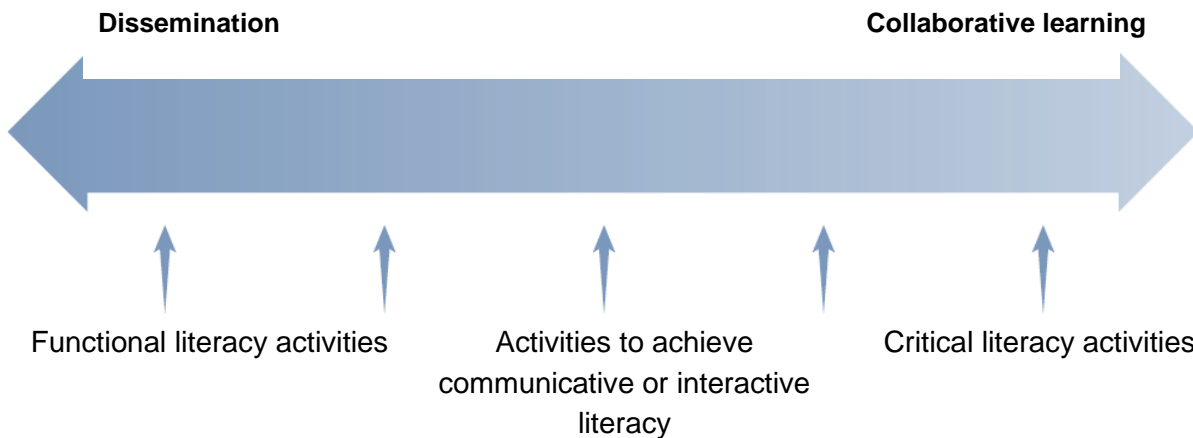
In view of the above observations, we propose to categorise the public for the purpose of this communication strategy in terms of specific roles that citizens assume (see Table 2-1). Categories overlap to achieve multiple contact points per individual.

**Table 2-1: Target audiences**

<b>Role</b>	<b>Levels</b>	<b>Rationale</b>
<b>Learners</b>	Basic education	Motivated by stakeholders and literature for sustainability.
	Higher education	To prolong education thrust in higher education. Higher education institutions play a dual role in educating students on water re-use and related aspects. On the one hand, they are educating students on those aspects of water re-use which form part of the curriculum. On the other hand, it is also the institution's responsibility to educate its community on sustainable water management and the role of water re-use.
	Professional learning	To prolong and extend education thrust.
	Councillor induction	To prolong and extend education thrust; political support is needed for water re-use implementation.
<b>Consumers</b>	Local government	Water re-use is implemented at WSIs; municipalities are well positioned to educate consumers, but they need to be mindful that their consumers comprise diverse groups with diverse interests.
	Household	Water re-use is implemented at household level: children educate parents at household level and vice versa
	Individual	Individuals interact on social media and other channels.
	Businesses: Large brand water-intensive businesses Retail sector	Targeted as partners of the implementing institutions: powerful brands to spread messages; sponsor education material; case studies of successful water re-use; candidates for public-private partnerships.
<b>Decision makers and influencers</b>	Politicians, water services institutions, the regulator, community leaders, women groups, NGOs, organised civil society, religious leaders, traditional leaders, organised business, the media	To fast-track water re-use literacy for key decision-makers and influencers.

## 2.6 A SUITABLE PARADIGM AND COMMUNICATION MODEL

The literature review and stakeholder research findings indicate that a hybrid communication model would be the most suitable for this communication strategy. The approach and proposed activities for the three levels of water re-use literacy range from knowledge dissemination to the critical analysis of information and negotiation of meaning in collaborative learning. Figure 2-11 below maps the activities onto the range of approaches:



**Figure 2-11: Activities of the three literacy types mapped onto a range of communication models**

Collaborative learning involves the co-production of knowledge (Roux et al., 2006). Roux et al. (2006) note that this approach "requires a shift from a view of knowledge as a 'thing' that can be transferred to viewing knowledge as a 'process of relating' that involves negotiation of meaning among partners". The proposed approach and associated communication activities and channels will be linked in the next section to the identified objectives and target audiences. The proposed activities will illustrate the link between the literacy level and the communication approach (ranging from dissemination to collaborative learning).

## 2.7 PROPOSED ACTIVITIES AND CHANNELS

In this section, activities and channels are proposed for target audiences in each role (Tables 2-2 to 2-9). The proposed activities and channels to achieve a water re-use literate public will now be described per sub-objective and for each target audience. The objective of sustainability has been addressed in the selection of target audiences, the use of multiple modalities for communication activities and the time frame of the public education programme.

### 2.7.1 Learners at different levels

**Table 2-2: Learners – basic education**

Basic education learners
Stakeholders indicated that it would not be feasible to revise the CAPS to cover all topics in the basic water curriculum outline (see the next chapter). They proposed that basic education learners be targeted through teacher training and making educational resources widely available. The Fundisa for Change model is an example of teacher training that focuses on a specific topic like climate change.

Basic education learners		
<p>To target basic education learners directly it is recommended that the DWS water competitions and annual water conference for youth, as well as SAASTA's national science week for basic education learners, be extended to include water re-use as a topic.</p> <p>Large brands might be interested in sponsoring some of these activities and supporting material such as a video on the basics of water re-use or a poster on safe greywater re-use for Intermediate Phase learners.</p>		
<p><b>Implementing institution:</b> Higher Education Institutions and DHET/DBE; the DWS School Intervention Programme in collaboration with the WRC; large brand water-intensive businesses as sponsors</p>		
<p><b>Time frame:</b> 10 years, the relevant implementation institution will have to update the curriculum for teacher training after five years to include latest research and case studies</p>		
Activities and channels		
Functional literacy	Communicative literacy	Critical literacy
<p>Resource materials for educators</p> <p>Include practical examples and case studies where relevant</p>	<p>Include practical skills in assessment activities</p> <p>Include a visit to a local water or wastewater treatment plant where feasible in the learning activities<sup>2</sup></p> <p>Include water re-use in the topics of DWS and DBE initiatives:</p> <ul style="list-style-type: none"> <li>• Baswa le Meetse (BLM) – a competition using arts and culture to convey hygiene and water messages</li> <li>• South African Youth Water Prize (SAYWP) on science and innovation</li> <li>• Aqua Enduro (AE) Competition on Drinking water quality</li> </ul>	<p>Include debate and discussion on topical aspects of water re-use in the learning activities</p> <p>Include water re-use as a topic in the Annual Youth Summit on Water and Climate Change</p>

**Table 2-3: Learners – higher education**

Higher education learners
<p>It is proposed that higher education institutions include water re-use as a topic in relevant curricula and learning material (TVET college qualifications, e.g. plumber; universities – water professional degree aimed at civil servants).</p> <p>Include water re-use into the institutions' annual water education programme.</p>

<sup>2</sup> For knowledge acquisition, it is important that learners get the opportunity to see an actual treatment plant, but not all municipalities are keen to have school groups on their plants. An alternative would be a regional demo plant, like the demo water re-use plant that Umgeni Water is launching. Water Wise takes learners to the Rand Water Vereeniging water treatment plant.

Higher education learners		
<b>Implementing institution:</b> Relevant departments at higher education institutions, such as universities and TVET colleges		
<b>Time frame:</b> 10 years, curricula to be revised every two years to included new research and case studies		
Activities and channels		
Functional literacy	Communicative literacy	Critical literacy
Include aspects of water re-use in relevant curricula, including case studies	Include practical skills development in student assignments and projects	Include the topic in student debates
Run annual campaigns to educate the student community on water re-use and related aspects	Include visits to treatment plants or a local industry that treats and recycles industrial water in student activities	Select reading material and tasks that includes the analysis of information and critical thinking

**Table 2-4: Learners – professional education**

Professional learners		
It is proposed that institutions like WISA, SAICE, the SETAs, IMESA and Umgeni Water (Learning Forum) consider the basic water curriculum outline and include water re-use in their professional courses.		
<b>Implementing institution:</b> SETAS, WISA, SAICE, IMESA, Umgeni Water		
<b>Time frame:</b> 10 years. Content to be revised every two years as new research and case studies become available		
Activities and channels		
Functional literacy	Communicative literacy	Critical literacy
Run courses on aspects of water re-use for CPD points Include case studies in the learning material	Include practical assessment tasks where learners have to apply information  Include visits to treatment plants in course activities	Encourage discussion and debate as part of the course  Select reading material and tasks that includes the analysis of information and critical thinking

**Table 2-5: Learners – Councillors**

Councillors
Other WRC projects have found that Council support for the implementation of water and wastewater projects is often lacking because new Councillors have limited scientific knowledge of the management of water and wastewater. This proposed activity will make use of a successful existing learning vehicle, i.e. SALGA's Councillor induction programme, to address this gap in water re-use literacy.
Another proposed vehicle to reach councillors is SALGA's Municipal Water Services Scientific Forum. The primary purpose of this forum is to provide strategic direction and leadership to the country's municipal scientific community in order to develop intuitive scientific leaders.
<b>Implementing institution:</b> SALGA

<b>Councillors</b>		
<b>Time frame:</b> 10 years, curriculum to be revised every two years to include new research findings and case studies		
<b>Activities and channels</b>		
<b>Functional literacy</b>	<b>Communicative literacy</b>	<b>Critical literacy</b>
Include water re-use in the curriculum	Include practical assessment tasks where learners have to apply information Include visits to treatment plants in course activities	Encourage discussion and debate as part of the course  Select reading material and tasks that includes the analysis of information and critical thinking

## 2.7.2 Consumers at different levels

**Table 2-6: Consumers – at local government level**

<b>Municipal consumers</b>		
<p>It is proposed that WSIs integrate the suggested activities into their regular communication with consumers. It is further suggested that WSIs follow a multiple-stakeholder approach to bring communities and the private sector on board to make water re-use part of the local water solution.</p> <p>The health and safety aspects of greywater are particularly relevant at local government level. It is suggested that existing communication material on greywater be adapted for this purpose and provided to all WSIs in electronic format so that they can reproduce it and make it available at clinics, hospitals and doctors' waiting rooms. A presentation with voice over on best practice, lessons learnt and practical guidelines for public communication on water saving and water re-use was developed for WSIs as part of the toolkit.</p>		
<b>Implementing institution:</b> WSIs in collaboration with local businesses, organised civil society and NGOs		
<b>Time frame:</b> 10 years		
<b>Activities and channels</b>		
<b>Functional literacy</b>	<b>Communicative literacy</b>	<b>Critical literacy</b>
Give informative talks on wastewater treatment and water re-use at local schools and community events Distribute material (printed and video) on health and safety aspects of greywater	Encourage public participation on the municipality's Facebook page and other social media platforms like Twitter and online platform even if it is not directly about water re-use (City of Tshwane's leak campaign and online platform are examples)  Take school groups on a tour of a water or wastewater	Arrange multiple-stakeholder forums where communities and private sector participate in finding local water solutions

Municipal consumers		
	<p>treatment plant <sup>3</sup> or a visitor's centre that demonstrates key aspects of water treatment and re-use.</p> <p>Include testimonials of local people in communication to start conversations</p>	

**Table 2-7: Consumers – at household and individual level**

Consumers at household and individual level		
<p>The Department of Water and Sanitation runs annually public campaigns on aspects of water. It is proposed that at least one of these annual campaigns include water re-use as a topic with the focus on water re-use literacy at household and individual level.</p> <p>Topics and activities to consider:</p> <ul style="list-style-type: none"> <li>Facts and figures of the water cycle</li> <li>Myths and misconceptions</li> <li>What is your family's water reuse strategy?</li> <li>What is safe and what is not when it comes to greywater re-use?</li> <li>Are you ready when the taps run dry? What can you do?</li> <li>Are you a good water citizen – score yourself?</li> <li>'Do-you-know?' competitions and campaigns (for example the Chappies wrappers)</li> <li>Rewards for engagement (free data if you participate on a forum)</li> <li>Story lines that show responsible water re-use in popular soapies</li> </ul>		
<p><b>Implementing institutions:</b>                      DWS in partnership with communities and the private sector as co-sponsors.                      Any organisation that wants to run its own awareness campaign for a specific segment of the public.                      Environmental organisations like SANBI and NGOs like AWARD have an important role to play in this regard.</p>		
<p><b>Time frame:</b> Annually</p>		
Activities and channels		
Functional literacy	Communicative literacy	Critical literacy
<p>Short informative messages in all media (social and mainstream) that DWS uses in their annual water campaigns</p>	<p>Develop a tagline and infographic to activate public participation in finding water solutions.</p> <p>Get celebrities to post water re-use messages on Twitter and Instagram: soccer players, soapie stars, talk show hosts/radio DJs, stand-up comedians, reality stars</p>	<p>Public debates/expert panels/talk shows on radio and TV focusing on scientific knowledge</p>

<sup>3</sup> For knowledge acquisition, it is important that learners get the opportunity to see an actual treatment plant, but not all municipalities are keen to have school groups on their plants. An alternative would be a regional demo plant, like the demo water re-use plant that Umgeni Water is launching.

**Table 2-8: Consumers – businesses**

<b>Business consumers</b>		
Water is a critical risk for water-intensive businesses. At manufacturing plants, they share resources with a local community. Is therefore important for them to be perceived as contributing to the sustainable management of water resources. Some of the large brands like Stella Artois use celebrities to market their water saving and recycling activities. They can therefore be excellent partners to grow water re-use literacy.		
<b>Implementing institutions:</b> NEPAD Business Foundation/SWPN. South African Affordable Residential Developers Association (SAARDA); Consumer Goods Council of South Africa		
<b>Time frame:</b> 10 years and according to the sustainability goals and implementation framework of each business		
<b>Activities and channels</b>		
<b>Functional literacy</b>	<b>Communicative literacy</b>	<b>Critical literacy</b>
Seminars and conferences where the latest water re-use research is shared	Create opportunities to showcase water and wastewater treatment facilities and recycling to the public Involve business as partners in other public education activities	Participation of water-intensive business in public discussion and debate on water-related topics

### 2.7.3 Decision makers and influencers

**Table 2-9: Activities and channels to fast-track knowledge acquisition in this target group**

<b>Decision makers and influencers</b>		
It is important to fast-track water re-use literacy among decision makers and influencers because important decisions will be continued to be made. The actions below have this aim in mind.		
<b>Implementing institution:</b> DWS, Chief Directorate: Communications in collaboration with the Water Research Commission and the science community; WISA; DBSA Water Re-use Programme		
<b>Time frame:</b> 10 years		
<b>Activities and channels</b>		
<b>Functional literacy</b>	<b>Communicative literacy</b>	<b>Critical literacy</b>
Information sessions involving a panel of experts, including medical experts to address issues of health and safety Invite decision makers to seminars and conferences on water re-use Media briefings where relevant	Identify key decision makers as champions and communicate through them to the public	Invite decision makers and influencers to respond to information sessions. Invite decision makers and influencers to present on specific topics. Support them with expert assistance



## 2.8 IMPLEMENTING INSTITUTIONS

It is envisaged that the proposed implementing institutions take the following actions:

- Allocate resources and responsibilities to the task
- Engage with experts and the target audience (where possible) to decide on appropriate content for the specific target audience and sub-groups
- Decide on appropriate activities and channels for the specific target audience and sub-groups
- Develop an implementation plan with time frame
- Verify the accuracy of the material that will be used for the educational programme and updating it regularly
- Roll out the educational programme, and
- Monitor and evaluate the impact of the programme.

Stakeholders emphasised the need for a single body or institution to coordinate the implementation of the strategy. See in this regard also section 1 of the final chapter.

## 2.9 PROPOSED MESSAGING

### 2.9.1 Principles

The principles for messaging have been taken from the literature review and stakeholder input.

1. Communication should always include the broader context and the impact on the environment, economy and society (UNESCO, 2012; Motion & Kearnes, 2014).

**This is especially true for a sensitive topic like water re-use. Public communication on water re-use tends to put all the emphasis on direct potable re-use instead of making sure the public has a basic understanding of water re-use (the natural water cycle, different types, different uses, different levels of treatment, quality standards, health and safety) before the public is expected to accept direct potable re-use.**

2. Prioritise messages or follow a hierarchy of messages (stakeholder input). Prioritise messages of water scarcity and the water cycle.
3. Messages must be consistent and coordinated (WHO, 2017).
4. For sustainability, messages must be simple, unexpected, concrete and credible. They must have emotional appeal and tell stories (REACH, 2015).

### 2.9.2 Social marketing

Market water re-use as beneficial for society to get positive responses and support from target audiences.

Key message frames should include:

- the social, economic and environmental benefits of water re-use
- the need for different sources to address water scarcity and water security, and
- safety standards for re-use (Motion & Kearnes, 2014).

### 2.9.3 Frame messages according to the literacy level

It is recommended that the appropriate message frame be used for each level of literacy to reflect the message's orientation toward the public. In the example below, the same message has been differently framed for each of the three literacy levels:

1. The risks and benefits of water re-use (functional literacy – emphasis on uptake of information).
2. Let's talk about the risks and benefits of water re-use (communicative and interactive literacy – emphasis on inviting interaction).
3. Join us in finding water re-use solutions (critical literacy – emphasis on engaging as a partner).

### 2.9.4 Drive a key message

Stakeholders suggested that the public education programme should drive the key message that all water has been and is being re-used. Most international water re-use campaigns have used a single tagline and infographic to identify and unify the campaign. Below are a few examples from taglines that are available on the internet<sup>4</sup> or that have been adapted from existing taglines.

#### **Re-use:**

Re-use it or lose it  
Recycle today for a better tomorrow

#### **Save and re-use:**

Reduce, re-use, recycle  
Don't waste, re-use  
Don't wait until the tap runs dry. Save and re-use  
No water = no life. Save and re-use for tomorrow  
Count every drop

#### **Become informed (on all aspects of water):**

Get waterwise

### 2.9.5 Tone of voice

Stakeholders emphasised that the tone of voice of messages should be tailored for the target audience. For example, especially young basic education learners relate to fun, entertainment and excitement. The public is a lay audience therefore use language that they can understand and relate to. Furthermore, messages should be positive, encouraging and inspiring. The tone should be inclusive: we have to come up with solutions together; we share the same goal and the same dreams.

## 2.10 GUIDELINES FOR EVALUATING THE SUCCESS OF THE INTERVENTION

There are two types of evaluations of a communication intervention. The one is formative, in other words, the evaluation takes place as the intervention is rolled out to check if implementation is on track and still aligned to the objectives. In development communication, formative evaluations are normally called 'monitoring'. The other type is summative; it occurs at the end of a communication intervention.

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<sup>4</sup> <https://www.everydayknow.com/recycling-slogans/>

Both are based on indicators that have been identified in the defining of objectives. They typically measure the difference in knowledge, awareness, attitude and behaviours between the situation before the intervention and the one after the intervention (Mefalopoulos, 2008:135) to establish if the communication has had any impact. Evaluation methods are quantitative or qualitative, or a combination of the two. Baseline information is often absent, or in a format that makes it impossible to quantify the change that took place. The indicators of change for each of the sub-objectives and the proposed evaluation instruments are summarised in Tables 2-10 to 2-13 below.

**Table 2-10: Indicators and evaluation instruments – all target audiences**

Target audience	Objective	Indicator	Evaluation instruments
All	Functional literacy	Knowledge index scores	Baseline assessment tool

**Table 2-11: Indicators and evaluation instruments – learners**

Target audience	Objective	Indicator	Evaluation instruments
Learners	Functional literacy	Improved performance on assessment activities	Annual report from DBE on national assessment outcomes
	Communicative literacy		
	Critical literacy		
		Participation and performance	Annual report on the competitions and conference of DWS' intervention project
			A national water online quiz for basic education learners

**Table 2-12: Indicators and evaluation instruments – consumers**

Target audience	Objective	Indicator	Evaluation instruments
Consumers	Functional literacy	Change in behaviour and attitude	Municipal return flows and water use tracked with AMR devices
	Communicative literacy		
	Critical literacy		
		Activity took place	Annual report to DWS captures findings of the above and educational activities
		Target audience participated	Attendance registers and feedback reports

<b>Target audience</b>	<b>Objective</b>	<b>Indicator</b>	<b>Evaluation instruments</b>
		Positive evaluative feedback	Reach data for electronic and print media  Facebook (and other social media) and Google analytics for web-based viewing and engagement activities

**Table 2-13: Indicators and evaluation instruments – decision makers and influencers**

<b>Target audience</b>	<b>Objective</b>	<b>Indicator</b>	<b>Evaluation instruments</b>
Decision makers and influencers	Functional literacy	Activity took place	Attendance registers and feedback reports  Media monitoring  Reporting of desired attitudes or behaviour
	Communicative literacy	Target audience participated	
	Critical literacy	Positive evaluative feedback	
		Any change in attitude and behaviour	

## CHAPTER 3: TOOLKIT OF SAMPLE MATERIAL

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### 3.1 INTRODUCTION

Table 3-1 provides details of sample communication material developed and the target audiences. The toolkit material is presented as Volume III of the report.

**Table 3-1: Toolkit developed**

Target audience	Sample communication material
All target audiences	<p>Developed two fact sheets on COVID-19 in collaboration with the WRC</p> <p>Developed an infographic that summarises that gives a visual summary of the information that the public needs to know</p> <p>Designed a mind map that shows how the infographic can be unpacked and used for different media and channels.</p>
All levels of learners	Developed a basic water curriculum outline, which includes water re-use for all levels of learners
Basic education learners	<p>Identified water and water-related aspects in current CAPS curriculum</p> <p>Mapped water and water-related aspects in current CAPS curriculum onto the basic water curriculum outline</p> <p>Mapped DWS, WRC and Rand Water learning material onto the basic water curriculum outline</p> <p>Adapted learning material for Intermediate phase (developed by the Masters student) to illustrate how a water topic can be taught across the curriculum<sup>5</sup></p>
Local government	Developed a presentation on best practice, lessons learnt and practical guidelines for public communication on water saving and water re-use

### 3.2 INFOGRAPHIC

The infographic aims to capture key aspects of water use, including re-use, that would be relevant and interesting for the public to know. At the same time, the infographic aims to inspire the public to become Water-Wise Warriors. This central message was selected to align with the concept of “becoming water wise”, which is already popular internationally and which is also used in South Africa by organisations such as Rand Water. The infographic is available in Volume III of the report.

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<sup>5</sup> See the capacity building report in the annexure.

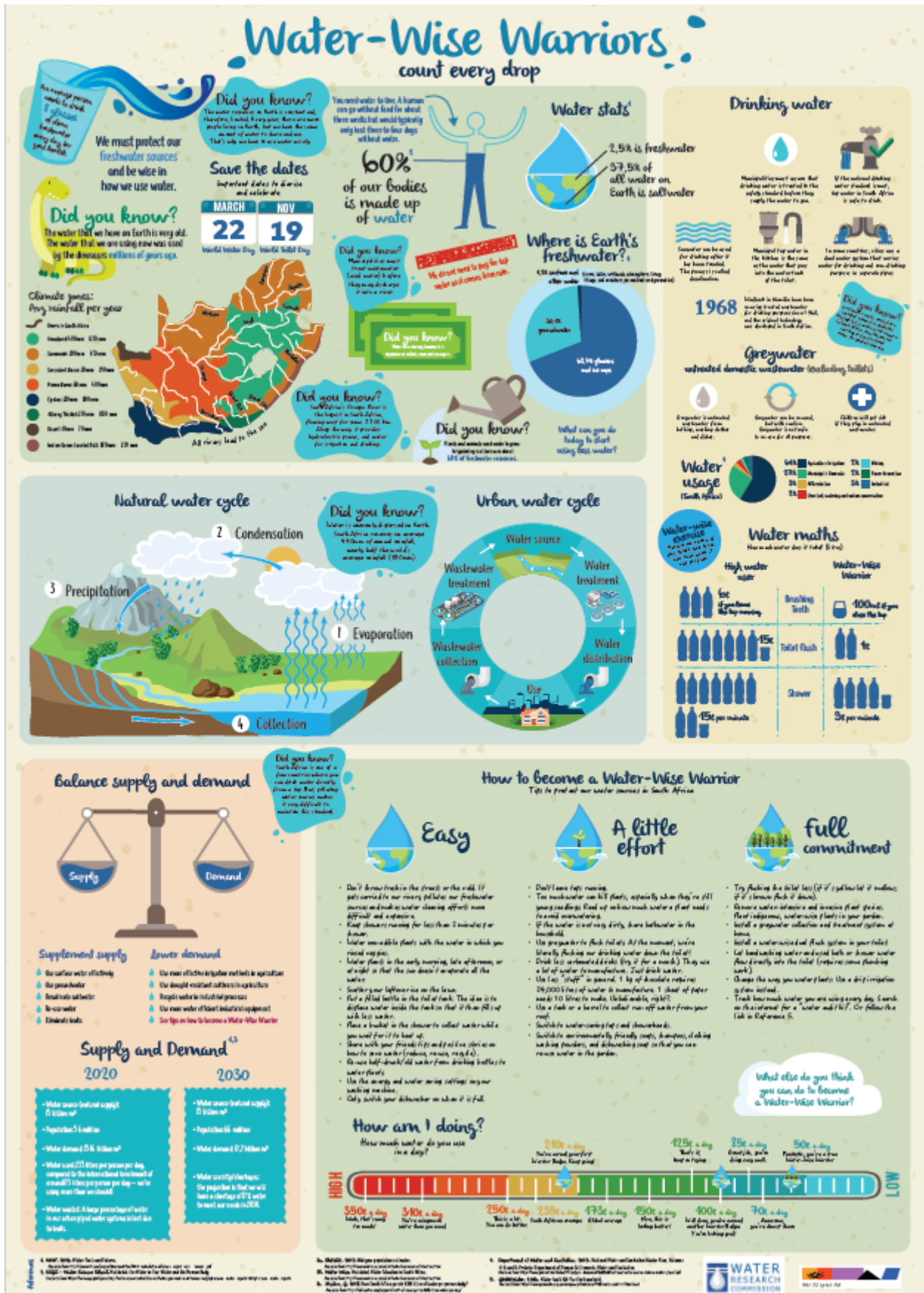


Figure 3-1: Infographic

### 3.3 MIND MAP

The mind map shows how the infographic can be re-used in a water education programme.

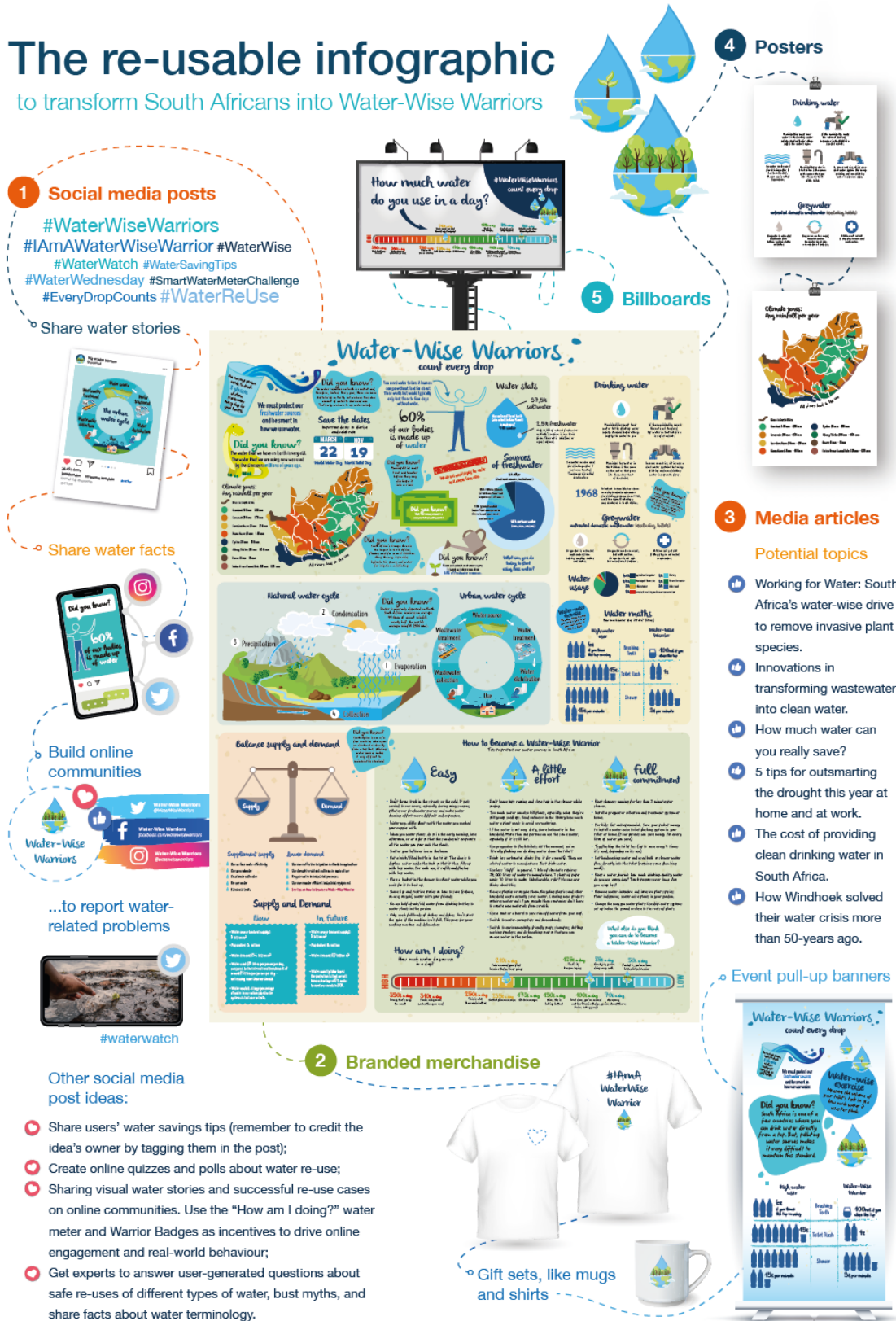


Figure 3-2: Mind map that shows how the infographic could be used



The above mind map shows samples of communication elements, all of which can be extracted from the infographic. The mind map also demonstrates how communication channels can be integrated to get better message exposure and retention. All these communication elements have a common objective: to increase water re-use literacy at all three levels, and to change behaviour sustainably.

The elements are:

- Social media posts
- Media articles
- Animations or videos
- Murals
- Newsletters (print or email)
- Billboards
- Posters
- Giftsets, like mugs, fridge magnets or bookmarks
- Printed clothing
- Website banners
- Pull-up banners for events
- Hashtags to use:
  - Campaign-specific hashtag: #IAmAWaterWiseWarrior
  - Hashtags used locally:
    - #WaterRe-Use
    - #WaterWednesday
    - #WaterWatch
    - #EveryDropCounts
    - #SmartWaterMeterChallenge
    - #WaterWise
- Types of posts:
  - Water savings tips
  - Online quizzes/polls (water re-use)
  - Online community building (sharing water use reduction goals and success stories) – water meter scale with badges (incentives)
  - Online engagement: answer FAQs about water (answer user-generated questions, gets experts to answer the questions, bust myths (water lies), “Did you know?” facts, share meaning of terms)
  - Reporting tool with municipality (take video/photo of polluted freshwater sources, like rivers)

The mind map is available from the WRC.

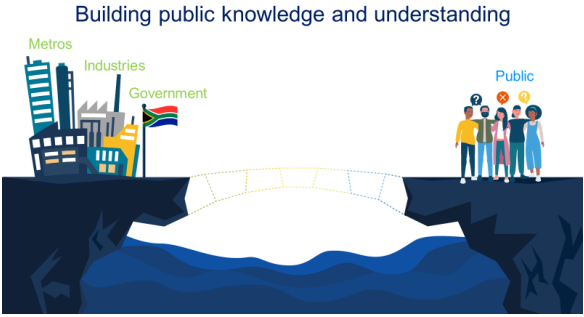


### 3.4 GUIDELINE PRESENTATION WITH HANDOUT


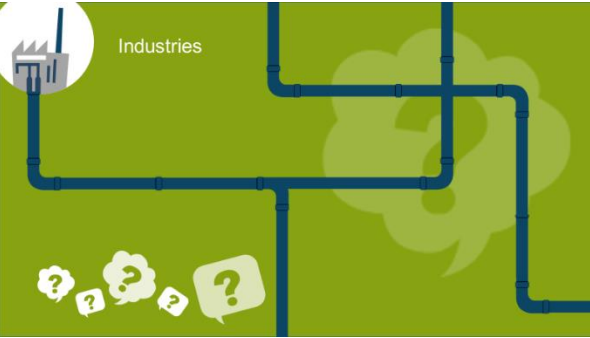


A presentation was developed in PowerPoint and Prezi on best practice, lessons learnt and practical guidelines for public communication on water saving and water re-use. The PowerPoint presentation and the handout are attached to this report as separate files.


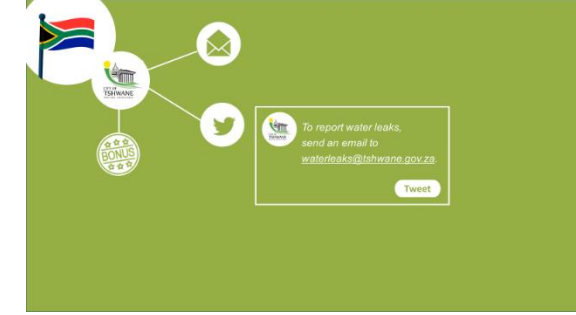
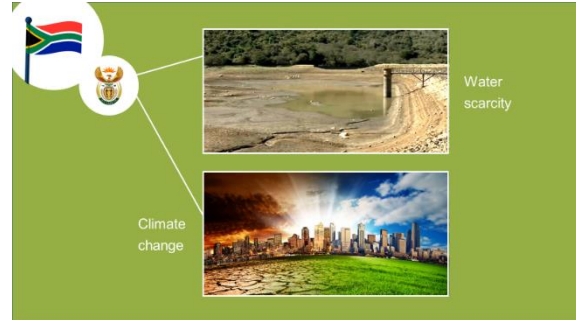

The Prezi presentation is available at <https://prezi.com/view/48crcdADhON2W5hTFhjH/>. The text and the slides appear in Table 3-2 below. The presentation is available from the WRC.








**Table 3-2: Guideline presentation**

<p><b>Building public knowledge and understanding (title slide)</b></p> <p>In this presentation, we share with you best practices and lessons learnt in building public knowledge and understanding of water, as was expressed by representatives of a selection of Metros, government organisations, and water-intensive industries in South Africa.</p> <p>We present these best practices and lessons to you as guidelines that you can use when you communicate with the public on water saving and water re-use.</p> <p>What is it that we all want to achieve? We want our communication to fill gaps in knowledge and build bridges towards an informed and supportive public. A public that understands and appreciates the value of water. A public that is committed to be Water-Wise Warriors.</p>	 <p>The illustration shows a bridge with a dotted yellow line connecting two cliff sides. On the left cliff, there are icons for 'Metros' (a skyscraper), 'Industries' (a factory), and 'Government' (a flag). On the right cliff, there are icons for 'Public' (a group of people). Below the bridge is a blue body of water.</p>
<p><b>Knowledge – perceptions – behaviour (Slide 2)</b></p> <p>Public perception and public behaviour go hand in hand. A positive and supportive public can lead to major water savings, as Cape Town has experienced during the drought of 2018. Negative public perceptions lead to public objections, which could shut down well-intended water re-use projects, before they even get off the ground.</p> <p>Many research studies done all over the world have found a correlation between public understanding of the water cycle and treatment technology and positive perceptions. This highlights how important it is for the public to understand the basics of sustainable water management.</p>	 <p>The illustration shows a grey silhouette of a person's head and shoulders. Inside the head, there are three interlocking gears in red, orange, and blue. To the left of the head, the words 'Knowledge' (red), 'Perception' (orange), and 'Behaviour' (blue) are listed vertically.</p>
<p><b>Challenges (Slide 3)</b></p> <p>Our first question to the representatives was: What did you find the most challenging in your communication with the public? What messages did you struggle to get across?</p>	 <p>The illustration shows a path made of a dotted yellow line leading from a dark blue area on the left, over a green hill, and across a blue body of water. The word 'Challenges' is written in the center.</p>

<p><b>Metros and government organisations respond (Slide 4)</b></p> <p>Government organisations and the Metros found it challenging:</p> <ul style="list-style-type: none"> <li>• To preach water scarcity when there is water in the tap</li> <li>• To expect rural people to understand the urban water cycle and urban people to understand the natural water cycle, and</li> <li>• To communicate bad news.</li> </ul>	
<p><b>Industry responds (Slide 5)</b></p> <p>The industry representatives found public communication challenging in general, because in their experience, the public does not understand industrial water use. If people don't understand a specific industrial process, how can you expect them to understand how much water this process involves and why? Even in the interaction between municipalities and industries, there is often ignorance on the part of municipalities of the nature of industrial water use.</p>	
<p><b>Approach (Slide 6)</b></p> <p>Each representative cited an approach or approaches to public communication or public education that has worked well for them.</p>	
<p><b>Cape Town (Slide 7)</b></p> <p>Making saving water and re-use sexy and aspirational. That's what Cape Town achieved with their communication approach during the 2018 drought. <i>We wanted residents to compare their water savings with friends and colleagues, and to brag about their water savings at braais and other social gatherings. Brown lawns became very fashionable... our communication encouraged competition in reducing water usage. The green dot map (see example below) was a huge tool for people to brag about their good behaviour.</i></p> <p>They have also found that testimonial campaigns work better than scientists or politicians speaking. <i>We rather had ordinary</i></p>	

<p><i>people speak about how they have changed their behaviour</i></p>	
<p><b>Joburg Water (Slide 8)</b>          Joburg Water said that social media works best for them to quickly reach a large number of residents and to keep a consistent flow of water messages going.  <i>Our Twitter account is currently sitting at four hundred thousand followers. Even the celebrities are following our Twitter account. We find through our Twitter reports that if those people with a huge following, say over a million, re-tweets our message it already pushes our communication to about two million reaches in just thirty minutes.</i></p>	
<p><b>City of Tshwane (Slide 9)</b>          The City of Tshwane created a successful online forum with a dedicated email address for their leak campaign. They also tweeted a message on Twitter: "To report water leaks, send an email to <a href="mailto:waterleaks@tshwane.gov.za">waterleaks@tshwane.gov.za</a>." The municipality not only educated the public but also encouraged further engagement by giving away free data to people who registered on their online communication forum.</p>	
<p><b>Dept. of Environment, Forestry and Fisheries (Slide 10)</b>          The Department of Environment, Forestry and Fisheries frame their water saving and re-use messages under the banner of South Africa being a water-scarce country. Together with climate change, this means that certain parts of the country will experience more extended periods of drought. The Department has a climate change awareness programme where they go to schools to speak to children about climate change and the effects thereof.</p>	
<p><b>SALGA (slide 11)</b>          SALGA's approach is to engage with the public through mayors and Councillor visiting communities and listening to their debates, and outreach programmes such as the community imbizos.</p>	

<p><b>Two water-intensive industries (slide 12)</b> explained their approach as follows: Sappi engages with the public through community forums. They've found that a face-to-face approach works better than media and flyers. They spearhead their communications through Councillors. This way we are recognising them as leaders with whom we are consulting. We also target the youth. We call them <i>abashintshi</i>, the game changers. AB InBev's approach is unique for each brewery but is based on the principle of working closely with the local authority and community. Honest, upfront and consistent communication worked best for AB InBev.</p> <p>Usually, industries share water resources with local communities. The Newlands beer plant, for example, shares a spring with the local community. During the 2018 drought in Cape Town, they worked very closely with the local community to protect this resource and to use it as conservatively as possible/for the benefit of all. AB InBev follows an approach in which they have a single contact person who does all the communication with the public, especially at high-risk sites.</p>	
<p><b>Lessons learnt (Slide 13)</b> What did they learn from communicating with, or educating the public? The representatives shared with the researchers the following lessons that they've learnt:</p>	
<p><b>Slide 14</b></p> <ul style="list-style-type: none"> <li>• Public education programmes should be done on a regular basis; not only when there is a crisis like a drought</li> <li>• Have a proper plan in place for crisis communications</li> <li>• Communicate as quickly as possible and give people enough information without scaring them</li> <li>• Don't go public if you do not have all the necessary and relevant information</li> <li>• Be proactive in your communications, especially when you are dealing with communities. Also, respect the authorities and the local leaders in the communities</li> <li>• Be open and transparent in your communications</li> </ul>	

<ul style="list-style-type: none"> <li>• Read and respond to the feedback that you get from the public. But, keep your emotions in check when responding, and</li> <li>• The representative of SALGA noted that there will always be elements of disagreement when you talk to the public. <i>People will not always agree, and politics are part of this element of disagreement.</i></li> </ul>	
<p><b>What should a public education campaign on water saving and water re-use teach the public? (Slide 15)</b></p>	 <p style="text-align: center;">Educating the public</p>
<p><b>What should the public know? (Slide 16)</b></p> <p>Before municipalities, government organisations and industries engage with the public about specific water-related issues, they all have to be on the same page about what the public <b>ideally should know and understand.</b></p> <p>A literature review and intensive stakeholder consultations in 2018 and 2019 as part of a WRC project to develop a communication strategy for water re-use identified the following knowledge areas as important:</p> <ul style="list-style-type: none"> <li>• Knowledge of terminology such as 'wastewater', 'treatment', 'greywater' and 'potable water'</li> <li>• Knowledge of the water cycle</li> <li>• Knowledge of water and wastewater treatment and municipal responsibilities in this regard</li> <li>• Knowledge of <i>de facto</i> water re-use</li> <li>• Knowledge of safety aspects of water re-use</li> <li>• Common myths and misconceptions</li> <li>• Knowledge of the effect of climate change on the availability of water</li> <li>• Knowledge of South Africa as a water-scarce country</li> </ul> <p>It is important though that the identification of knowledge needs is a dynamic two-way process. The content of what the public needs and wants to know is furthermore not closed. It will evolve and expand as new research and development uncover and discover new information.</p>	 <p>What should the public know?</p> <ul style="list-style-type: none"> <li>✓ Knowledge of terminology such as 'wastewater', 'treatment', 'greywater' and 'potable water'</li> <li>✓ Knowledge of the water cycle;</li> <li>✓ Knowledge of water and wastewater treatment and municipal responsibilities in this regard;</li> <li>✓ Knowledge of <i>de facto</i> water re-use;</li> <li>✓ Knowledge of safety aspects of water re-use;</li> <li>✓ Common myths and misconceptions;</li> <li>✓ Knowledge of the effect of climate change on the availability of water;</li> <li>✓ Knowledge of South Africa as a water-scarce country.</li> </ul>

**Slide 17**

This list was echoed by the representatives of the Metros, government institutions and industries when they suggested topics for public education. The also added a few topics:

- Educate people about dam levels.
- Educate industry that technology already exists to treat and re-use industrial water.
- Companies and industry should share their best practices.
- Educate people about mine water. *When the public hear of mine water, they think of contamination, pollution and that it's a bad thing. The public need to understand that mine water has different signatures with different re-use potential.*
- Showcase success stories from South Africa and other countries such as Singapore. Windhoek is an excellent example because some of the treatment technology was developed in South Africa.

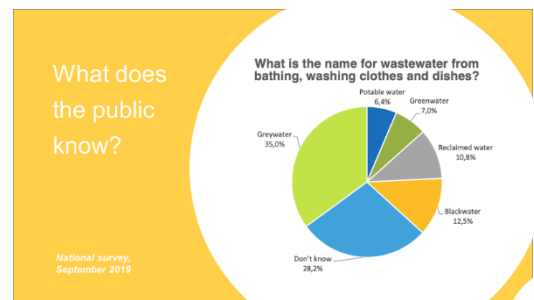


**What does the public know? (Slide 18)**

In September 2019 a national survey tested South Africans' knowledge of these aspects of water re-use.

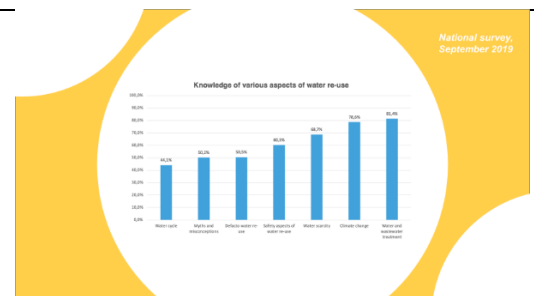
The survey found that South Africans across all demographic groups have poor knowledge and understanding of the basic terminology that is needed for a meaningful public discourse on water re-use. For example, only 35% of South Africans know that greywater is the term for wastewater from bathing, washing clothes and dishes.

Knowledge of terms like 'wastewater' and 'treated wastewater' was so poor that these terms had to be explained upfront in a showcard before respondents could be asked any questions.

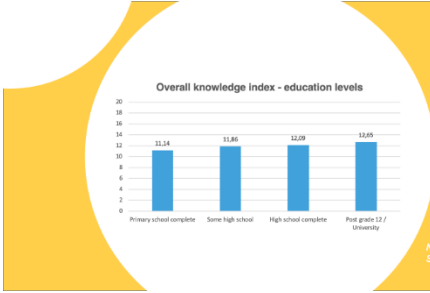
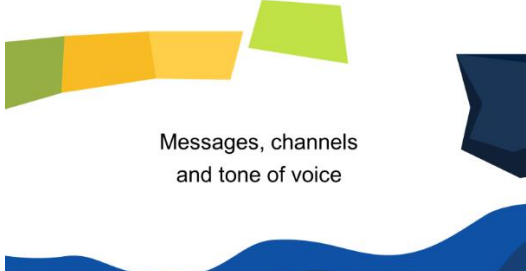

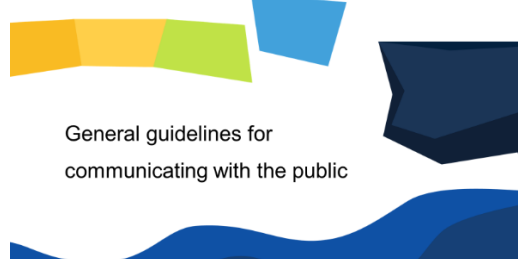

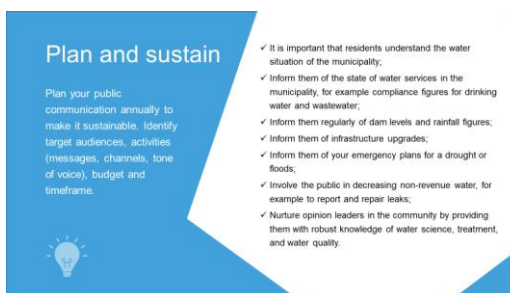


**Slide 19**

South African's knowledge of water re-use and related aspects was tested with 18 statements. The composite result was presented as an index score out of 20. On average, South Africans scored 12 out of 20.





<p><b>Slide 20</b></p> <p>Even for the highest LSM (Living Standard Measure) group, LSM 8-10, and for people with a post Grade 12 qualification, the average scores were 13,05 and 12,65 respectively. This indicates that public knowledge of water re-use and related aspects needs to be improved and a public education campaign on water re-use should target all demographic groups</p>	
<p><b>Ideas for messages, channels and activities (Slide 21)</b></p> <p>The representatives that the researchers talked to shared messages, channels and tone of voice that worked well them for a public education campaign on water savings and re-use.</p>	
<p><b>Slide 22</b></p> <p>The messages, channels and tone of voice that the consulted stakeholders recommend are captured in the handout.</p> <p>Take from these recommendations what will be appropriate for <u>your</u> circumstances and the people in <u>your</u> community.</p>	
<p><b>Slide 23</b></p> <p>General guidelines for communicating follow five principles:</p>	
<p><b>Slide 24:</b></p> <ul style="list-style-type: none"> <li>• Plan and sustain</li> <li>• Showcase</li> <li>• Incentivise</li> <li>• Use multiple media</li> <li>• Listen</li> </ul> <p>Each of these can be applied in a range of actions.</p>	
<p><b>Slide 25</b></p> <p>Plan</p> <ul style="list-style-type: none"> <li>• Plan your public communication annually to make it sustainable. Identify target audiences, activities (messages, channels, tone of voice), budget and timeframe. It is important to have dedicated resources to monitor messages from the public and to respond timeously.</li> </ul>	

<ul style="list-style-type: none"> <li>• It is important that residents understand the water situation of the municipality.</li> <li>• Inform them of the state of water services in the municipality, for example compliance figures for drinking water and wastewater</li> <li>• Inform them regularly of dam levels and rainfall figures.</li> <li>• Inform them of infrastructure upgrades</li> <li>• Inform them of your emergency plans for a drought or floods</li> <li>• Involve the public in decreasing non-revenue water, for example to report and repair leaks</li> <li>• Nurture opinion leaders in the community by providing them with robust knowledge of water science, treatment, and water quality</li> </ul>	
<p><b>Slide 26</b> Showcase</p> <ul style="list-style-type: none"> <li>• Work with the media: provide them with accurate information early and frequently so that they themselves are well-informed.</li> <li>• If you are proud of your water or wastewater treatment plants, take school and environmental groups on guided visits. On such a visit you can demonstrate technical terminology to visitors.</li> <li>• Give regular talks on water saving and aspects of water re-use at schools and environmental groups, and community forums</li> </ul>	
<p><b>Slide 27</b> Incentivise</p> <ul style="list-style-type: none"> <li>• Run local water competitions, sponsored by the municipality in collaboration with local water-intensive businesses. Please note that National Treasury has strict rules regarding municipal competitions.</li> <li>• Just remember that you must meet National Treasury's requirements for running competitions.</li> <li>• Incentivise positive behaviour with free data or airtime</li> </ul>	
<p><b>Slide 28</b> Multiple media</p> <ul style="list-style-type: none"> <li>• Use social media to your advantage. Social media can work well but it can also be a hotbed for residents' expression of dissatisfaction and vitriol. Metro representatives believe that social media is not a good landing place for sensitive topics; direct communication with key stakeholders is a better approach to start with.</li> <li>• Use bills for water messages</li> <li>• Show videos on greywater or groundwater at pay points and local clinics</li> <li>• Make use of available resources (for example the resources of Water Wise (Rand Water), WRC and DWS)</li> </ul>	



<p><b>Slide 29</b> Listen</p> <ul style="list-style-type: none"> <li>• Communication is two-way: Give attention to customer service, complaints, and response times.</li> </ul> <p><i>Communication is as much about listening to and understanding the needs of others as it is about conveying information or key messages to others.</i></p> <p>Residents will be more likely to support a water re-use project if they are involved in the decision-making.</p>	
<p><b>Slide 30</b></p> <p>To conclude, I'd like to share with you a quote from the Water Strategy of the City of Cape Town.</p>	
<p><b>Slide 31</b></p> <p><i>At least three components are important: when communicating and educating people about the value of water: educating people about climate futures, the need to plan for extremes, and how this affects communities; and communications around behaviour changes. (Cape Town Water Strategy, 2019:30)</i></p>	
<p><b>Slide 32</b></p> <p>South Africa needs a water-wise public. Let's work together towards this goal and continue to share our best practices and lessons learnt.</p>	

The Handout that slide 22 refers to appears in the pages that follow.



CITY OF CAPE TOWN  
ISIXEKO SASEKAPA  
STAD KAAPSTAD

## City of Cape Town

Messages	Channels	Tone of voice
<ul style="list-style-type: none"> <li>• Get people comfortable with technical information, but don't bombard them with scientific language.</li> <li>• Get people to drink the treated water.</li> <li>• Show them the journey of water and how it is treated.</li> </ul>	<ul style="list-style-type: none"> <li>• Social media and mainstream media.</li> <li>• Have a visual campaign where people see clean sparkling water and not dull brown water.</li> <li>• Big public events where important people like the mayor drinks the treated water.</li> <li>• Testimonials of influencers about the taste of the treated water.</li> <li>• Share videos like Singapore new water's success story on WhatsApp and other media and play them at public and town hall meetings.</li> <li>• Speak to the Muslim Judicial Council and other faith-based organisations.</li> </ul>	<ul style="list-style-type: none"> <li>• One of dialogue and confidence; we need to show people that we have done our own rigorous testing.</li> <li>• We must be the trusted authority.</li> <li>• We must let the public know that we have done everything to ensure that the water is safe to drink.</li> </ul>

Note: A more targeted approach needs to be used when trying to gain acceptance for a re-use scheme which is to be implemented, not necessarily targeting the whole of society at once from the start. Be more strategic by starting with key stakeholders, overcoming major objections and grow from a base of allies and experts who have been educated. If you do not manage the process very carefully, it could well be rejected right up front before there has been time to educate and create allies first.



## City of Tshwane

Messages	Channels	Tone of voice
<ul style="list-style-type: none"> <li>We cannot live without water. Without water we are doomed.</li> <li>You don't want to traumatise people but show them the results of not having water.</li> </ul>	<ul style="list-style-type: none"> <li>Go to the people directly. Currently our Executive Mayor has been going to townships personally.</li> <li>Social media, it is part of our daily lives.</li> <li>Talk to Institutions like the Department of Higher Education for ideas.</li> <li>Schools to come up with ideas.</li> <li>Communities to come up with ideas. Let them teach us.</li> </ul>	<ul style="list-style-type: none"> <li>Positive approach.</li> <li>Firm tone but not harsh.</li> <li>Build relationships with the people.</li> <li>Talk to even the guy who sleeps under the bridge, engage and respect people.</li> </ul>



## Joburg Water

Messages	Channels	Tone of voice
<ul style="list-style-type: none"><li>• Be specific.</li><li>• Look at the City of Cape Town campaign for ideas.</li></ul>	<ul style="list-style-type: none"><li>• Social media.</li><li>• Email.</li><li>• WhatsApp work well for us – we are reaching people in different areas.</li><li>• Incentivise with T-shirts and flasks.</li></ul>	<ul style="list-style-type: none"><li>• Young people prefer slang language.</li><li>• Older people prefer formal communication that is to the point.</li></ul>



## SALGA

Messages	Channels	Tone of voice
<ul style="list-style-type: none"> <li>• A 'did you know' campaign like the Chappies wrappers.</li> <li>• Look at the SDG, Goal 6 requirements such as delivering better services to communities.</li> </ul>	<ul style="list-style-type: none"> <li>• Let the three largest Metros run a campaign at the same time, i.e. synchronised.</li> <li>• Do branding of municipal cars.</li> <li>• A highway patrol awareness drive from Johannesburg to Sandton.</li> <li>• Billboards with moving adverts.</li> </ul>	<ul style="list-style-type: none"> <li>• Have the mayors wearing a particular suit at particular events. Even the president and the cabinet.</li> <li>• Also have ward committees at municipality level.</li> </ul>



## Department of Environment, Forestry and Fisheries

Messages	Channels	Tone of voice
<ul style="list-style-type: none"><li>• It is important to treat water as a resource because we might not have it tomorrow.</li><li>• South Africa is a water stressed country.</li></ul>	<ul style="list-style-type: none"><li>• Television and radio adverts.</li><li>• Community theatre, edutainment.</li><li>• Social media.</li><li>• The print element will make sure the message lives longer with more space to explain the ad.</li><li>• Ambassadors like comedians (Skhumba), reality TV stars (Papa Penny) and soccer players.</li></ul>	<ul style="list-style-type: none"><li>• You come as a partner not as government saying, "thou shalt not!" – it becomes a societal message not a government message as people don't trust government anymore.</li><li>• Have a narrative where you get the nation talking.</li></ul>

# sappi

## Sappi

Messages	Channels	Tone of voice
<ul style="list-style-type: none"><li>• Stress the urgency. They say the new world war is going to be about water.</li><li>• The messages must be factual, not using scare tactics.</li><li>• Incentivise citizens who use less water in their homes.</li><li>• Tax incentives for corporates.</li><li>• Give facts on the situation in South Africa in relation to the rest of the world.</li></ul>	<ul style="list-style-type: none"><li>• Local radio; don't waste time with TV.</li><li>• Social and mainstream media.</li><li>• Local newspapers and magazines.</li><li>• Messages from leaders in our country, DWS and the president.</li><li>• Corporates can also share what they are doing in innovation.</li><li>• Get an ambassador like Maps Maponyane. He is serious, fun and respected by business. He also works with WWF. He is approachable too.</li></ul>	<ul style="list-style-type: none"><li>• Use a positive tone. You don't want to be too negative.</li></ul>

# AB In Bev

## AB In Bev

Messages	Channels	Tone of voice
<ul style="list-style-type: none"><li>• Tax rebates for big business to drive them to do more and move quicker from a legislation perspective.</li><li>• Fine people who waste water (positive reinforcement).</li></ul>	<ul style="list-style-type: none"><li>• Social and mainstream media.</li><li>• Radio and TV.</li><li>• Community newspapers.</li><li>• Use big brands to run campaigns and drive messages, e.g. Black Label's campaign about domestic abuse.</li><li>• Sport teams.</li></ul>	<ul style="list-style-type: none"><li>• Municipalities need scare tactics.</li><li>• Business: serious and to the point.</li><li>• General public: a positive message. It can be done.</li><li>• Children: fun and create excitement that there's this new cool thing that you can do, and it will always make you cool, and if you tell your parents, it will make them cool too.</li><li>• Communities and farmers: encouraging and inspiring; Madiba type of message.</li></ul>





## Anglo Coal

Messages	Channels	Tone of voice
<ul style="list-style-type: none"> <li>The messaging has to show that the big mining companies have good programmes in place that they live by and implement to make sure that we have proper water stewardship.</li> <li>For industry people and farmers, you need to communicate facts, scientific communication to demonstrate to them that this is a workable solution. You need to show that there are no corrosion implications, that there is no food safety issues.</li> </ul>	<ul style="list-style-type: none"> <li>Social media.</li> </ul>	<ul style="list-style-type: none"> <li>A positive tone.</li> <li>Often buddy speaking is easier to get a message across for the layman because you can grab their attention by being less formal. The older generation would find it offensive.</li> <li>You need to tailor your tone of voice for different audiences.</li> <li>If you're addressing someone who is concerned about the impact, like industry and farmers, you need to be serious.</li> </ul>

## 3.5 WATER IN THE CURRICULUM

### 3.5.1 Outline of a basic water curriculum

#### 3.5.1.1 Introduction

A curriculum that addresses water re-use and the related aspects as identified in the stakeholder engagement presupposes a context of a broader water curriculum that addresses a comprehensive spectrum of water topics. Such a broad water curriculum is hard to find in the literature. Various aspects of water are addressed in curriculum statements such as the CAPS of the Department of Basic Education and in lesson plans and learning materials such as those developed by the WRC and Rand Water's Water Wise programme as will be discussed below. A wide range of lesson plans and learning material on specific aspects of water are also available on the internet from organisations, such as WaterAid, Sydney Water and American Water. The basic water curriculum below was constructed from the literature review of this project, the stakeholder consultations and the learning materials that we analysed. Water re-use and the related aspects that stakeholders indicated as essential for a public education programme for water re-use are highlighted in yellow.

#### 3.5.1.2 Curriculum outline

<b>Water curriculum</b>	
Water on Earth	
<ul style="list-style-type: none"> <li>• What is water?</li> <li>• Different states of water</li> <li>• Different types of water</li> </ul>	
<b>The natural water cycle</b>	
How much water do we have?	
<ul style="list-style-type: none"> <li>• Different sources: surface water, including wetlands; groundwater; seawater; vapour</li> <li>• Percentages</li> <li>• Catchments</li> <li>• Unequal distribution of water: countries, regions/biomes/seasons</li> <li>• Climate variability: Droughts and floods</li> <li>• Storing water                             <ul style="list-style-type: none"> <li>○ Dams and lakes</li> <li>○ Reservoirs</li> <li>○ Rainwater harvesting</li> <li>○ Water trucks</li> </ul> </li> </ul>	
How much do we need?	
Water is life	
<ul style="list-style-type: none"> <li>• Water in cells</li> <li>• Water in human and animal bodies (water cycle in humans)</li> <li>• Water in plants</li> <li>• Water plants and animals</li> <li>• How long can you live without water?</li> <li>• Water and health:                             <ul style="list-style-type: none"> <li>○ Safe and unsafe uses of water, including greywater</li> <li>○ Waterborne diseases</li> </ul> </li> <li>• Plants and animals that have adapted to little water</li> </ul>	
Different human uses and abuses of water	

- Personal use: water to clean: yourself, your house, your clothes, your car, your dishes, your food
- Water to produce food (irrigated agriculture)
- Water to prepare or process food (personal or industrial)
- Water in industries: building, mining, manufacturing, electricity generation
- Water for recreation: gardens, parks, swimming pools, fountains, water sport
- Water in cultural and religious activities
- Water footprint, pie chart
- Water abuse (pollution; wastage, etc.)

#### Urban water cycle

- Water conservation and demand management
- Non-revenue water losses

#### Water and wastewater treatment

- The science of water treatment
- Treatment and distribution network
- Water quality standards
- Effluent standards

#### Balancing supply and demand

##### Supplementing supply:

- Re-use (at different scales – household, municipal, agricultural, industrial)
- Desalination
- Groundwater
- Using surface water effectively
- Rainwater harvesting
- Repair leaks

##### Lowering demand:

- More effective irrigation methods in agriculture
- Drought-resistant cultivars
- Recycle water in industrial processes
- Water-efficient technology
- How to use less water(personal use)

#### Water economics

- The cost to collect, abstract, treat, store and distribute water
- Tariffs and affordability

#### Water governance

- Water legislation
- Institutional framework/Government structures
- Regulation
- Licenses
- Water services: municipalities (Water Services Authorities)
- Water resource management
  - Catchment management
  - Healthy rivers
  - Caring for the ocean
  - Looking after groundwater
  - Prevent pollution
  - Plan for climate change

Your responsibility as a citizen: become a water-wise warrior

### 3.5.1.3 Relevance for target audiences of the draft communication strategy for water re-use

In the communication strategy set out in Chapter 2, several learner target audiences (see Section 2.5) were identified at different levels. Table 3-3 shows learner target audiences. It is recommended that the water curriculum outline is discussed with stakeholders and further refined where necessary, and that it is then applied in the curriculum of the learner target audiences as will be proposed.

**Table 3-3: Learner target audiences**

Learners	Basic education	Rationale: motivated by stakeholders and literature for sustainability
	Higher education	Rationale: to prolong education thrust in relevant higher education curricula
	Professional learning	Rationale: to prolong and extend education thrust
	Councillor induction	Rationale: to prolong and extend education thrust; political support is needed for water re-use implementation

### 3.5.2 Curriculum mapping – water and water-related aspects in current CAPS curriculum

This sub-section summarises the water and water-related aspects that are part of the current CAPS curriculum for Grades R to 12. The summaries are based on the Department of Basic Education’s curriculum documents.

#### 3.5.2.1 Foundation phase (Grade R-3)

For the Foundation phase (Grade R-3), water and water-related aspects are included in the curriculum for Life Skills. The map below shows that the majority of water and water-related aspects that are taught are part of the Grade 1 curriculum. Grade 2 learners are taught simple ways of purifying water. Water re-use is part of the Grade 3 curriculum, but no further detail is given.

**Map 1: Water-related aspects in the Life Skills curriculum of the Foundation phase**

Grade R	Grade 1
Saving water The importance of a clean environment Ways in which people pollute the environment The importance of recycling	Protecting our bodies from illness <ul style="list-style-type: none"> <li>• Washing fruit and vegetables before eating</li> <li>• Making water safe to drink</li> </ul> Water <ul style="list-style-type: none"> <li>• Uses of water – home and school</li> <li>• Ways water is wasted</li> <li>• Ways of saving water</li> <li>• Safe and unsafe drinking water (overlaps with 'making water safe to drink' above)</li> <li>• Storing clean water</li> </ul>
Grade 2	Grade 3
Why we need water, different sources of water Simple ways of purifying water	Re-using water

3.5.2.2 Intermediate phase (Grade 4-6)

For the Intermediate phase (Grade 4-6), water and water-related aspects are included in the curriculum for Natural Sciences and Technology, and Social Sciences (Geography). The map below shows that some water and water-related aspects are covered in the Natural Sciences and Technology curriculum for Grade 4 and Grade 6, but there is no reference to water in the Grade 5 curriculum statements.

**Map 2: Water-related aspects in the Natural Sciences and Technology curriculum of the Intermediate phase**

Grade 4	Grade 5
<p>The Earth</p> <ul style="list-style-type: none"> <li>Most of the surface of the Earth is covered with water (sea)</li> </ul>	--
Grade 6	
<p>The Earth</p> <ul style="list-style-type: none"> <li>The Earth has an atmosphere and water</li> <li>Matter and materials</li> <li>Groundwater and wetlands act as resources for humans: water needed to support life</li> <li>Importance of water for plants and animals' ecosystems</li> </ul>	

Map 3 below shows that water is extensively covered in the Grade 4 and 5's CAPS curriculum for Social Sciences (Geography). The topic of water is noticeably absent from the Grade 6 curriculum.

**Map 3: Water and water-related aspects in the Social Sciences (Geography) curriculum of the Intermediate phase**

Grade 4	Grade 5
<p>Uses of water</p> <ul style="list-style-type: none"> <li>Daily uses in personal lives</li> <li>Other uses – such as farming, factories, mines, electricity generation, gardens and recreation</li> </ul> <p>Water as a resource</p> <ul style="list-style-type: none"> <li>Saltwater and freshwater on earth</li> <li>The natural water cycle: from sea to land and back to sea</li> <li>Fresh water in nature: rain, rivers, streams, wetlands, lakes and underground</li> <li>Storing water:                             <ul style="list-style-type: none"> <li>Why people need to store water</li> <li>Ways of storing water – such as in dams, water tanks, buckets and pots</li> </ul> </li> </ul> <p>How people get their water (access)</p> <ul style="list-style-type: none"> <li>Rivers, streams and springs – people collecting and carrying water directly from natural sources</li> <li>Boreholes and wells – getting water from underground</li> <li>Trucks with water containers for places that do not have other sources</li> <li>Taps – water travels along pipes from big dams to purification plants, reservoirs and</li> </ul>	<p>Rivers</p> <ul style="list-style-type: none"> <li>Where rivers begin and end – directions of flow from high areas to the sea</li> <li>Concept of river systems – tributaries and catchment areas</li> <li>Main rivers of South Africa – identifying the sources, major tributaries and directions of flow (map)</li> </ul> <p>Rainfall</p> <ul style="list-style-type: none"> <li>Rainfall in South Africa (distribution map)</li> <li>Rainfall patterns – summer/winter/all year (maps; bar graphs for selected places)</li> </ul> <p>Mining and the environment</p> <ul style="list-style-type: none"> <li>Impact of mining on the environment – water pollution</li> </ul>

<p>finally to taps in communities, homes and other buildings</p> <p>Pollution and wastewater</p> <ul style="list-style-type: none"> <li>• Personal, daily practices that pollute water</li> <li>• Factory and farming waste</li> <li>• Wastewater and sewage recycling</li> <li>• The water use cycle: how water, taken from the natural cycle, is used and returned to the sea</li> </ul>	
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**Grade 6**

People around the worlds

- The influence of climate, water and mineral resources on global settlement

3.5.2.3 Senior phase (Grade 7-9)

For the Senior phase (Grade 7-9), water and water-related aspects are covered in the curriculum of Natural Sciences and Technology, and Social Sciences (Geography) in Grade 7 (Map 4). Water and water-related aspects are absent in the curriculum of the same subjects in Grades 8 and 9.

**Map 4: Water and water-related aspects in the Natural Sciences and Technology curriculum of the Senior phase**

Grade 7	Grade 8
<p>Methods of physical separation</p> <ul style="list-style-type: none"> <li>• filtration (separating sand and water)</li> <li>• distillation (retrieving pure water from seawater). Distillation always involves boiling and condensation.</li> </ul>	--
<b>Grade 9</b>	
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Map 5 below shows a similar trend in the CAPS curriculum for Social Sciences (Geography) with the topic of water only being present in the Grade 7 curriculum.

**Map 5: Water and water-related aspects in the Social Sciences (Geography) curriculum of the Senior phase**

Grade 7	Grade 8
<p>Floods</p> <ul style="list-style-type: none"> <li>• Causes of floods – unusually heavy rain, environmental factors (such as farming, settlement, fires and loss of vegetation) and earthquakes (tsunamis)</li> <li>• Effects of floods – including injury and loss of life; disease; displacement of people; soil erosion; damage to fields, buildings and infrastructure</li> <li>• Why some communities are at higher risk than others</li> <li>• Reducing the impact – preparing for and responding to floods</li> </ul> <p>Natural resources</p> <ul style="list-style-type: none"> <li>• Natural resources on earth – including water, air, forests, soil, animal and marine life</li> </ul>	--

<ul style="list-style-type: none"> <li>• Use and abuse of selected examples</li> </ul> <p>Water in South Africa</p> <ul style="list-style-type: none"> <li>• Who uses South Africa’s water (pie graph of water users)?</li> <li>• Availability of water and requirement in South Africa</li> <li>• River health and the care of catchment areas</li> <li>• Disappearing wetlands and why conservation is necessary – case study</li> <li>• Responsible use of water resources – agricultural, industrial and domestic users</li> </ul>	
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**Grade 9**

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**3.5.2.4 Further Education and Training (FET) phase**

The Geography and Life Sciences curricula for the FET phase include some aspects related to water. It is important to note that Geography and Life Sciences are not compulsory subjects for Grade 10 and onwards. The aspects below are therefore not taught to all FET learners. For example, out of the 798 289 learners that wrote the matric examination in 2017<sup>6</sup>, only 38% (302 600 learners) wrote the subject, Geography<sup>7</sup>. The map below shows that aspects related to water are part of the Grade 10 and Grade 12 CAPS curriculum for Geography. No aspects related to water are covered in the Grade 11 curriculum.

**Map 6: Water and water-related aspects in the Geography curriculum of the FET phase**

Grade 10	Grade 11
<p>Moisture in the atmosphere</p> <ul style="list-style-type: none"> <li>• water in the atmosphere in different forms, such as water vapour and liquid</li> <li>• processes associated with evaporation, condensation and precipitation</li> </ul> <p>Water in the world</p> <ul style="list-style-type: none"> <li>• different forms of water in the world: liquid, solid and gas</li> <li>• the hydrological cycle</li> <li>• occurrence of saltwater and fresh water: oceans, rivers, lakes, ground water and atmosphere</li> </ul> <p>Water management in South Africa</p> <ul style="list-style-type: none"> <li>• rivers, lakes and dams in South Africa</li> <li>• factors influencing the availability of water in South Africa</li> <li>• challenges of providing free basic water to rural and urban communities in South Africa</li> <li>• the role of government – initiatives towards securing water: inter-basin transfers and building dams</li> <li>• role of municipalities: provision and water purification</li> <li>• strategies towards sustainable use of water – role of government and individuals</li> </ul> <p>Floods</p>	<p>--</p>

<sup>6</sup> We could not find the statistics for 2018.

<sup>7</sup> Source: <https://www.news24.com/SouthAfrica/News/the-real-matric-marks-20170107>

- causes of flooding – physical and human
- characteristics of floods – analysis and interpretation of flood hydrographs
- managing flooding in urban, rural and informal settlement areas
- case study of a flood in South Africa

**Grade 12**

**Drainage Systems in South Africa**

- important concepts: drainage basin, catchment area, river system, watershed, tributary, river mouth, source, confluence water table, surface run-off and groundwater
- types of rivers: permanent, periodic, episodic and exotic
- drainage patterns: dendritic, trellis, rectangular, radial, centripetal, deranged and parallel
- drainage density
- use of topographic maps to identify stream order and density
- discharge of a river: laminar and turbulent flow

**Fluvial Processes**

- river profiles: transverse profile, longitudinal profile and their relationship to different stages of a river
- identification and description of fluvial landforms: meanders, oxbow lakes, braided streams, floodplain, natural levee, waterfall, rapids and delta;
- river grading
- rejuvenation of rivers: reasons and resultant features, such as knick point, terraces and incised meanders;
- river capture (stream piracy): the concepts of abstraction and river capture; features associated with river capture (captor stream, captured stream, misfit stream, elbow of capture, wind gap)
- superimposed and antecedent drainage patterns

**Catchment and River Management**

- importance of managing drainage basins and catchment areas
- impact of people on drainage basins and catchment areas
- case study of one catchment area management strategy in South Africa

Map 7 below shows that aspects related to water are part of the Grade 10 and Grade 11 CAPS curriculum for Life Sciences. No aspects related to water are covered in the Grade 12 curriculum.

**Map 7: Water and water-related aspects in the Life Sciences curriculum of the FET phase**

Grade 10	Grade 11
<p>Molecules of life</p> <ul style="list-style-type: none"> <li>• Main functions of water</li> <li>• Cells are made up of water</li> </ul> <p>Biomes</p>	<p>Water</p> <ul style="list-style-type: none"> <li>• Availability:                             <ul style="list-style-type: none"> <li>○ Construction of dams</li> <li>○ Destruction of wetlands</li> <li>○ Poor farming practices</li> <li>○ Droughts and floods</li> <li>○ Exotic plantations and depletion of water table</li> <li>○ Boreholes and effects on aquifers</li> <li>○ Wastage</li> <li>○ Cost of water</li> </ul> </li> <li>• Quality:                             <ul style="list-style-type: none"> <li>○ Water for domestic use, industry, agriculture and mining: pollution, diseases, eutrophication and algal bloom.</li> <li>○ The effect of mining on quality of water</li> <li>○ Thermal pollution</li> </ul> </li> </ul> <p>Solid Waste Disposal – managing dumpsites for rehabilitation and prevention of soil and water pollution</p>
<b>Grade 12</b>	



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### 3.5.3 Curriculum mapping – resources and learning material from WRC, Rand Water and DWS

#### 3.5.3.1 WRC

The WRC has the following resources and education material available<sup>8</sup>:

- Splash book, which is described as water resource book for curious kids; and
- A series of lesson plans for Grades R-7 (WRC Report No TT 345/08). The lesson plans were developed in 2008, which means that the content is not aligned with the CAPS curriculum.

#### **Splash book**

The Splash book was published in 2018. The following topics are covered in the book:

- Water words
- Introduction
- The wonderful world of water
  - A universal solvent
  - Extraordinary properties
  - How much water do we have?
  - A healthy body needs water
- The water cycle
  - Clouds
  - Rivers
  - River pollution
  - Wetlands
  - Estuaries
  - Glaciers
  - Groundwater
- Water in South Africa
- South Africa's largest rivers
  - Orange River
  - Vaal River
  - Limpopo River
  - The Ecological Reserve – keeping our rivers flowing
- Water use in the home

#### **Lesson plans**

The lesson plans were developed by Share-Net (Map 8). According to the Learning Through Nature website<sup>9</sup>, Share-Net was once a section of the Wildlife and Environment Society of South Africa (WESSA). Share-Net was an innovative South African-based, informal networking project that supported environmental education through the provision of resource materials. Over the years many people contributed to the development of the library of learning resources. Even though Share-Net does not exist anymore, Learning Through Nature placed a number of the Share-Net learning resources on their website. Below is a summary of the lesson plans that were developed as part of WRC Report No TT 345/08.

**Map 8: Share-Net lesson plans**

Grade and theme	Name of activity	Subject
R	Listening, answering questions and colouring in	Languages

<sup>8</sup> Lani van Vuuren from the WRC sent us the material.

<sup>9</sup> <http://learningthroughnature.co.za/share-net-resources/>

<b>Grade and theme</b>	<b>Name of activity</b>	<b>Subject</b>
Water, water, water	Making water bells	Natural Sciences
	Dancing, moving and shaking	Arts and culture
	Boat building and racing	Technology
	Some wet, damp, rainy poems and rhymes	Just for fun
1 Water in my life	Water in our lives	Languages
	Where does our water supply come from?	Languages
	Water, Sanitation and Health	Life Orientation
	Clean hands! Making a hand washer	Technology
	Making an indoor rainbow	Just for fun
2 Water all around me	Where does rain comes from?	Languages
	Moving and shaking!	Arts and Culture
	Create your own water cycle	Natural Sciences
	Drip the drop's journey to our tap	Life Orientation
	Construct a mobile	Just for fun
3 Water is life	How much water do I use?	Mathematics
	A walk along two rivers	Languages
	The importance of water, at home, at school, and in my community	Natural Sciences
	Where is that word hiding?	Languages
	How do carrots drink?	Just for fun
4 Water Creepy Crawlies	There's creepy crawly in this stream!!	Natural Sciences
	Even creepy crawlies like clean water	Mathematics
	Did you know that creepy crawlies can tell us how healthy a stream is?	Life Orientation
	How do we make water safe to drink?	Technology
	If I was a tadpole and captured by a Grade 4 learner on a hot Monday afternoon	Languages
5 It's raining today	It's raining today!	Social Sciences: Geography
	Let's make a rain gauge	Technology
	A water study around our school	Natural Sciences
	Are we wasting our water at school, home and in our community?	Mathematics
	Water Challenge Quiz	Just for fun
6 The water cycle in nature and the water cycle in me	The water cycle in nature and the water cycle in me	Languages
	Watery word sums, number sentences and fractions	Mathematics
	From Cape to Cairo	Social Sciences: Geography
	Where does our drinking water come from?	Natural Sciences
	Making a bottle rain gauge	Just for fun
7 Wetlands are wonderful	Wetlands are wonderful!	Languages
	Dirty water, clean water, let's design and build a water filter	Technology
	How well do our water filters work?	Natural Sciences

Grade and theme	Name of activity	Subject
	Walking in a Wetland with David	Social Sciences: Geography
	“Save our Wetlands” poster	Arts and Culture

Although these lesson plans are not CAPS aligned, they are very valuable as illustrations of how aspects of water can be taught across the curriculum.

### 3.5.3.2 Rand Water

According to the Water Wise website<sup>10</sup>, “Water Wise” is Rand Water’s environmental brand. It is a campaign aimed at increasing awareness of the need to value water and to use it wisely. The Water Wise Education Team (WWET) is a dynamic team that developed edutaining (educational & entertaining) programmes and learning material for schools, teachers and other tertiary institutions.

#### Edutaining programmes

The WWET uses the Rand Water Nature Centre as an outdoor classroom. At the Centre, they offer a number of hands-on programmes<sup>11</sup> for school learners and teachers. The programmes are aligned to the curriculum. The team also hosts interactive activities at the Vereeniging Purification Station and the JNF Walter Sisulu Environmental Centre (Mamelodi). The activities are designed to meet the curriculum requirements. There are different programmes available<sup>12</sup> for learners ranging from Grade R to Grade 12. All the programmes are free.

The Rand Water Nature Centre and the Vereeniging Purification Station have equipment that learners can use to test the water quality of river water, tap water or bottled water for school projects.

Rand Water also offers the following Water Wise talks and tours for teachers and adults:

- Teacher workshop on water;
- Talks on Water Wise gardening;
- Tours of the purification station for community-based organisations and adults.

#### Learning materials

Water Wise offers a range of cross-curricular learning material for Foundation and Intermediate phase learners. In partnership with the Pick ‘n Pay School Club, Water Wise developed workbooks that are suitable for Foundation phase learners. Map 9 below is a summary of activities in the workbooks. Map 10 summarises the material that is available for Intermediate phase learners:

**Map 9: Activities in the Water Wise workbook for Foundation phase learners**

Grade	Name of activity	Subject
R	Ethan learns to be Water Wise	Language
	The Wise and the Unwise	Life Skills
1	The Earth recycles water	Life Skills
	Manzi dice	Mathematics
2	A water filter	Life Skills
	Manzi mobile	Life Skills
3	Splooosh goes on an adventure	Language
	Water Wise quiz	Life Skills

<sup>10</sup> <http://www.waterwise.co.za/site/about/index.html>

<sup>11</sup> See the full list of programmes here:

[http://www.waterwise.co.za/export/sites/water-wise/downloads/main/RWNC\\_Flyer - 24 August 2017.pdf](http://www.waterwise.co.za/export/sites/water-wise/downloads/main/RWNC_Flyer_-_24_August_2017.pdf)

<sup>12</sup> See the full list of programmes here:

[http://www.waterwise.co.za/export/sites/water-wise/downloads/main/Vg\\_Flyer - 24 August 2017.pdf](http://www.waterwise.co.za/export/sites/water-wise/downloads/main/Vg_Flyer_-_24_August_2017.pdf) and [http://www.waterwise.co.za/export/sites/water-wise/downloads/main/WSEC\\_Flyer - August 2017.pdf](http://www.waterwise.co.za/export/sites/water-wise/downloads/main/WSEC_Flyer_-_August_2017.pdf)

**Map 10: Water Wise material available for Intermediate phase learners**

Theme	Name of activity	Subject
Respect water, respect life	Respect water! Respect life!	Life Orientation
	Water – life blood of the Earth	Arts & Culture – Music
	Thousands of years old and still fresh	Social Sciences – History
	Respect our precious resource	Language
Don't waste water	Don't waste water	Mathematics
	Drip, drop... stop!	Technology
	Will water be the most valuable resource on Earth in the future?	Economic Management Sciences
	Nature is wise	Natural Sciences
Don't pollute water	Pollution hurts	Life Orientation
	A day in the life of a frog	Language
	Watery wetlands	Arts & Culture – Drama
	Respect our rivers	Natural Sciences
Pay for water	Is it worth it?	Social Science – History
	Water is the new money... look after it!	Economic Management Sciences
	Don't pollute. Pay for water.	Technology
	Saving water makes cents	Mathematics
	Clean drinking water in the town	Natural Sciences
Environmental action	Waste not, want not	Arts & Culture – Drama
	Wise management	Economic Management Sciences
	Take action	Language
	Reduce, reuse and repair	Technology
Conserve water, conserve the environment	Conserve!	Life Orientation
	Water demand and population growth	Mathematics
	Conserving water – from ancient times to the present day	Social Science – History
	Stranded on the moon	Natural Sciences
How is tap water cleaned?	Water purification experiment	Natural Sciences and Technology
How is wastewater cleaned?	Making a model of a wastewater treatment works	Natural Sciences and Technology

### Other resources

In addition to the edutaining materials and the learning materials, there are a number of other resource materials on the Water Wise website, such as posters, quizzes, games and video clips.

### 3.5.4 DWS

We received the following material from DWS:

- Baswa Le Meetse Project guidelines;
- Baswa Le Meetse 2010 video;
- 2018 Education Awards Ceremony video.

The material illustrates the valuable work that DWS does to encourage learners to discover and learn about water.

### 3.5.5 Current CAPS curriculum mapped onto the water curriculum outline

After the water and water-related content in the current CAPS curriculum were identified, the research team mapped this content onto the proposed water curriculum outline (see Map 11). The map shows that the water and water-related content in CAPS is rather arbitrary and does not seem to relate to an underlying knowledge framework. There are serious gaps in the CAPS, for example the researchers we could not deduct from CAPS where 'different types of water' are addressed. Water and wastewater treatment are only addressed in Grade 7 under the heading 'filtration and distillation'. Water economics is nowhere addressed. **Water governance is only addressed in Geography in the FET phase. This means that the majority of learners leave school without any knowledge of water governance in South Africa.**

**Map 11: Current CAPS curriculum mapped onto the water curriculum outline**

Water curriculum outline	CAPS curriculum
Water on Earth <ul style="list-style-type: none"> <li>• What is water?</li> <li>• Different states of water</li> <li>• Different types of water (freshwater, seawater, brackish water, greywater)</li> </ul>	Grade 4, NS&T (water on Earth) Grade 6, NS&T (water on Earth) Grade 10, Geography (moisture in the atmosphere, states of water)
The natural water cycle	Grade 4, SS Geography Grade 10, Geography
How much water do we have? <ul style="list-style-type: none"> <li>• Different sources: surface water, groundwater, seawater, vapour</li> <li>• Percentages</li> <li>• Catchments</li> <li>• Unequal distribution: countries, regions/ biomes/seasons</li> <li>• Climate variability: Droughts and floods</li> <li>• Storing water                             <ul style="list-style-type: none"> <li>○ Dams and lakes</li> <li>○ Reservoirs</li> <li>○ Water trucks</li> <li>○ Rainwater harvesting</li> </ul> </li> </ul>	Grade 11, Life Sciences (availability of water – variety of aspects) Grade 2, Life Skills (different sources of water) Grade 6, NS&T (groundwater and wetlands) Grade 4, SS Geography (salt and freshwater; freshwater in nature – streams, boreholes, rivers, wells) Grade 10, Geography (salt content of water) Grade 12, Geography (drainage, basin, catchment, tributary, runoff, groundwater, types of rivers, river profiles, fluvial processes, etc.) Grade 5, SS Geography (rivers; rainfall patterns) Grade 10, Life Sciences (biomes) Grade 7, SS Geography (floods) Grade 10, Geography (floods) Grade 4, SS Geography (ways of storing water and why, trucks)
How much do we need? <p>Water is life</p> <ul style="list-style-type: none"> <li>• Water in cells</li> <li>• Water in human and animal bodies (water cycle in humans)</li> <li>• Water in plants</li> <li>• Water plants and animals</li> <li>• Plants and animals that have adapted to little water</li> <li>• How long can you live without water?</li> <li>• Water and health:                             <ul style="list-style-type: none"> <li>○ Safe and unsafe uses of water</li> <li>○ Waterborne diseases</li> </ul> </li> </ul>	Grade 2, Life Skills (why we need water) Grade 10, Life Sciences (water in cells) Grade 6, NS (importance of water in plant and animal ecosystems) Grade 1, Life Skills (washing fruit and vegetables; making water safe to drink, uses of water; safe and unsafe drinking water; storing clean water) Grade 2, Life Skills (ways of purifying water)

Water curriculum outline	CAPS curriculum
<p>Different human uses and abuses of water</p> <ul style="list-style-type: none"> <li>• Personal use: Water to clean: yourself, your house, your clothes, your car, your dishes, your food</li> <li>• Water to produce food (irrigated agriculture)</li> <li>• Water to prepare or process food (personal or industrial)</li> <li>• Water industries: building, mining, manufacturing, electricity generation</li> <li>• Water for recreation: gardens, parks, swimming pools, fountains, water sport</li> <li>• Water in cultural and religious activities</li> <li>• Water footprint; pie chart</li> <li>• Water abuse (pollution, wastage, etc.)</li> </ul>	<p>Grade 4, SS Geography (uses of water, personal and other)</p> <p>Grade 7, SS, Geography (use and abuse of water)</p> <p>Grade 7, SS Geography (pie chart, responsible use of water resources)</p> <p>Grade 4, SS Geography (practices that pollute water)</p> <p>Grade 5, SS Geography (impact of mining on water)</p> <p>Grade 11, Life Sciences (Quality of water – variety of aspects)</p>
<p><b>Urban water cycle</b></p>	<p>Grade 4, SS – Geography (how people get water, water use cycle)</p>
<p><b>Water and wastewater treatment</b></p> <ul style="list-style-type: none"> <li>• The science of water treatment</li> <li>• Treatment and distribution network</li> </ul>	<p>Grade 7, NS (filtration and distillation)</p>
<p>Balancing supply and demand</p> <p>Supplementing supply:</p> <ul style="list-style-type: none"> <li>• <b>Re-use</b></li> <li>• Desalination</li> <li>• Groundwater</li> <li>• Using surface water effectively</li> <li>• Rainwater harvesting</li> <li>• Repair leaks</li> </ul> <p>Lowering demand:</p> <ul style="list-style-type: none"> <li>• More effective irrigation methods in agriculture</li> <li>• Drought-resistant cultivars</li> <li>• <b>Recycle water in industrial processes</b></li> <li>• Water-efficient technology</li> <li>• Tips to use less water (personal use)</li> </ul>	<p>Grade 3, Life Skills (re-using water)</p> <p>Grade 4, SS Geography (wastewater and <i>sewage recycling</i>)</p> <p>Grade 6, SS Geography (influence of water resources on human settlements)</p> <p>Grade 7, SS Geography (supply and demand)</p> <p>Grade 11, Life Sciences (availability of water – variety of aspects)</p>
<p>Water economics</p>	
<p>Water governance</p> <ul style="list-style-type: none"> <li>• Water legislation</li> <li>• Institutional framework/Government structures</li> <li>• Regulation</li> <li>• Licenses</li> <li>• Water services: municipalities (Water Services Authorities)</li> <li>• Water resource management <ul style="list-style-type: none"> <li>○ Catchment management</li> <li>○ Healthy rivers</li> <li>○ Caring for the ocean</li> <li>○ Looking after groundwater</li> <li>○ Prevent pollution</li> </ul> </li> </ul>	<p>Grade 10, Geography (water management in SA)</p> <p>Grade 12, Geography (catchment and river management)</p> <p>Grade 7, SS Geography (river health and care of catchment areas, disappearing wetlands)</p>
<p>Your responsibility as a citizen: become a water-wise warrior</p>	<p>Grade R, Life Skills (saving water; clean environment, pollution, importance of recycling)</p> <p>Grade 1, Life Skills (ways water is wasted; saving water)</p>

### 3.5.6 Recommendations

#### 3.5.6.1 *Learners in higher education, professional learning and SALGA's Councillors' induction programme*

It is proposed that the basic water curriculum outline be made available to higher education organisations. Each organisation can select topics and develop advanced learning modules as it fits course requirements and the particular needs of their learners. For example, learning modules for TVET college students will probably not be the same as for Councillors. This will ensure that higher education and professional learners will be equipped with advanced knowledge of water re-use and related aspects in the broader context of water science and water management.

#### 3.5.6.2 *Basic education learners*

The mapping of the current CAPS onto the proposed water curriculum outline indicated several gaps as shown and discussed in 3.5.2. To address these gaps, we did a reverse mapping in which we mapped the proposed water curriculum onto the four learning phases (Map 12). The reverse mapping is based on three principles:

1. The CAPS interpretation of what type of information is suitable for each the four phases.
2. Fundamental concepts and topics must be addressed before learners split into different subjects in the FET phase.
3. Fundamental concepts and topics must be reinforced across more than one phase.

The distribution of the proposed water curriculum across the four phases of basic education is high level. The current curriculum statements (CAPS) allocate topics to learning areas or subjects. However, the WRC and Water Wise materials and the learning materials available on the internet illustrate how water topics could be successfully taught across the curriculum, including Languages, Mathematics, Arts and Culture and Technology. Map 13 could be very useful for educators because it shows which material is available for which grade, subject and topic.

It is recommended that DBE consider a cross-curricular approach for water education. It is further proposed that the activities associated with each water topic be structured according to the three levels of water re-use literacy: functional literacy, communicative or interactive literacy and critical literacy. The lesson plans below demonstrate how a water topic could be integrated across the curriculum simultaneously at different literacy levels. **The lesson plans are for the Intermediate phase and the same resource, a poster in English and Sepedi on the safe and unsafe uses of greywater<sup>13</sup>, is used in all the lessons.**

The poster and lesson plans appear on the pages that follow. The poster is available from the WRC.

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<sup>13</sup> The guidelines that the poster gives for safe greywater use is conservative, considering the most unfavourable conditions (Carden et al., 2007).

**Map 12: Reverse mapping of proposed curriculum outline across phases**

<b>Proposed water curriculum outline</b>	<b>Foundation phase Grade R-3</b>	<b>Intermediate phase Grade 4-6</b>	<b>Senior phase Grade 7-9</b>	<b>FET phase Grade 10-12</b>
<p>Water on Earth</p> <ul style="list-style-type: none"> <li>• What is water?</li> <li>• Different states of water</li> <li>• Different types of water (freshwater, seawater, brackish water, greywater)</li> </ul>	<p>Water on Earth</p> <ul style="list-style-type: none"> <li>• Different states of water</li> <li>• Different types of water (freshwater, seawater, brackish water, greywater)</li> </ul>	<p>Water on Earth</p> <ul style="list-style-type: none"> <li>• Different states of water</li> <li>• Different types of water (freshwater, seawater, brackish water, greywater)</li> </ul>	<p>Water on Earth</p> <ul style="list-style-type: none"> <li>• What is water?</li> <li>• Different states of water</li> </ul>	<p>Water on Earth</p> <ul style="list-style-type: none"> <li>• What is water?</li> <li>• Different states of water</li> </ul>
<b>The natural water cycle</b>	<b>The natural water cycle</b>	<b>The natural water cycle</b>	<b>The natural water cycle</b>	
<p>How much water do we have?</p> <ul style="list-style-type: none"> <li>• Different sources: surface water, groundwater, seawater, vapour</li> <li>• Percentages</li> <li>• Catchments</li> <li>• Unequal distribution: countries, regions/ biomes/seasons</li> <li>• Climate variability: Droughts and floods</li> <li>• Storing water <ul style="list-style-type: none"> <li>○ Dams and lakes</li> <li>○ Reservoirs</li> <li>○ Water trucks</li> <li>○ Rainwater harvesting</li> </ul> </li> </ul>	<p>How much water do we have?</p> <ul style="list-style-type: none"> <li>• Climate variability: Droughts and floods</li> <li>• Storing water <ul style="list-style-type: none"> <li>○ Dams and lakes</li> </ul> </li> </ul>	<p>How much water do we have?</p> <ul style="list-style-type: none"> <li>• Different sources: surface water, groundwater, seawater, vapour</li> <li>• Percentages</li> <li>• Climate variability: Droughts and floods</li> <li>• Storing water <ul style="list-style-type: none"> <li>○ Dams and lakes</li> <li>○ Rainwater harvesting</li> </ul> </li> </ul>	<p>How much water do we have?</p> <ul style="list-style-type: none"> <li>• Different sources: surface water, groundwater, seawater, vapour</li> <li>• Percentages</li> <li>• Catchments</li> <li>• Unequal distribution: countries, regions/ biomes/seasons</li> <li>• Climate variability: Droughts and floods</li> <li>• Storing water <ul style="list-style-type: none"> <li>○ Dams and lakes</li> <li>○ Reservoirs</li> <li>○ Water trucks</li> <li>○ Rainwater harvesting</li> </ul> </li> </ul>	<p>How much water do we have?</p> <ul style="list-style-type: none"> <li>• Different sources: surface water, groundwater, seawater, vapour</li> <li>• Percentages</li> <li>• Catchments</li> <li>• Unequal distribution: countries, regions/ biomes/seasons</li> <li>• Climate variability: Droughts and floods</li> <li>• Storing water <ul style="list-style-type: none"> <li>○ Dams and lakes</li> <li>○ Reservoirs</li> <li>○ Water trucks</li> <li>○ Rainwater harvesting</li> </ul> </li> </ul>
<p>How much do we need?</p> <p>Water is life</p> <ul style="list-style-type: none"> <li>• Water in cells</li> <li>• Water in human and animal bodies (water cycle in humans)</li> <li>• Water in plants</li> </ul>	<p>How much do we need?</p> <p>Water is life</p> <ul style="list-style-type: none"> <li>• Water plants and animals</li> <li>• How long can you live without water?</li> <li>• Water and health:</li> </ul>	<p>How much do we need?</p> <p>Water is life</p> <ul style="list-style-type: none"> <li>• Water in human and animal bodies (water cycle in humans)</li> <li>• Water in plants</li> </ul>	<p>How much do we need?</p> <p>Water is life</p> <ul style="list-style-type: none"> <li>• Water in cells</li> <li>• Water in human and animal bodies (water cycle in humans)</li> <li>• Water in plants</li> </ul>	<p>How much do we need?</p> <p>Water is life</p> <ul style="list-style-type: none"> <li>• Water in cells</li> <li>• Water in human and animal bodies (water cycle in humans)</li> <li>• Water in plants</li> </ul>



Proposed water curriculum outline	Foundation phase Grade R-3	Intermediate phase Grade 4-6	Senior phase Grade 7-9	FET phase Grade 10-12
<ul style="list-style-type: none"> <li>• Water plants and animals</li> <li>• Plants and animals that have adapted to little water</li> <li>• How long can you live without water?</li> <li>• Water and health:                             <ul style="list-style-type: none"> <li>○ Safe and unsafe uses of water</li> <li>○ Waterborne diseases</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>○ Safe and unsafe uses of water</li> </ul>	<ul style="list-style-type: none"> <li>• Water plants and animals</li> <li>• Plants and animals that have adapted to little water</li> <li>• How long can you live without water?</li> <li>• Water and health:                             <ul style="list-style-type: none"> <li>○ Safe and unsafe uses of water</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Water plants and animals</li> <li>• Plants and animals that have adapted to little water</li> <li>• Water and health:                             <ul style="list-style-type: none"> <li>○ Safe and unsafe uses of water</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Plants and animals that have adapted to little water</li> <li>• Water and health:                             <ul style="list-style-type: none"> <li>○ Waterborne diseases</li> </ul> </li> </ul>
<p>Different human uses and abuses of water</p> <ul style="list-style-type: none"> <li>• Personal use: Water to clean: yourself, your house, your clothes, your car, your dishes, your food</li> <li>• Water to produce food (irrigated agriculture)</li> <li>• Water to prepare or process food (personal or industrial)</li> <li>• Water industries: building, mining, manufacturing, electricity generation</li> <li>• Water for recreation: gardens, parks, swimming pools, fountains, water sport</li> <li>• Water in cultural and religious activities</li> <li>• Water footprint; pie chart</li> <li>• Water abuse (pollution, wastage, etc.)</li> </ul>	<p>Different human uses and abuses of water</p> <ul style="list-style-type: none"> <li>• Personal use: Water to clean: yourself, your house, your clothes, your car, your dishes, your food</li> <li>• Water abuse (pollution, wastage, etc.)</li> </ul>	<p>Different human uses and abuses of water</p> <ul style="list-style-type: none"> <li>• Personal use: Water to clean: yourself, your house, your clothes, your car, your dishes, your food</li> <li>• Water to produce food (irrigated agriculture)</li> <li>• Water for recreation: gardens, parks, swimming pools, fountains, water sport</li> <li>• Water in cultural and religious activities</li> <li>• Water abuse (pollution, wastage, etc.)</li> </ul>	<p>Different human uses and abuses of water</p> <ul style="list-style-type: none"> <li>• Water to produce food (irrigated agriculture)</li> <li>• Water to prepare or process food (personal or industrial)</li> <li>• Water industries: building, mining, manufacturing, electricity generation</li> <li>• Water in cultural and religious activities</li> <li>• Water footprint; pie chart</li> <li>• Water abuse (pollution, wastage, etc.)</li> </ul>	<p>Different human uses and abuses of water</p> <ul style="list-style-type: none"> <li>• Water to produce food (irrigated agriculture)</li> <li>• Water to prepare or process food (industrial)</li> <li>• Water industries: building, mining, manufacturing, electricity generation</li> <li>• Water in cultural and religious activities</li> <li>• Water footprint; pie chart</li> <li>• Water abuse (pollution, wastage, etc.)</li> </ul>

Proposed water curriculum outline	Foundation phase Grade R-3	Intermediate phase Grade 4-6	Senior phase Grade 7-9	FET phase Grade 10-12
<b>Urban water cycle</b>		<b>Urban water cycle</b>	<b>Urban water cycle</b>	<b>Urban water cycle</b>
<b>Water and wastewater treatment</b> <ul style="list-style-type: none"> <li>The science of water treatment</li> <li>Treatment and distribution network</li> </ul>	<b>Water and wastewater treatment</b>	<b>Water and wastewater treatment</b>	<b>Water and wastewater treatment</b> <ul style="list-style-type: none"> <li>The science of water treatment</li> <li>Treatment and distribution network</li> </ul>	<b>Water and wastewater treatment</b> <ul style="list-style-type: none"> <li>The science of water treatment</li> <li>Treatment and distribution network</li> </ul>
Balancing supply and demand Supplementing supply: <ul style="list-style-type: none"> <li><b>Re-use</b></li> <li>Desalination</li> <li>Groundwater</li> <li>Using surface water effectively</li> <li>Rainwater harvesting</li> <li>Repair leaks</li> </ul> Lowering demand: <ul style="list-style-type: none"> <li>More effective irrigation methods in agriculture</li> <li>Drought-resistant cultivars</li> <li><b>Recycle water in industrial processes</b></li> <li>Water-efficient technology</li> <li>Tips to use less water (personal use)</li> </ul>	Balancing supply and demand Supplementing supply: <ul style="list-style-type: none"> <li><b>Re-use</b></li> <li>Groundwater</li> <li>Rainwater harvesting</li> </ul> Lowering demand: <ul style="list-style-type: none"> <li>Tips to use less water (personal use)</li> </ul>	Balancing supply and demand Supplementing supply: <ul style="list-style-type: none"> <li><b>Re-use</b></li> <li>Desalination</li> <li>Groundwater</li> <li>Rainwater harvesting</li> <li>Repair leaks</li> </ul> Lowering demand: <ul style="list-style-type: none"> <li><b>Recycle water in industrial processes</b></li> <li>Water-efficient technology</li> <li>Tips to use less water (personal use)</li> </ul>	Balancing supply and demand Supplementing supply: <ul style="list-style-type: none"> <li><b>Re-use</b></li> <li>Desalination</li> <li>Groundwater</li> <li>Rainwater harvesting</li> <li>Repair leaks</li> </ul> Lowering demand: <ul style="list-style-type: none"> <li>More effective irrigation methods in agriculture</li> <li>Drought-resistant cultivars</li> <li><b>Recycle water in industrial processes</b></li> <li>Water-efficient technology</li> <li>Tips to use less water (personal use)</li> </ul>	Balancing supply and demand Supplementing supply: <ul style="list-style-type: none"> <li><b>Re-use</b></li> <li>Desalination</li> <li>Groundwater</li> <li>Using surface water effectively</li> </ul> Lowering demand: <ul style="list-style-type: none"> <li>More effective irrigation methods in agriculture</li> <li>Drought-resistant cultivars</li> <li><b>Recycle water in industrial processes</b></li> <li>Water-efficient technology</li> <li>Tips to use less water (personal use)</li> </ul>
Water economics	Water economics	Water economics	Water economics	Water economics
Water governance <ul style="list-style-type: none"> <li>Water legislation</li> <li>Institutional framework/Government structures</li> <li>Regulation</li> <li>Licenses</li> </ul>		Water governance <ul style="list-style-type: none"> <li>Institutional framework/Government structures</li> <li>Water services: municipalities (Water Services Authorities)</li> </ul>	Water governance <ul style="list-style-type: none"> <li>Water legislation</li> <li>Institutional framework/Government structures</li> <li>Regulation</li> <li>Water services: municipalities (Water Services Authorities)</li> </ul>	Water governance <ul style="list-style-type: none"> <li>Water legislation</li> <li>Institutional framework/Government structures</li> <li>Regulation</li> <li>Licenses</li> </ul>

Proposed water curriculum outline	Foundation phase Grade R-3	Intermediate phase Grade 4-6	Senior phase Grade 7-9	FET phase Grade 10-12
<ul style="list-style-type: none"> <li>• Water services: municipalities (Water Services Authorities)</li> <li>• Water resource management                             <ul style="list-style-type: none"> <li>○ Catchment management</li> <li>○ Healthy rivers</li> <li>○ Caring for the ocean</li> <li>○ Looking after groundwater</li> <li>○ Prevent pollution</li> </ul> </li> </ul>			<ul style="list-style-type: none"> <li>• Water resource management                             <ul style="list-style-type: none"> <li>○ Catchment management</li> <li>○ Healthy rivers</li> <li>○ Caring for the ocean</li> <li>○ Looking after groundwater</li> <li>○ Prevent pollution</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Water services: municipalities (Water Services Authorities)</li> <li>• Water resource management                             <ul style="list-style-type: none"> <li>○ Catchment management</li> <li>○ Healthy rivers</li> <li>○ Caring for the ocean</li> <li>○ Looking after groundwater</li> <li>○ Prevent pollution</li> </ul> </li> </ul>
Your responsibility as a citizen: become a water-wise warrior	Your responsibility as a citizen: become a water-wise warrior	Your responsibility as a citizen: become a water-wise warrior	Your responsibility as a citizen: become a water-wise warrior	Your responsibility as a citizen: become a water-wise warrior

**Map 13: WRC and Water Wise education material mapped onto the water curriculum outline**

Water curriculum outline	WRC material (2008, based on outcomes-based curriculum; not CAPS; SPLASH BOOK [2018])	Water Wise material (Intermediate phase unless marked otherwise; aligned with CAPS [?], but across curriculum)
Water on Earth <ul style="list-style-type: none"> <li>• What is water?</li> <li>• Different states of water</li> <li>• Different types of water (freshwater, seawater, brackish water, greywater)</li> </ul>	Grade R, NS (the phases of water) Grade 6 Maths (water facts and word sums) SPLASH BOOK	Languages (Respect our precious resource)
The natural water cycle	Grade 2 Languages (story of a water drop) Grade 2 Arts & Culture (acting the water cycle) Grade 2 NS (making your own water cycle) Grade 6 Languages (compared with water cycle in humans) SPLASH BOOK	SS History (Thousands of years old and still fresh) Grade 1, Languages (The Earth recycles water)
How much water do we have?	Grade 1, Languages (story about freshwater)	

Water curriculum outline	WRC material (2008, based on outcomes-based curriculum; not CAPS; SPLASH BOOK [2018])	Water Wise material (Intermediate phase unless marked otherwise; aligned with CAPS [?], but across curriculum)
<ul style="list-style-type: none"> <li>• Different sources: surface water, groundwater, seawater, vapour</li> <li>• Percentages</li> <li>• Catchments</li> <li>• Unequal distribution: countries, regions/ biomes/seasons</li> <li>• Climate variability: Droughts and floods</li> <li>• Storing water                             <ul style="list-style-type: none"> <li>○ Dams and lakes</li> <li>○ Reservoirs</li> <li>○ Water trucks</li> <li>○ Rainwater harvesting</li> </ul> </li> </ul>	<p>Grade 1, Languages (story about different sources)                      Grade 5 NS &amp; SS Geography (Quiz for parents)                      Grade 6 SS Geography (waterways of Africa)                      Grade 7 Languages (text and activities on wetlands)                      Grade 6 NS (catchments)                      Grade 5, SS Geography (distribution of rainfall)                      Grade 5, Technology (make a rain meter)                      Grade 6 Technology (making a rain gauge)                      SPLASH BOOK</p>	
<p>How much do we need?</p> <p>Water is life</p> <ul style="list-style-type: none"> <li>• Water in cells</li> <li>• Water in human and animal bodies (water cycle in humans)</li> <li>• Water in plants</li> <li>• Water plants and animals</li> <li>• Plants and animals that have adapted to little water</li> <li>• How long can you live without water?</li> <li>• Water and health:                             <ul style="list-style-type: none"> <li>○ Safe and unsafe uses of water</li> <li>○ Waterborne diseases</li> </ul> </li> </ul>	<p>Grade 6 Languages (compared with natural water cycle)                      SPLASH BOOK                      Grade 3 NS (how much water does a carrot need?)                      Grade 2 Arts &amp; Culture (mobile of animals living in a wetland)                      Grade 4 NS (water animals)                      Grade 4 Maths (count the water animals)                      Grade 4 LO (water animals and water health)                      Grade 4 Languages (write the story of a water animal)                      Grade 1, Life Orientation (health aspects of water use)                      Grade 1, Technology (making a hand washing station)</p>	<p>LO (Respect water! Respect life!)                      Arts &amp; Culture (water is the life blood of Earth; music)                      NS (stranded on the moon; plant needs)                      NS (Nature is wise; plants adapting to little water)</p>
<p>Different human uses and abuses of water</p> <ul style="list-style-type: none"> <li>• Personal use: Water to clean: yourself, your house, your clothes, your car, your dishes, your food</li> <li>• Water to produce food (irrigated agriculture)</li> </ul>	<p>Grade R Languages (Otter story; poems about water)                      Grade 1, Languages (activities about uses of freshwater)</p>	<p>Maths (Don't waste water; calculations)                      Technology (Drip, drop... stop!; repairing leaks)                      LO (Pollution hurts)                      Maths (Saving water makes cents)</p>

Water curriculum outline	WRC material (2008, based on outcomes-based curriculum; not CAPS; SPLASH BOOK [2018])	Water Wise material (Intermediate phase unless marked otherwise; aligned with CAPS [?], but across curriculum)
<ul style="list-style-type: none"> <li>Water to prepare or process food (personal or industrial)</li> <li>Water industries: building, mining, manufacturing, electricity generation</li> <li>Water for recreation: gardens, parks, swimming pools, fountains, water sport</li> <li>Water in cultural and religious activities</li> <li>Water footprint; pie chart</li> <li>Water abuse (pollution, wastage, etc.)</li> </ul>	<p>Grade R Arts and culture (Acting different uses of water)</p> <p>Grade R Technology (building a boat)</p> <p>Grade 3 Languages (water vocabulary activity)</p> <p>SPLASH BOOK</p> <p>Grade 5 Maths (water footprint of school, data collection)</p> <p>Grade 3 Maths (water diary)</p> <p>Grade 3 Languages (pictures of a clean vs polluted river)</p> <p>Grade 7 SS Geography (abuses of wetlands)</p>	<p>Arts &amp; Culture (Watery wetlands; drama, wetlands under threat)</p> <p>Languages (A day in the life of a frog)</p> <p>NS (Respect our rivers)</p> <p>Grade R, LO (The wise and the unwise; uses and abuses)</p>
<b>Urban water cycle</b>	Grade 5 NS (Map the water course in your school)	<p>SS History (included under Thousands of years old and still fresh)</p> <p>Grade 3 Languages (Sploosh goes on an adventure)</p>
<b>Water and wastewater treatment</b>	<p>Grade 2, LO (explain treatment process using a comic strip)</p> <p>Grade 4 Technology (how to make water safe to drink)</p> <p>Grade 7 Technology &amp; NS (making a water filter, test and evaluate)</p> <p>SPLASH BOOK (limited info)</p>	<p>Technology (Don't pollute. Pay for water; make your own water filter)</p> <p>NS (Clean drinking water in the town)</p> <p>Technology (water purification experiment)</p> <p>Technology (making a model of WWTP)</p> <p>Grade 2, LO (A water filter)</p>
<p>Balancing supply and demand</p> <p>Supplementing supply:</p> <ul style="list-style-type: none"> <li><b>Re-use</b></li> <li>Desalination</li> <li>Groundwater</li> <li>Using surface water effectively</li> <li>Rainwater harvesting</li> <li>Repair leaks</li> </ul> <p>Lowering demand:</p>	SPLASH BOOK	<p>Maths (Water demand and population growth)</p> <p>SS – History (Conserving water from ancient times to present day)</p>

Water curriculum outline	WRC material (2008, based on outcomes-based curriculum; not CAPS; SPLASH BOOK [2018])	Water Wise material (Intermediate phase unless marked otherwise; aligned with CAPS [?], but across curriculum)
<ul style="list-style-type: none"> <li>• More effective irrigation methods in agriculture</li> <li>• Drought-resistant cultivars</li> <li>• Recycle water in industrial processes</li> <li>• Water-efficient technology</li> <li>• Tips to use less water (personal use)</li> </ul>		
Water economics		Economic Management Sciences (Will water be the most valuable resource on Earth in the future?) SS History (Is it worth it?; value of water) EMS (Water is the new money... look after it!) EMS (Wise management)
Water governance <ul style="list-style-type: none"> <li>• Water legislation</li> <li>• Institutional framework/Government structures</li> <li>• Regulation</li> <li>• Licenses</li> <li>• Water services: municipalities (Water Services Authorities)</li> <li>• Water resource management                             <ul style="list-style-type: none"> <li>○ Catchment management</li> <li>○ Healthy rivers</li> <li>○ Caring for the ocean</li> <li>○ Looking after groundwater</li> <li>○ Prevent pollution</li> </ul> </li> </ul>	SPLASH BOOK (limited info)	
Your responsibility as a citizen: become a water-wise warrior	Grade 1 Languages (ways to save water) Grade 2 NS (make posters on how to save water & stop pollution) SPLASH BOOK	Arts & Culture (drama; Waste not, want not, be water efficient) Languages (Take action) Technology (Reduce, re-use and repair) LO: (Conserve! rights & responsibilities) Grade R: Languages (Ethan learns to be Water Wise) Grade 2 LO (Manzi mobile; make a mobile with waterwise slogans) Grade 3 LO (Waterwise quiz)

South Africa is among the 50 driest countries in the world. It is experiencing water scarcity issues due to high freshwater demand and low supply.

Therefore, Let's fight water scarcity issues experienced in the country through greywater re-use practices.



Afrika Borwa e balwa le dinaga tse 50 tseo di lebanego le komelelo mo lefaseng. E ilemogela bosesekarasa tja meetse ka lebaka la hlokego ye ntlhi ya meetse a go hlweka le kabo ya tase.

Ge go le bjalo, Ga re somiseng meetse gape go lwansha hlokego ye ya meetse nageng ya bo rena.

## What Is greywater?

**Non-soapy water**  
Meetse a go hloka sesepa






rinsing fruits & vegetables  
Go tsokolotša dinya le merogo

rinsing dishes  
Go tsokolotša dibjwana

rinsing clothes  
Go tsokolotša diaporo

rag or warm-up water  
meetse a go tshologa

**Soapy water**  
Meetse a go ba le sesepa






washing hands  
go hlapa matsogo

bathing  
go hlapa

washing clothes or laundry  
go hlatswa diaporo

washing dishes and pots  
go dibjwana diaporo

### Safe uses of greywater

It is safe to re-use non-soapy water from:






rinsing fruits & vegetables  
Go tsokolotša dinya le merogo

rinsing dishes  
Go tsokolotša dibjwana

rinsing clothes  
Go tsokolotša diaporo

rag or warm-up water  
meetse a go tshologa

for...

- ✔ Watering non-food gardens (plants and lawns)
- ✔ Washing cars
- ✔ Flushing toilets

It is safe to re-use soapy water from:





washing hands  
go hlapa matsogo

bathing  
go hlapa

washing clothes or laundry  
go hlatswa diaporo

for...

- ✔ Flushing toilets

**Important:**  
Greywater can only be stored for 24 hours

### Unsafe uses of greywater

It is NOT safe to re-use soapy water from:





washing hands  
go hlapa matsogo

bathing  
go hlapa

washing clothes or laundry  
go hlatswa diaporo

for...

- ✘ Watering food gardens (such as fruit and vegetables)
- ✘ Playing
- ✘ Animals

It is NOT safe to re-use soapy water from:



washing dishes and pots  
go dibjwana diaporo

**✘ AT ALL**

**Important:**  
Do NOT re-use soapy water from washing dishes and pots AT ALL

Developed for intermediate phase learners. See also the lesson plans based on the poster.




Figure 3-3: Greywater poster

### Lesson plan 1: Languages

Languages		
Water curriculum topic	Activities	Resources
How much water do we need? Water is life <ul style="list-style-type: none"> <li>• Water and health                             <ul style="list-style-type: none"> <li>○ Safe and unsafe uses of greywater</li> </ul> </li> </ul>	Comprehension: make a list of all the words that you do not understand. Look them up in the dictionary. (functional literacy)  Speaking (small group activity): tell each what the poster is about. (communicative literacy)  Writing (individual activity): design a quiz for your parents based on the poster. 5 questions. Report back on their scores. (communicative literacy)	Greywater poster

### Lesson plan 2: Mathematics

Mathematics		
Water curriculum topic	Activities	Resources
How much water do we need? Water is life <ul style="list-style-type: none"> <li>• Water and health                             <ul style="list-style-type: none"> <li>○ Safe and unsafe uses of greywater</li> </ul> </li> </ul>	Measure the volume of water that your family uses in the kitchen to rinse vegetables for supper. Use a teacup (250ml) or a litre jug to measure the volume. OR Measure the volume of lag water that you can collect during a shower. Use a bucket to collect the water. Use a teacup (250ml) or a litre jug to measure the volume. (communicative literacy)	Greywater poster Cup or litre jug Bucket

### Lesson plan 3: Natural Sciences and Technology

Natural Sciences and Technology		
Water curriculum topic	Activities	Resources
How much water do we need? Water is life <ul style="list-style-type: none"> <li>• Water and health                             <ul style="list-style-type: none"> <li>○ Safe and unsafe uses of greywater</li> </ul> </li> </ul>	Experiment: <ul style="list-style-type: none"> <li>• Plant three seeds in three pots</li> <li>• Water each seed with a different type of water (tap, non-soapy greywater and soapy greywater)</li> <li>• Observe and write down their progress</li> </ul> (critical literacy)	Greywater poster Seeds Pots and soil Tap water Rinse water (non-soapy) Water from washing clothes (soapy)



### Lesson plan 4: Social Sciences (Geography)

Social Sciences (Geography)		
Water curriculum topic	Activities	Resources
How much water do we need? Water is life <ul style="list-style-type: none"> <li>• Water and health                             <ul style="list-style-type: none"> <li>○ Safe and unsafe uses of greywater</li> </ul> </li> </ul>	Research, data collection, data analysis  Class activity: Discuss the difference between urban and rural. Do you think urban and rural people use greywater differently? (communicative and critical literacy)  Homework activity: Select three people that you know who live in an urban area and three people that you know who live in a rural area. Ask each person two questions: <ul style="list-style-type: none"> <li>• What do you do with the soapy water in which you have washed your clothes?</li> <li>• What do you do with the water that you have rinsed vegetables before you cook them?</li> <li>• Write up your results. (communicative literacy)</li> </ul> Class activity: Present your results. The teacher will plot the data on the board. Discuss the findings. (critical literacy)	Greywater poster

### Lesson plan 5: Life Skills (Arts and Culture)

Life Skills (Arts and Culture)		
Water curriculum topic	Activities	Resources
How much water do we need? Water is life <ul style="list-style-type: none"> <li>• Water and health                             <ul style="list-style-type: none"> <li>○ Safe and unsafe uses of greywater</li> </ul> </li> </ul>	Write and perform a rap about the safe and unsafe uses of greywater. (communicative literacy)	Greywater poster

## 3.6 FACTSHEETS

In March 2020, the toolkit was expanded with two topic fact sheets on specific aspects of the new Corona virus. The first fact sheet deals with hand hygiene and is aimed at people without access to running water in their homes. The second fact sheet deals with cleaning and disinfecting surfaces and is aimed at the public at large. The fact sheets can be downloaded from the WRC's website.

### **3.7 NEED FOR A CENTRAL HUB OF RESOURCES**

It became clear from the research into available educational material on water re-use and related aspects that:

- there is a wide range of resources available on water re-use and related aspects both locally and internationally, but
- there is no central space for these resources.

Since the websites that host these resources seldom link to other websites or resources, it is time-consuming and onerous to find specific resources on a specific topic or for a specific purpose. Plus, users have to sift through resources of varying quality and appropriateness to find what they need.

It is therefore proposed that a central hub be developed for South African resources on water re-use and related aspects (educational material, videos, posters, etc.) and links to the best international material. See also section 4.3 of the final chapter.

## CHAPTER 4: TAKING THE STRATEGY INTO ACTION

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### 4.1 INTRODUCTION

This section highlights some of the key factors to be considered for implementing the communication strategy for water re-use.

### 4.2 A COORDINATING BODY

A number of stakeholders asked questions about the coordination and monitoring of the proposed interventions. These stakeholders are of the opinion that there is a need for a structure or institution that can coordinate and monitor the actions. The Development Bank of Southern Africa (DBSA) is establishing a National Water Re-use Programme, which will include a Management Office. It is proposed that this Office coordinates a committee of implementing institutions as a platform where these institutions can report on implementation, exchange best practice and challenges, and harness support.

### 4.3 A CENTRAL HUB OF RESOURCES

The proposal for a central hub of resources was welcomed enthusiastically by all stakeholders. Such a hub would be online in the form of a mobile friendly website and would include a full range of communication resources, including resources aimed at general public education and resources for water re-use projects.

For example:

#### **Resources aimed at general public education**

- Existing resources developed by organisations like Water Wise, Metros, NGOs, DWS
- The sample material that was developed as part of this project
- Resources like posters, videos, radio messages, advertisements that could be used as part of annual awareness campaigns. The study has identified a need for educational videos on water re-use that are tailored for a South African public.
- Resources specifically aimed at municipal consumers to be made available to municipalities
- Learning material for basic, higher and professional education, based on the proposed basic water curriculum. The initial discussion between the WRC and TVET colleges has already highlighted the need for learning material for specific courses and modules.
- Links to the best available international resources.

#### **Communication resources for water re-use projects**

- A standard communication plan template for organisations who will be implementing water re-use projects
- Supporting resources.

Some of these resources exist already; others will have to be developed.

The following features are proposed for the central hub:

- Online (pc, tablet, phone)
- Independent website or microsite
- Open to the public
- All resources vetted by experts
- Users will be able to:
  - Search for resources according to their needs
  - View and download resources
  - Comment on and rate resources
  - Apply to have resources uploaded (all new resources will have to be vetted first)
  - Engage with experts or other users on forums/interest groups, and
  - Share resources on social media.

A central hub of resources will require a hosting organisation and an administration team. The administration team will be responsible for website administration, the selection of resources, the development of new resources, quality control, the marketing of the resources and engagement with the public and all interest groups through various channels, including social media. The website and associated social media are proposed as channels through which the public can continuously express knowledge needs to the scientific community and the implementing organisations of this strategy. The research team has had discussions with the Water Wise team of Rand Water and DBSA as possible hosts of such a central hub of resources.

#### **4.4 SUPPORTING MUNICIPALITIES**

Stakeholders are concerned that not all WSIs have the educational resources to inform their consumers, nor do they have the human resources to plan, manage and implement continuous consumer education and communication sustainably. Each municipality has its own unique water and consumer profile, which necessitates a tailor-made approach. A central hub of resources will make educational resources available for WSIs, but they will need additional support to develop and implement such a tailor-made public education programme. It is proposed that training be provided through SALGA and the GCIS Municipal Communicator's Forum. Training videos could also be uploaded on the central hub to be available online. A standardised public education plan for WSIs is also proposed as part of the training.

#### **4.5 SUPPORTING THE DEPARTMENT OF BASIC EDUCATION**

Stakeholders highlighted the need to fast-track public education, especially in view of the implementation of water re-use projects. It is therefore proposed that the WRC, in collaboration with DBE, and with the support of organisations like DBSA and/or the NEPAD Business Foundation/SWPN, develop a full set of learning material for Grade R to Grade 12 that integrates the basic water curriculum across the current school curriculum. Topics that are not addressed in the current CAPS statements will be introduced in subjects like languages and Mathematics that are not topic specific. It is further proposed that these resources are integrated into teacher training and made available on the central hub of resources.

#### **4.6 GETTING INFLUENCERS AND DECISION MAKERS ON BOARD**

The activities that this strategy proposes for influencers and decision makers are aimed at fast tracking public knowledge. For example, information sessions, media briefings, identifying and supporting champions, seminars and conferences. The WRC, DWS and WISA are proposed as implementing institutions. The Management Office of DBSA's National Water Re-use Programme will also be well suited to fulfil this role.

#### **4.7 HARNESSING THE SUPPORT AND INVOLVEMENT OF BUSINESS**

DBSA's National Water Reuse Programme, in collaboration with the SWPN of the NEPAD Business Foundation, will be ideally positioned to harness the support and involvement of business for the educational initiatives proposed in the strategy. This could be done through requesting partners for the development of resources and putting businesses into contact with the right persons at the implementing institutions. At the final stakeholder workshop, SWPN suggested the following actions to support the implementation of the strategy:

- Collaboration with the central hub
- Sharing lessons and opportunities
- Running community awareness campaigns, and
- Supporting learners' programmes and teacher training in collaboration with DBE

#### **4.8 MECHANISMS TO MONITOR AND EVALUATE PROGRESS**

It will be critical, especially for the roll out of water re-use projects, to track public knowledge of water re-use and related aspects. What does the public know at this point in time? Is public knowledge improving? Where are there still serious gaps? General improvement in public knowledge of water re-use and related aspects can be measured against the findings of the baseline study. It is proposed that the baseline study be repeated every two or five years to determine if the educational interventions have had an impact on public knowledge. Several stakeholders also suggested data on household water use and self-reported behavioural change (as recorded with qualitative research methods such as focus groups) as mechanisms to evaluate the impact of interventions. The identification of knowledge needs is however a dynamic two-way process and the public's knowledge needs will change over time. It would therefore be important to develop a channel through which the public can continuously express their knowledge needs. Stakeholders proposed that DBE reports annually on the national assessment outcomes with specific reference to activities that assessed learners' water re-use literacy.

#### **4.9 THE CROSS-CUTTING ROLE OF THE WRC**

The WRC can play an important role to take the communication strategy into action, which cuts across the above and entails two aspects:

1. Liaising at executive level with the proposed implementing institutions to set up collaboration agreements; and
2. Identifying and commissioning further educational material on water re-use and related aspects to support implementation such as learning material for TVET college courses, a video on water re-use in South Africa, and a standardised communication plan for municipalities.

#### **4.10 CONCLUSION**

Both the literature review and the engagement with stakeholders highlighted that successful public education programmes require energetic and committed institutions and individuals, supported with adequate resources. It was evident from the discussions with stakeholders that scientists and decision makers in the water sector take the need to diversify South Africa's water resource mix seriously and that they want to make it work. The research team is therefore confident that these scientists and decision makers can successfully implement a programme to educate the South African public so that they understand and support responsible and safe water re-use.

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## **ANNEXURE A: CAPACITY BUILDING REPORT**

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The research team has a sub-contractor agreement with the School of Languages and Communication Studies at the University of Limpopo.

Masters student, Ms Rosinah Mamabolo focussed her dissertation on a specific target audience, namely basic education learners. The Masters study aimed to research and develop a communication strategy for water re-use with specific focus on basic education. Her study leaders were Dr Ian Saunderson and Ms Maphuti Choung.

Ms Rosinah Mamabolo and her study leaders attended the stakeholder engagement workshop on 23 November 2018. She participated in the workshop by introducing the aspect of target audiences and sustainability. She put forward Foundation and Intermediate phase learners as a target audience for sustainable water re-use literacy in South Africa. She submitted her dissertation for examination in November 2019 and was awarded her degree in 2020.