A COMMUNICATION STRATEGY FOR WATER RE-USE IN SOUTH AFRICA

Volume I:

Situational analysis and stakeholder engagement

Sarah Slabbert and Nadja Green

WATER RESEARCH COMMISSION

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VOLUME I: SITUATIONAL ANALYSIS AND STAKEHOLDER ENGAGEMENT

Report to the
Water Research Commission

by

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

Volume II: A communication strategy for water re-use in South Africa – communication strategy development and implementation (WRC Report No. 2805/2/20)

EXECUTIVE SUMMARY

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 ESTABLIS 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. 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.

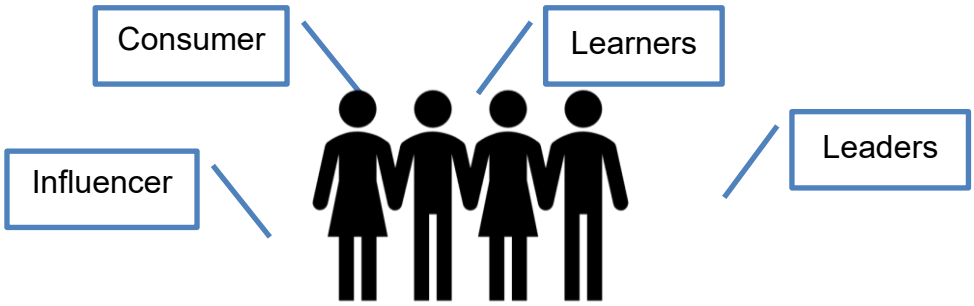

Figure E-1: Individuals in different roles in society[1]

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.

[1] Figures and tables without sources have been developed by the authors.

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Mr D Mtsweni	Department of Water and Sanitation

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Ms Rosinah Mamabolo (University of Limpopo).

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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

1.1 MOTIVATION FOR A COMMUNICATION STRATEGY FOR WATER RE-USE

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 funded a lot of research groundwork on the technical, financial and water quality aspects of water re-use (for example, Osunmakinde *et al*., 2013, Patterson, 2013, Ilembade *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 STUDY METHOD

1.3.1 Study design

The diagram below summarises the project phases:

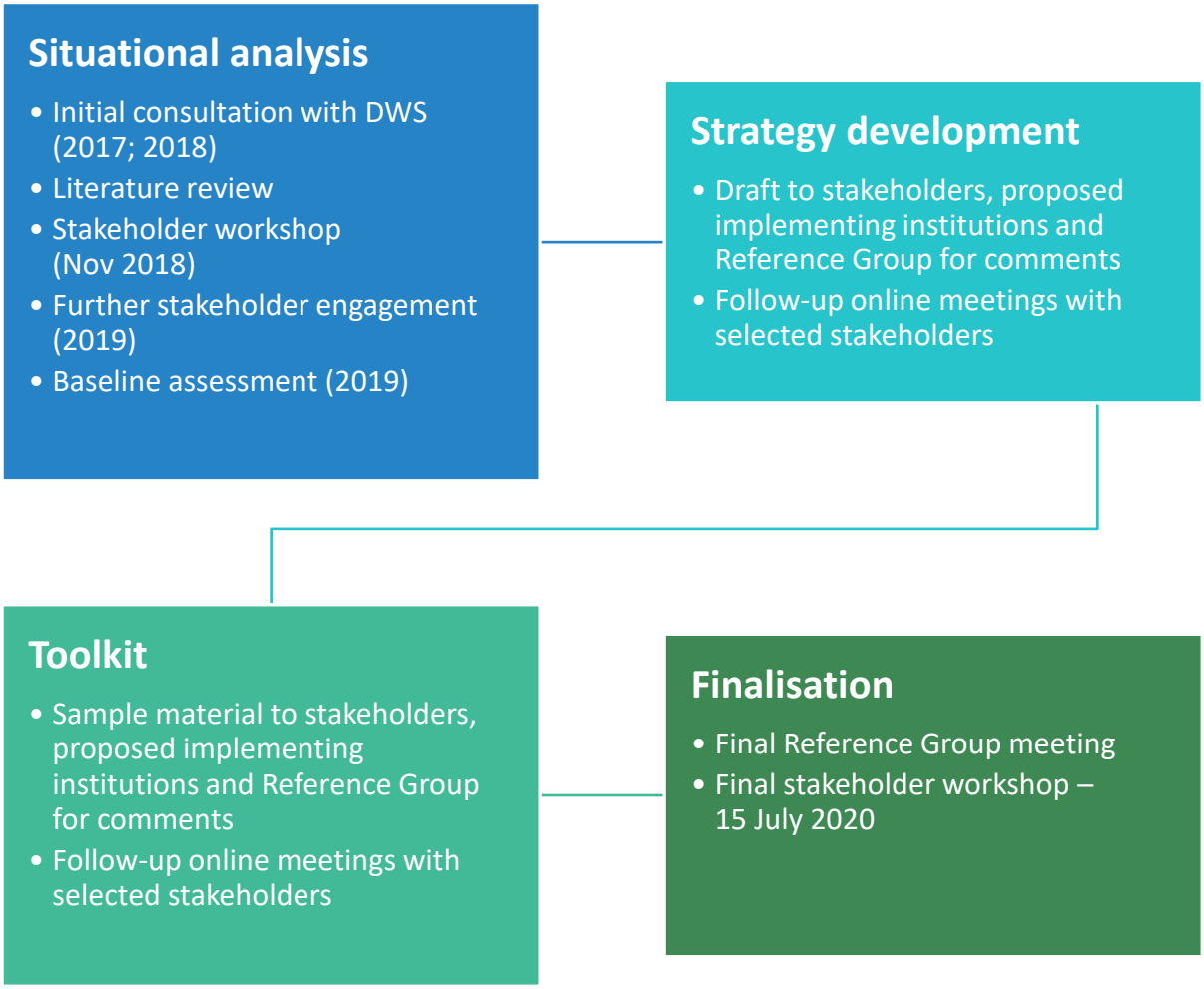


Figure 1-1: Project phases

The sub-sections below describe the methodology that was used to address the research aims.

1.3.2 Literature review

The research team conducted a literature review on the development of a communication strategy for a public education programme for water re-use. The literature includes local and international perception studies on water re-use, as well as best practice in water re-use communication strategies and campaigns. The literature review appears in the next chapter of this document.

1.3.3 Stakeholder engagement

The theoretical basis of stakeholder mapping and stakeholder engagement methods is discussed as part of the literature review. The study followed a multi-stakeholder engagement approach. "Stakeholder" is defined in this study as an organisation who has a vested interest in water re-use and whose actions will benefit from a water re-use literate public. The following stakeholders that fit this definition have been identified from the literature review:

1. Department of Water and Sanitation (DWS), who is the custodian of water in South Africa and owner of the National Strategy on Water Re-use, as not only the primary stakeholder of the study, but as a partner
2. Metros and other large municipalities that have implemented or are planning to implement water re-use projects
3. South African Local Government Association (SALGA)
4. Water Services Providers other than municipalities, such as the Water Boards and private companies
5. Water intensive industries and mines, who are implementing or planning to implement water re-use, and representative organisations like the Strategic Water Partners Network (SWPN).

Six further stakeholder groups were added to the above list:

6. The research community who has done extensive groundwork for the implementation of water re-use in South Africa, and who included public communication in their studies
7. The Department of Environmental Affairs (to get their input on the content of a public water re-use strategy as far as environmental protection is concerned)
8. The Department of Basic Education as the primary educator of the future public
9. The Department of Higher Education and Universities South Africa
10. The Gauteng Environmental Education Forum (GEEF), and
11. The Development Bank of Southern Africa (DBSA).

For this project, stakeholder engagement involved:

- Initial stakeholder consultations
- A stakeholder engagement workshop
- Further discussions with stakeholders to follow up on the stakeholder workshop
- A second stakeholder engagement workshop, planned for 2020, where the draft communication strategy and the toolkit was to be presented to stakeholders for their input. The COVID-19 pandemic and the lockdown situation in South Africa made this impossible. Feedback was therefore received via email and video conferences. In July 2020, a final stakeholder workshop was hosted by the WRC on Zoom. The topic of the workshop was ‘Taking the communication strategy into action’.

The public is both a target audience of a public education programme and a stakeholder. In this study, the public was engaged through a national survey to assess their baseline knowledge of water re-use and related aspects.

1.3.4 Developing a communication strategy and toolkit

The research team used the stakeholder input and the findings of the baseline survey to develop the communication strategy for a public education programme. A toolkit of communication material on different facets of water re-use was developed to support implementation. Volume 2 sets out the communication strategy and outlines the material that was developed for the toolkit.

1.4 CONTEXT AND STRUCTURE OF THIS REPORT

Mefalopulos and Kamlongera (2004) define communication strategy development as "a well-planned series of actions aimed at achieving specific objectives through the use of communication methods, techniques and approaches". The study follows the four-phase framework for a communication strategy of Mefalopulos (2008) as shown in Figure 1-2.

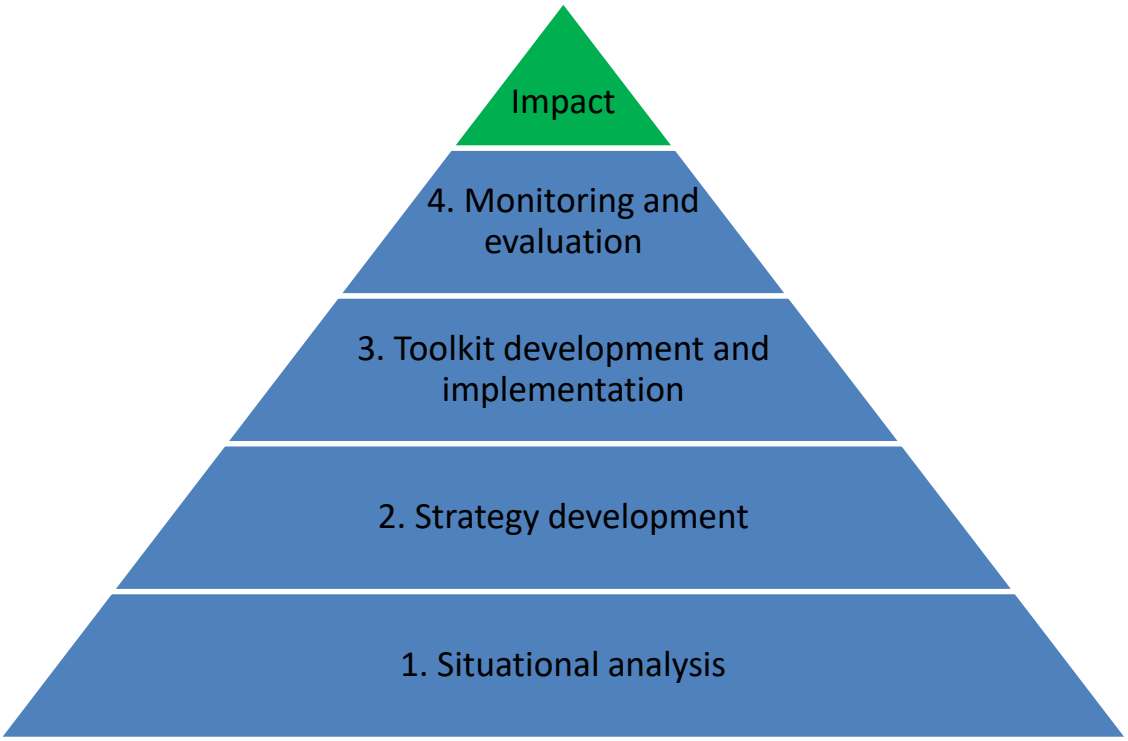


Figure 1-2: The four phases of a communication strategy Mefalopulos (2008)

This report presents reviews of literature that relates to the four phases of a communication strategy for a public education programme for water re-use. In terms of this framework, the first phase of a communication strategy will always be **a situational analysis** and setting of objectives, in other words, assessing where you are now and deciding where you want to be. This is presented in Chapter 2. Chapter 3 provides literature on the second phase, where one develops a **strategy** to take you from where you are to where you want to be. Chapter 4 reviews literature on the Phase 3, implementing the strategy through specific **communication actions and activities** directed at specific target audiences. A communication strategy needs to be **monitored and evaluated** and improved (Phase 4). Chapter 5 reviews literature on this aspect and also on how a communication strategy has to adapt to contextual changes and integrate feedback in a continuous learning cycle.

Each aspect of the framework is a study field on its own with comprehensive literature; the researchers consulted therefore handbooks, reports and journal articles that included an overview of the most important literature of each field.

Chapter 6 deals with the stakeholder engagement activities, which played a pivotal role in the development of the communication strategy.

CHAPTER 2: SITUATIONAL ANALYSIS

2.1 INTRODUCTION

The situational analysis deals with the following aspects:

- The concept of water re-use, associated terminology and relevance for a communication strategy
- The regulatory and institutional frameworks for the implementation of water re-use to identify the relevant stakeholders, their respective roles and responsibilities and the relevance of a public education programme on water re-use for them
- An overview of local and international studies on public knowledge and perceptions of, and communication programmes for, water re-use and their relevance for this study.

2.2 TERMINOLOGY AND DEFINITIONS

A public education programme requires clear terminology and definitions that the public can understand and relate to. Unfortunately, the terminology and definitions used in the literature are neither clear, unambiguous, nor consistent. The terms water re-use, water reclamation and water recycling are often used interchangeably in the literature. For example, the NWRS (DWS, 2013) defines water re-use and water recycling as synonyms, although it makes a distinction between a change of user (re-use) and the same user (recycling). However, the term ''re-use'' is used for domestic recycling. The distinction between re-use and reclamation is another example. Both terms are used in the NWRS. Reclamation is defined as ''treatment of wastewater for re-use'', but the term ''reclaimed'' is used for treated or untreated wastewater as illustrated in bold in the definition below.

Re-use	Utilisation of treated or untreated wastewater for a process other than the one that generated it, i.e. it involves a change of user. For instance, the re-use of municipal wastewater for agricultural irrigation. Water re-use can be direct or indirect, intentional or unintentional, planned or unplanned, local, regional or national in terms of location, scale and significance. **Water re-use may involve various kinds of treatment (or not) and the reclaimed water may be used for a variety of purposes**. (emphasis added)

South African researchers Muanda *et al.* (2017a) and Swartz *et al.* (2015) similarly use both ''water re-use'' (alternatively re-use) and ''water reclamation'' without making a clear distinction between the two.

The National Water and Sanitation Master Plan (NW&SMP) (DWS, 2019) uses the term ‘’water reclamation’’ twice, but it is not defined:

> *On the supply side, there is a need to optimise the water mix which is currently strongly dominated by surface water, with some groundwater and return flows to a water mix that includes increased groundwater use, re-use of effluent from waste water treatment plants, water reclamation, as well as desalination and treated acid mine drainage. (p12)*
>
> *…re-use options such as the eMalahleni Water Reclamation project (p 3-30)*

To add to the confusion, not all countries use the same term. For example, the Australian Water Association uses the term ''water recycling'', instead of ''water re-use''. They define the term as follows: ''water recycling involves the recovery or reclamation of water from wastewater for potable (drinking) or non-potable use,

which can be supplied back to the water system either directly or indirectly."[2] In the description, rainwater that is collected or harvested from stormwater drainage systems, is included as recycled water.

The WateReuse Association, a non-profit trade organisation based in the USA, representing water utilities, businesses, industrial and commercial enterprises, not-for-profit organisations and associations, also prefers the term "water recycling" because it relates water re-use to the water cycle. Their definition appears in the quote below:

> *Recycled Water generally refers to treated domestic wastewater that is used more than once before it passes back into the water cycle.*[3]

The preference for the term "recycling" relates to its link to the water cycle. Several communication programmes for water re-use (for example, European Commission, 2016, Motion & Kearnes, 2014, Miller, 2006) address prejudices against water re-use by emphasising that all freshwater on the planet is being constantly re-used or recycled. Water re-use processes such as the treatment of wastewater replicate the natural cleaning process of the water cycle and can increase the freshwater available to a community. From another perspective, the re-use of treated water is described on a website of the European Commission as extending its life cycle and preserving water resources.[4]

To add to the terminological complexity, "water re-use/recycling/reclamation" is defined broadly or narrowly in the literature:

In terms of the definition in the NWRS (DWS, 2013), water re-use is a broad term that includes the direct and indirect re-use of treated wastewater, the indirect re-use of wastewater return flows, the re-use of treated acid mine water drainage, and water from recharged aquifers. Figure 2-1 below from the NWRS includes agricultural, industrial and mining return flows and industrial water recycling as examples of water re-use. In this figure, "re-use" is the broader term; recycling and return flows, and direct and indirect re-use, are terms with more restricted meanings.

The National Strategy for Water Re-use (DWS, 2011) describes water re-use in similar broad terms.
Several websites restrict the meaning of water re-use to treated wastewater, for example, the National Academics of Science"[5] defines water re-use as "…using treated wastewater for a beneficial purpose. The process of treating wastewater prior to re-use is called water reclamation. The European Commission's web page[6] on water re-use also restricts the definition to the re-use of treated wastewater.
The US Bureau of Reclamation[7], on the other hand, includes water re-use and desalination in their definition of the word “reclamation”.

[2] http://www.awa.asn.au/AWA_MBRR/Publications/Fact_Sheets/Water_Recycling_Fact_Sheet/AWA_MBRR/Publications/Fact_Sheets/Water_Recycling_Fact_Sheet.aspx?hkey=54c6e74b-0985-4d34-8422-fc3f7523aa1d

[3] https://watere-use.org/water-re-use-101/glossary/

[4] http://ec.europa.eu/environment/water/re-use.htm

[5] http://nas-sites.org/waterre-use/what-is-water-re-use/

[6] http://ec.europa.eu/environment/water/re-use.htm

[7] https://www.usbr.gov/

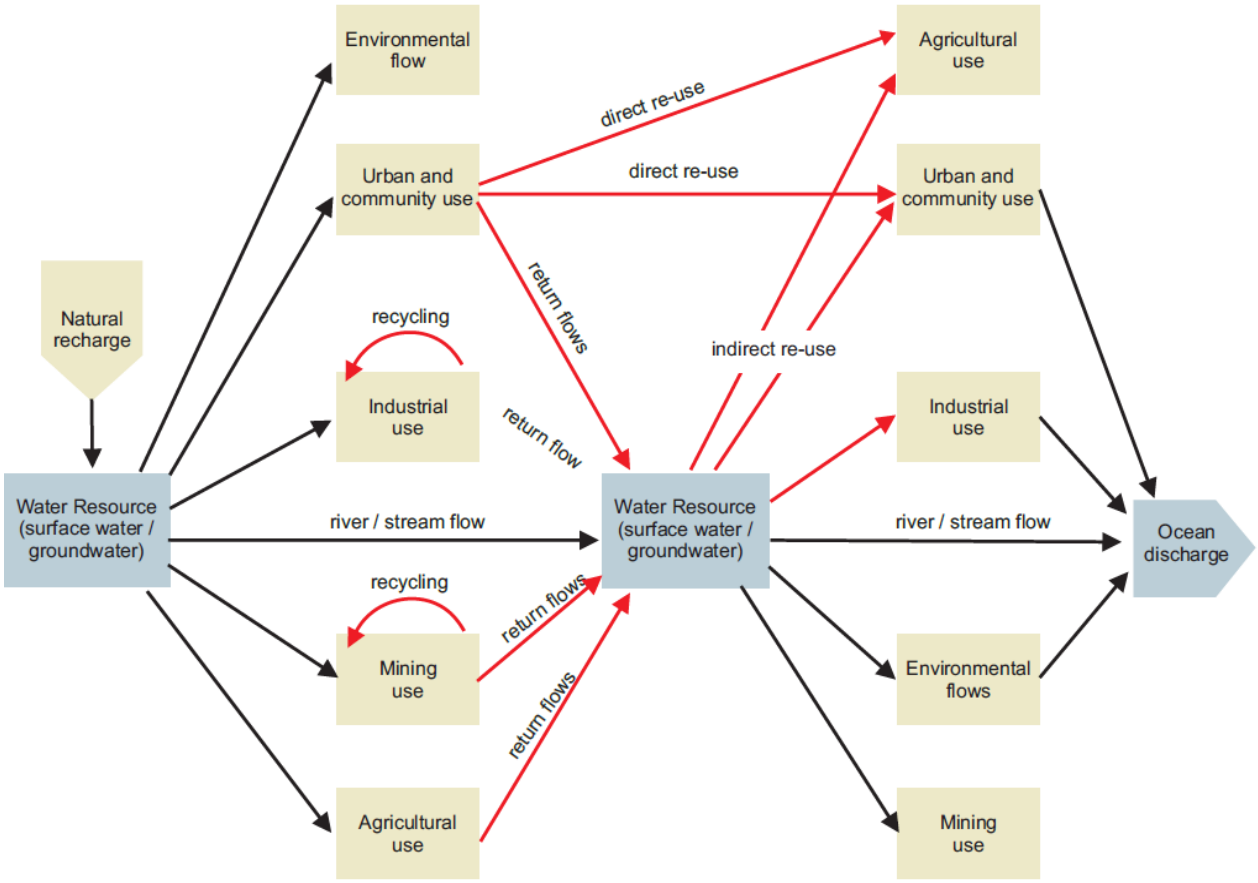


Figure 2-1: Diagram from the NWRS (DWS, 2013)

The WateReuse Association (Miller, 2006) defines re-use broadly as “the reclamation and treatment of non-traditional (or impaired) waters for the purpose of beneficial re-use.” Non-traditional or impaired waters include municipal and industrial wastewater effluent, brackish water, poor quality ground water, agriculture return flows, stormwater and the oceans.

In line with the distinction between a narrow versus a broader focus on water re-use/recycling/reclamation, some sources include a further classification of different types of water re-use (DWS, 2013; Miller, 2006) as depicted in Figure 2-2. Other sources advocate an integrated approach to re-use that considers a portfolio of water supplies to manage global water needs, for example Miller (2006) and the European Commission (2016). Such a portfolio would include re-using wastewater, rainwater harvesting and stormwater collection, desalination (of seawater or brackish groundwater), aquifer storage and demand management and loss reduction. The term "alternative water resources" has since become a common term in the literature (Hardy *et al*., 2015). A portfolio of water sources is also considered in the National Water and Sanitation Master Plan (DWS, 2018) where it is called the ‘water resource mix’. The optimal water resource mix includes increased groundwater use, re-use of effluent from wastewater treatment plants, water reclamation, as well as desalination and treated acid mine drainage (DWS, 2019:12). The integrated approach has the advantage that it shifts the emphasis of the narrative from a singular focus on the merits and challenges of water re-use/recycling/reclamation to the quest for more water sources, of which water re-use/recycling/reclamation is one.

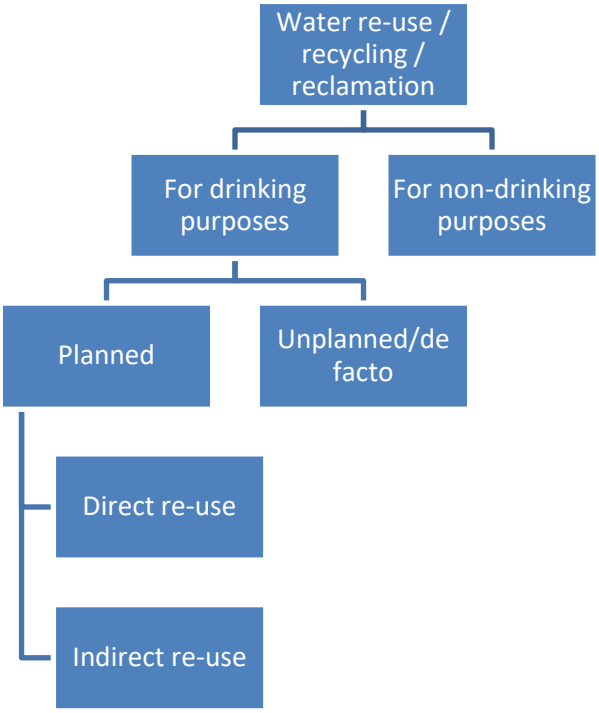


Figure 2-2: Classification of water re-use/recycling/reclamation (DWS, 2013; Miller, 2006)

For a communication strategy for a public education programme on water re-use it would be important to:

- use standardised terminology for water re-use that the public can understand and relate to. This will instil credibility and confidence (Swartz *et al*., 2015).
- decide on the scope and focus of the content of the public education programme. Should it have a narrow or a broad focus? Should water re-use/recycling/reclamation be discussed as a topic on its own or should it be discussed as one of the options in a diversified water resource mix?
- decide if the public should also be able to distinguish between the different types of water re-use/recycling/reclamation or whether these distinctions will only confuse the public.

Based on the literature, the research team proposes for the public education programme terminology that clearly link water re-use to the water cycle to emphasise the fact that the earth's water is being constantly re-used. It is further proposed that the concept of water re-use to have a broad meaning that includes treated and untreated wastewater. Similarly, it is proposed that the concept should not be narrowed to use for drinking purposes only. Use for drinking purposes is only one of many uses of re-used water. It is also proposed that the public education programme approaches water re-use as part of a diversified water resource mix.

These proposals were put forward for discussion in the stakeholder consultations. Based on many years of experience of the numerous misspellings, mispronunciations and misunderstandings of the term "potable", it is proposed that the term be avoided in a public education programme and be replaced by 'for drinking purposes". This proposal was put forward for discussion in the stakeholder consultations.

2.3 REGULATORY AND INSTITUTIONAL FRAMEWORKS FOR THE IMPLEMENTATION OF WATER RE-USE IN SOUTH AFRICA

2.3.1 Overview

For the situational analysis of a communication strategy it is important to understand the regulatory and institutional frameworks for the implementation of water re-use because this assists stakeholder mapping and identifying the stakeholders to be consulted in the process of developing a communication strategy.

2.3.2 Legislation

The protection of water resources in South Africa and the use of water are governed by different tiers of legislation with the Constitution of the Republic of South Africa of 1996 at the top. In terms of the Bill of Rights (Sections 27 (1)(b) and Section 24 (a)) everyone has the right to have access to sufficient food and water and the right to an environment that is not harmful to their health or well-being.

The National Water Act, 1998 (Act 36 of 1998) and the National Water Services Act, 1997 (Act 108 of 1997) legislate roles and responsibilities to achieve the sustainable use of water for the benefit of all. In terms of these two Acts, it is the responsibility of DWS to develop water policies and strategies for implementation, of which the National Strategy for Water Re-use (DWS, 2011) is an example.

Several other sectors involve the use of water, for example mining, energy, environmental management and health. The legislation governing these sectors makes it clear that any activities in these sectors that involve water resources and water use, including water re-use, are also governed by the two water Acts. Acts include the Mineral and Petroleum Resources Development Act, 2002 (Act 28 of 2002), the National Environmental Management Act, 1998 (Act 107 of 1998), the National Environmental Management: Waste Act, 2008 (Act 59 of 2008), the National Energy Act, 2008 (34 of 2008), the National Environmental Management: Integrated Coastal Management Act, 2008 (Act 24 of 2008) and the National Health Act, 2003 (Act 61 of 2003). The National Health Act, for example, sets out the role of municipal health services and includes the monitoring of water quality, all of which are subject to the norms and standard set by DWS, the regulator. This will include the quality standards for water re-used within a municipality. The Mineral and Petroleum Resources Development Act, in turn, stipulates that any prospecting or mining rights are subject to the National Water Act. Water re-use from mining activities are therefore also governed by the two water Acts.

At local government level, the provision of water and sanitation services and associated tariffs are also governed by the Municipal Systems Act, 2000 (Act 32 of 2000) and the Municipal Finance Management Act, 2003 (Act 56 of 2003). Water Services Authorities are responsible for developing bylaws that, amongst others, enable regulation of water services provision and use within its area of jurisdiction (DWS, 2018).

2.3.3 The regulatory framework

In terms of the National Water Act, 1998 (Act 36 of 1998) the National Government, acting through the Minister, has the power to regulate the use, flow and control of all water in the Republic. In terms of this power, DWS is responsible for the regulation of water resources and the use of water in the country, including water re-use. The regulatory role of DWS in terms of water re-use includes developing implementation guidelines for water re-use projects and guidance to regulatory approvals, setting norms

and standards, reducing the regulatory burden for implementation, making sure that bylaws supporting appropriate re-use of water, and ensuring that water quality standards are implemented (DWS, 2011).
Since the publication of the National Water Re-use Strategy (DWS, 2011), some of the envisaged guidelines and standards have been published. For example, the *National norms and standards for domestic water and sanitation services* (Government Gazette 41100, 2017) includes norms and standards for wastewater re-use and greywater re-use.

The South African Bureau of Standards plays a complementary regulatory role. It has set several water quality standards for the water sector, including drinking water standards (SANS 241). The WRC, through its research network of academia and researchers in the private sector, has supported the regulation of water re-use with a series of research studies as the list below demonstrates:

1. Metcalf, G, Pillay, L, Murutu, C, Chiburi, S, Gumede, N & Gaydon, P. 2014. Wastewater Reclamation for Potable Reuse. Volume 2: Integration of MBR Technology with Advanced Treatment Processes. WRC Report No. TT 611/14. Pretoria: Water Research Commission.
2. Swartz, C.D., Coomans, C.J., Müller, H.P., Du Plessis, JA, Kamish, W. 2014. Decision-Support Model for the Selection and Costing of Direct Potable Reuse Systems from Municipal Wastewater WRC Report No. 2119/1/14. Pretoria: Water Research Commission.
3. De Jager, C., Aneck-Hahn, N.H., Barnhoorn, I.E.J., Bornman, M.S., Pieters, R., Van Wyk, J.H. and Van Zijl, C. 2011. The compilation of a toolbox of bio-assays for detection of estrogenic activity in water. WRC Report No. 1816/1/10. Water Research Commission, Pretoria.
4. Osunmakinde, C.S., Tshabalala, O.S., Dube, S., Nindi, M.M. 2013. Verification and Validation of Analytical Methods for Testing the Levels of PPHCPs (Pharmaceutical & Personal Health Care Products) in treated drinking Water and Sewage. WRC Report No. 2094/1/13.
5. Patterton, H.G. 2013. Scoping study and research strategy development on currently known and emerging contaminants influencing drinking water quality. WRC Report No. 2093/1/13. Pretoria: Water Research Commission.
6. Ilemobade, A.A., Olanrewaju, O.O. & Griffioen, M.L. 2011. Greywater reuse for toilet flushing in high-density urban buildings in South Africa: a pilot study. WRC report no. 1821/1/11. Pretoria: Water Research Commission.

Several WRC studies that will support the regulation of water re-use were in progress at the time (Presentation by Dr Kalebaila of the WRC; Chris Swartz, personal communication), for example studies on:

- Status of water reuse in South Africa – baseline studies
- Demonstration of water reclamation (non-reverse osmosis) technologies
- Micro-pollutants and endocrine disrupting contaminants in wastewater treatment systems: towards effective water reclamation
- Antibiotic resistant bacteria and genes in raw and drinking water: implications for water production and water quality monitoring.
- The status and extent of de facto reuse in South Africa
- Development of technology validation frameworks for the water sector

2.3.4 The institutional framework

The water sector of South Africa comprises a large number of institutions whose roles and responsibilities are complex, and whose functions overlap (DWS, 2018; Beck *et al*., 2016). Table 2-1 lists the main institutions of the water sector in terms of roles and responsibilities and the relevance of public education on water re-use.

Table 2-1: Main institutions of the water sector

Institution	Role and responsibilities	Relevance of public education on water re-use?
Minister of Water and Sanitation; DWS	Executive, responsible for policy, regulation, oversight of water sector institutions, including municipal water supply and sanitation, water resources planning, operation and maintenance of large dams, collection and assessment of water data	Yes
COGTA	Oversight of municipalities	Not directly
SALGA	Represent, promote and protect the interest of local government, also with reference to water services	Yes, as a channel to communicate with WSAs
National Treasury	Provides funding for water and sanitation provision; oversight of municipal finances	No
The Trans Caledon Tunnel Authority	Fund and implement a variety of water resource projects	Yes, as potential implementation agent of water re-use projects
CMAs	Only two have yet been established.	Not at this stage
Water Boards (Regional water utilities)	Provides water services to other water services institutions	Yes, as potential implementer of water re-use projects
Municipalities	144 are Water Services Authorities; responsible to provide drinking water and sanitation services, either as water services provider (WSP) or through another WSP	Yes, in terms of their responsibility to consumers, also potential implementers of water re-use projects
Water Services Providers (other than municipalities)	Private water companies, industry, mines, Dept of Public Works	Yes, in terms of their responsibility to consumers, also potential implementers of water re-use projects
Local Water Resource Management Institutions	90 Water User Associations and 177 Irrigation Boards manage irrigation schemes	No. Public education on water re-use is more relevant to organised agriculture.
Transboundary water course commissions	Responsible for transboundary infrastructure	No
NGOs active in the water sector		Yes
Water Research Commission	Develop research agendas, fund research and establish research partnerships	Yes, The WRC supports the implementation of water re-use through targeted research.

The WRC has also supported the implementation of water re-use projects with research projects that relate to public participation and communication as the list below illustrates:

1. Muanda, C., Cousins, D., Lagardien, A., Owen, G. & Goldin, J. 2017a. *Direct Reclamation of Municipal Wastewater for Drinking Purposes – Volume 2: Investigation into institutional and social factors influencing public acceptance of reclaimed water for potable uses in South Africa.* WRC Report No. TT 734/17. Pretoria: Water Research Commission.

2. Muanda, C., Cousins, D., Lagardien, A. 2017b. Direct reclamation of municipal wastewater for drinking purposes. Volume 3: Framework guidelines for public engagement on water reuse. WRC Report No. TT735/17. Pretoria: Water Research Commission.

3. Swartz, C.D., Genthe, B., Menge, J.G., Coomans, C.J. and Offringa, G. 2015. *Direct Reclamation of Municipal Wastewater for Drinking Purposes – Volume 1: Guidance on Monitoring, Management and Communication of Water Quality.* WRC Report No. TT 641/15. Pretoria: Water Research Commission.
4. Van Niekerk, A.M. & Schneider, B. 2013. *Implementation Plan for Direct and Indirect Water Re-use for Domestic Purposes – Sector Discussion Document.* WRC Report No. KV 320/13. Pretoria: Water Research Commission.

5. Rivett, U., Taylor, D., Chair, C., Forlee, B., Mrwebi, M., Van Belle, J-P. & Chigona, W. 2013. Community engagement in drinking water supply management: A review. WRC Report No TT 583/13. Pretoria: Water Research Commission.

In addition to the list in the table above, public education on water re-use is also relevant to sectors or organisations that use large quantities of water, for example, agriculture, energy, mining and selected industries, for example the food and beverage industry. On the one hand, public education on water re-use will serve to encourage these sectors and organisations to re-use water in a responsible manner. On the other hand, public education on water re-use will also sensitise the public to water re-use initiatives in these sectors and by these organisations, and the implications that they have for water resource management and public health.

2.4 PUBLIC ACCEPTANCE OF WATER RE-USE

2.4.1 Overview

The primary objective of a public education programme for water re-use is to foster informed public acceptance. Public acceptance is a critical success factor for water re-use, but wastewater re-use initiatives met with public resistance in many countries (Bungu, 2014). According to the literature, public acceptance of water re-use is determined by awareness, knowledge and perceptions, as well as certain contextual factors, although it not always phrased in these terms. For example, a publication of the European Commission (2015) cites WHO (2006) for a list of factors that determine public acceptance of water re-use. The list of factors can be categorised in terms of awareness, knowledge, perceptions and context:

Awareness

- The degree of public awareness (for example, the number of people informed about the procedure).

Knowledge

- The average understanding of sanitation issues.

- The average knowledge of water stress issues.

Perceptions
- The degree of confidence in the wastewater treatment technology.
- The degree of confidence in the sanitary regulations established by the government.

Contextual factors
- Existing alternatives to wastewater re-use.

In a similar vein, Hartley (2006) lists 10 factors that surveys and case studies in the US between the 1970s and the early 2000s identified as increasing public acceptance of local water re-use projects:

Awareness
- Awareness of water supply problems in the community is high.

Knowledge
- Protection of public health is clear.
- Protection of the environment is a clear benefit of the re-use
- Promotion of water conservation is a clear benefit of the re-use.
- Role of reclaimed water in overall water supply scheme is clear.

Perceptions
- Cost of treatment and distribution technologies and systems is reasonable.
- Perception of wastewater as the source of reclaimed water is minimal.
- Perception of the quality of reclaimed water is high.
- Confidence in local management of public utilities and technologies is high

Contextual factors
- Degree of human contact (used for drinking or to water food crops) is minimal.

Perceptions seem to be the key driver of public acceptance of water re-use (Adewumi et al., 2010). For example, in 2017, a global survey was conducted to get water re-use professionals' input on the factors that influence the development of water re-use markets. The 347 respondents (from across the Americas, Asia, Europe, and Middle and East Africa) considered public perceptions the biggest barrier to direct re-use for drinking purposes, scoring 3.94 out of a possible five points, with 54.6% of respondents regarding it as a “very strong” barrier. It was further established that water re-use professionals regard public opinion to be a much stronger barrier to water re-use in situations where the water will be used for drinking or watering food crops (Water. desalination + re-use, 2017).

Dolnicar and Schafer (2009) state that the success or failure of a water re-use project depend on the public’s perceptions on public health, safety, water quality, land use, environmental protection and economic growth. Muanda *et al*. (2017a) also refer to public perception as a key obstacle to the success of a water re-use initiative.

The eThekwini and George cases below demonstrate how public perception led to unsuccessful direct water re-use projects (Carnie, 2012; Muanda *et al*., 2017a):

- In eThekwini, water re-use was proposed as an option to address increasing water demand. But, after the press framed the proposal as "from toilet to tap", more than 5 000 residents made objections and signed a petition against eThekwini’s re-use proposal. One resident suggested that

"Instead of spending millions on treatment plants, spend it on educating the public on saving water". Another resident said that her major concern was technical or operational error during the purification process. To date, the project has not been implemented.

- In George, a direct water re-use plant was constructed as a response to the 2010 drought. The municipality lodged an extensive communication campaign but met with resistance from some communities (presentation from George municipality at the WRC and WISA water re-use dialogue of 11-12 October 2016). As a result, direct re-use changed to indirect re-use: the water from the plant is pumped to the town's dam where it is mixed with rainwater and then treated for drinking purposes.

Perceptions about water re-use don't operate in isolation; they are influenced by awareness, knowledge and the sociocultural, political and economic context in which water is used and water re-use is discussed. People's interaction with, and use of, water is complex; they use water in many ways including for religious and spiritual purposes.

2.4.2 Drivers of public acceptance of water re-use

In the sections below a few of the drivers of public acceptance that have relevance for a public education programme for water re-use are discussed.

2.4.2.1 Knowledge as a driver of public acceptance of water re-use

A public education programme for water re-use aims to improve awareness and knowledge of those aspects of water re-use that influences public acceptance.

In general, several studies found that the public often rejects water re-use projects due to misinformation and a lack of knowledge (Ormerod, 2016). Correlation between knowledge and desired attitude and behaviour seems to be a consistent finding. Bungu (2014), for example, found that knowledge of wastewater re-use and water scarcity had a positive effect on consumers' perceptions. Lack of knowledge was raised as a major concern as to why consumers are not receptive to wastewater re-use.

The complexity of wastewater treatment systems further adds to the average person's knowledge gap. Dean *et al*. (2016) found improved water knowledge to be associated with the adoption of water-saving and pollution-reduction behaviours, and support for both alternative water sources and rain gardens. Several studies have shown that risk perception correlates with knowledge of the water cycle and water re-use (Dolnicar and Hurlimann, 2009; Marks *et al*., 2008; Nancarrow *et al*., 2009). Research of Macpherson and Slovic (2008) and Macpherson and Snyder (2012) have shown that public education enhances the understanding of the water cycle, the appreciation of technology and leads to accepting the safety of re-used water when produced in accordance with appropriate regulations.

A doctoral study by Rice (2014) assessed perceptions of the public in three cities in the USA relating to the acceptance and occurrence of de facto re-use. The study found that respondents with knowledge of de facto re-use were ten times more likely (more than 75%) to accept treated wastewater from their home tap. Knowledge of alternative water resources is mentioned as increasing public acceptance of water re-use (Hardy *et al*. (2015). Dolnicar *et al.* (2011) found that knowledge about alternative water sources is a key factor for public acceptance.

Public education programmes and public outreach can do much to create the awareness and instil the knowledge required for public acceptance of water re-use (Fries, 2014). A study by Po *et al.* (2005) investigated, identified, measured and tested the major factors that influence the public's decision on

whether to accept or reject a water re-use project. The research found that the provision of comprehensive and transparent information could lead to higher levels of acceptance. Dolnicar *et al.* (2011) highlights the importance of positive messages that spread through personal networks such as family, friends and colleagues beyond a public education programme. These positive messages increase the probability that alternative water sources are taken up by the public.

Only one study could be found that have established what the public knows or does not know about water services, including water re-use. Dean *et al.* (2016)'s findings are based on 15 questions about the impact of household activities on waterways, the urban water cycle, and water management. According to the CRC for Water Sensitive Cities publication[8], Dean's study found that most Australians know that:

- Household actions can reduce water use
- Household fertilizers can impair waterway health
- Stormwater from houses can impair waterway health
- Planting trees near waterways improves waterway health

Most Australians don't know that:

- Domestic wastewater is treated before entering waterways
- Stormwater is not treated before entering waterways
- Separate pipes carry domestic wastewater and stormwater
- A catchment is the total land area draining to a waterway.

Dean *et al.* (2016) also found greater water knowledge in the older and better educated groups. Studies on water re-use in South Africa have focused on perceptions and attitudes, not on knowledge about water re-use. As a result, there is no baseline available on the current status of public knowledge on water re-use in South Africa. For example, do people know where their tap water come from? What does the term 'water re-use' mean to them? Do they know where their wastewater goes? Do they know if it is treated? Following consultations, it was decided that a study to establish a baseline of public knowledge on water re-use is needed to inform a communication strategy for a public education programme and a toolkit for primary target audiences.

2.4.2.2 The disgust factor

Apart from knowledge, studies on public acceptance highlight several other drivers that a public education programme should take note of. The disgust or "yuck" factor is a psychological barrier when it comes to water re-use (Muanda *et al*., 2017a). Ormerod (2016) found that the public often rejects water re-use projects due to instinctive repugnance to drinking treated wastewater. In his study Bungu (2014) found that health concerns are a major reason why consumers are not receptive to re-using treated wastewater for drinking purposes.

Vedachalam and Mancl (2010) surveyed 599 students from the Ohio State University to get their opinions on water resources and water re-use. The findings indicated that the level of contact with the treated wastewater has a strong impact on perceptions of the processed wastewater quality.

This finding was confirmed by Chen *et al.* (2015) who studied the perceptions of stakeholders involved in a water re-use project in Beijing, China. The study found that the stakeholders showed a strong acceptance for non-contact and non-potable re-use, but that they were concerned about the potential risks of re-use for drinking purposes. The stakeholders' perceptions of re-used water were influenced by their social-economic attributes, such as their age, education, occupation and income.

[8] https://watersensitivecities.org.au/wp-content/uploads/2016/05/IN_A2-3_WaterLiteracyInAustralia.pdf

These findings have implications for message framing in a public education programme. To facilitate public acceptance, direct re-use for drinking purposes or for edible crops should not be highlighted as the primary outcome of a water re-use programme; it should be a secondary outcome under highly regulated and controlled conditions.

2.4.2.3 Cultural and spiritual factors

Cultural and spiritual factors influencing acceptance of water re-use will have to be acknowledged and addressed in a public education programme. Although there is agreement in the literature that cultural taboos and spiritual factors can influence acceptance of water re-use, findings are not always consistent.
For example, Wilson and Pfaff (2008) conducted a study to determine if there are groups in Durban with religious or philosophical objections to the potable re-use of wastewater. They found that there was no evidence to support the proposition that Muslims reject water re-use for drinking purposes on religious grounds. Furthermore, no other groups were found to have religious or conscience-based restrictions on the consumption of re-used water.

In contrast, Muanda *et al*. (2017a) found that culture and religion influence public perceptions. The study quotes a Muslim leader who said that water that has not been treated in the conventional way poses problems for spirituality. It seems as if the respondent did not understand treatment processes.
It would therefore be important to include opportunities for dialogue and debate on religious and cultural restrictions on water re-use in the public participation that the planned communication strategy proposes. The findings also indicate the importance to educate the public on treatment processes.

2.4.2.4 Confidence in the local authority

Confidence in the local authority has been quoted in the literature (Hartley, 2006) as a factor that determines public acceptance of water re-use. Po *et al*. (2003) and Bungu (2014) found that lack of trust in implementing agencies or service providers is a major reason why there are negative perceptions regarding water re-use for drinking purposes.

Van Niekerk and Schneider (2013) noted that the public in South Africa does not have much confidence in local authorities due to poor operation, maintenance and performance of municipal wastewater treatment plants. Hence it is unlikely that water re-use for drinking purposes will be put on the national water agenda until the performance of municipal wastewater treatment plants has improved consistently on a national scale.

This conclusion has been confirmed in the National Water & Sanitation Master Plan (DWS, 2018) and in a presentation by Mr Tendani Nditwani of DWS on 23 November 2018. Furthermore, the *National norms and standards for domestic water and sanitation services* (Government Gazette 41100, 2017) identifies five potential re-uses of domestic wastewater (in urban areas for flushing toilets, agricultural irrigation, environmental re-use and industrial use and indirect re-use for drinking purposes). Direct re-use for drinking purposes is conspicuously absent.

The implications for a communication strategy for a public education programme are the following:

- The communication strategy must include guidelines for municipalities on how they could build public confidence in their competence to treat and manage wastewater.
- Since water re-use for drinking purposes is not on the short-term national water agenda, a public education programme does not need to have this particular type of re-use as its focus; instead it could do the groundwork for an informed public by, for example, educating the public on the water

cycle, water re-use as one of the sources of water, different types of re-uses, treatment processes and water quality regulation.

2.4.2.5 Successful water re-use projects

A study by Water, desalination + re-use (2017) found that successful water re-use projects and clear regulatory guidelines are the most likely to improve public opinion on water re-use:

Ranking of factors likely to improve public opinion - all respondents

Factor	Ranking
Existing successful projects	1
Clear regulatory guidelines	2
Public education (PE) campaign - water scarcity	3
PE campaign - health/safety	4
PE campaign - economic benefits	5
PE campaign - environmental benefits	6

Figure 2-3: Findings of Water, desalination + re-use (2017)

Vedachalam and Mancl (2010) also found that pilot projects (that include education programmes) are the recommended method to increase awareness and educate the public on water re-use.

A public education programme should therefore refer to successful water re-use projects. Unfortunately, there does not seem to be updated information available on water re-use projects. The most recent list of water re-use projects in SA seems to be an appendix of the National Water Re-use Strategy (DWS, 2011). Information on an updated list was requested from DWS, Prof Lagardien of CPUT and Mr Chris Swartz, but the research team could not get a more recent list. Appendix A of the Strategy lists water re-use projects in the following categories:

- The use of treated municipal wastewater for urban use)
- The use of treated municipal wastewater for industrial use
- Zero discharge mining/industrial facilities
- Rethinking household sanitation and greywater
- The direct re-use of treated municipal wastewater for potable use purposes
- The treatment of acid mine drainage

According to the National Water Re-use Strategy (DWS, 2011), water re-use in the agricultural sector is not yet common due to concerns about pollutants that may be difficult or costly to treat adequately. Water re-use in the industrial sector, on the other hand, is quite common in industries that use large quantities of water and range from re-using municipal treated effluent in industries that do not require high quality water to specialised treatment for industries that require high quality water, such as food processing. With reference to the power-generating sector, the Strategy states that coal-fired power stations in South Africa are typically operated as zero effluent discharge facilities.

Van Niekerk and Schreider (2013) note that direct water re-use for drinking purposes is not yet common in South Africa. As a result, there are few success stories that can be cited in a public education programme to foster public acceptance. Van Niekerk and Schneider (2013) cite the Beaufort West case as an example of the direct re-use of domestic wastewater and give two examples of the direct re-use of treated mine water for domestic purposes:

- eMalahleni Water Reclamation Plant owned and operated by Anglo American Thermal Coal, which employs advanced treatment technology and disinfection to supply drinking water to the eMalahleni Local Municipality; and
- Optimum Water Reclamation Plant owned and operated by Glencore Optimum Coal Holdings, which employs advanced treatment technology and disinfection to supply drinking water to the Steve Tshwete Local Municipality.

Swartz et al. (2015) lists the following municipal projects of direct re-use for drinking purposes (Ballito was added in personal communication):
Re-use plants

- Windhoek (Goreangab)
- Beaufort West LM
- KwaDukuza LM, Ballito (run by Sembcorp Siza Water)

Feasibility studies

- City of Cape Town (feasibility study)
- eThekwini (IPR)
- Overstrand LM, Hermanus (DPR feasibility and tender)
- Nelson Mandela Bay Metro, Port Elizabeth (NPR/IPR, feasibility study complete)
- Buffalo City Metro, East London (planning stage).

Unfortunately, unplanned de facto re-use for drinking purposes is common in South Africa due to mismanagement at municipal level (Van Niekerk & Schreiner, 2013). This undermines the positive contribution that reference to successful re-use project in a public education programme can make to public acceptance and links back to confidence in the local water services authority discussed above. The communication strategy must therefore put forward a mechanism to address these negative public experiences and perceptions.

2.4.3 Public participation to facilitate acceptance of water re-use

The literature on public acceptance of water re-use emphasises the importance of public participation, also called public education and outreach (Freedman & Enssle, 2015) to facilitate acceptance (Bungu, 2014, Muanda *et al*., 2017b; Hartley, 2006). Public participation in this context comprises stakeholder engagement at a range of levels, including stakeholder consultation activities and public awareness and education campaigns and programmes.

Public education campaigns and programmes for water re-use and related aspects usually fall into one of the following two categories:

- Public consultations and communication that are part of the implementation of a specific water re-use project;
- Public communication that has a more long-term goal to lay the foundation of public knowledge and understanding of water re-use, on which implementing organisations can base public communication campaigns for specific water re-use projects.

Guidelines for the first category, i.e. public consultations and communication as part of the implementation of a specific water re-use project, have been researched and developed in South Africa (Muanda *et al*., 2017b; Swartz *et al*., 2015). However, no communication strategy or material for a long-term public education programme for water re-use has yet been developed in South Africa. This study will fill this gap. Internationally, though, there are many examples of successful public education programmes and associated communication strategies. To cite a few (Freedman & Enssle, 2015):

The Australia Water Recycling Centre of Excellence, as part of the Australian government's Department of the Environment, runs the National Demonstration, Education and Engagement Program (NDEEP).	http://www.australianwaterrecycling.com.au/ projects/national-demonstration-educationamp-engagement-program
The Australian Water Association works towards water education reform as part of the Australian Curriculum Project – Water Education in Schools	Australian Centre of Water Recycling Excellence https://www.awa.asn.au/ AustralianCurriculumProject/
In 2015, the WateReuse organisation launched a project called, "Model Communication Plans for Increasing Awareness and Fostering Acceptance of Direct Potable Re-use." The plans are available to members only.	https://www.watereuse.org/foundation/pressrelease_012714
Singapore's Public Utilities Board is famous for its public education and outreach programme concerning 'used water' as they call it. Activities include tips in traditional media and online media, a water audit program for commercial users, a visitor's centre and a range of activities to encourage business to re-use treated water for their operations.	http://www.pub.gov.sg/fow/Programmes/ Pages/watermarkaward2015.aspx http://www.singaporeworldwaterday.com/ index.php
The City of Los Angeles is engaging stakeholders through an advisory group called the "Recycled Water Advisory Group". The Group consists of over 60 community groups, environmental organisations, businesses, academia, and public agencies. The water and sanitation department of the city has held, amongst other activities, workshops, facility tours, surveys and webinars to inform the stakeholders.	(LADWP) Bureau of Sanitation http://lacitysan.org/irp/documents/Recycled_ Water_Advisory_Group_Launch.pdf
San Diego in California managed to improve public acceptance for water re-use from 26% in 2004 to 73% in 2012 through their education project, called San Diego's Water Purification Demonstration Project.	http://www.uswateralliance.org/2015/01/26/2015-water-prize-winners/ http://www.katzandassociates.com/ category/water/

Successful international public education programmes for water re-use cited in the literature have used the following strategies that would be useful to consider for the proposed communication strategy.

1. Awards to bring good practice to public attention and raise awareness of water re-use:
2. Visitor's centres and demonstrations: According to Fries (2014), visitors centres and projects, like Singapore's NEWater Visitor Centre (Lee & Tan, 2016), Perth's Water Cycle Center, San Diego's PURE Water Demonstration Project and Orange County's Tour of Water Factory, have facilitated public acceptance of water re-use. These centres and projects give transparent and imaginative information on the water cycle and water re-use. Liem (2005) notes that, for these centres and projects to be successful, the communication must be digital, interactive, creative and interesting to engage target audiences.
3. Message framing (message framing will be further discussed in 3.3.5):
    a. The central message of the communication strategy of Perth, Australia integrates water re-use into sustainable water resource management. After a three-year public trial, the city of Perth will receive up to 20% of its drinking water from reclaimed sources in coming decades, with a reported 76% public support.
    b. In the USA, the organisation, WateReuse, emphasises in their public communication that all water is ultimately recycled. The water that you drink now, is the same water now as when dinosaurs walked the earth, is the central message.

A local example of a successful water re-use education and communication campaign that used message framing as a strategy to facilitate public acceptance is Sembcorp Siza Water's stakeholder engagement and communication strategy during the drought (Sembcorp, 2015), Through daily slots on local radio, regular updates in newspapers and on the company website, flyers and text message alerts, the company educated consumers on the water crisis, and called on them for support for the drought plan. They also communicated tips on how to save water. Stakeholder engagement included meetings, media interviews and briefings. In the course of these engagements, innovative solutions to the water crises came up, of which water re-use was one. When they tested public acceptability for introducing recycled water into their drinking water, 96% of consumers voted in favour.

2.5 STAKEHOLDER ENGAGEMENT ON WATER REUSE

2.5.1 Stakeholder mapping

In development communication literature, the term "stakeholder" is used to refer to stakeholder consultations, stakeholder engagement, stakeholder mapping, etc., but a definition could not be found in the literature consulted. In development communication, the term "stakeholder" seems to be used as a synonym for target audience or any grouping who has a vested interest in, or an impact on, the subject.
Freeman's definitions of stakeholder are widely quoted in the literature on organisational communication:

- "any group or individual who can affect or who is affected by the achievement of the firm's objectives" (Freeman, 1984)
- "those groups who are vital to the survival and success of the organisation" (Freeman, 2004).

In this study, "stakeholder" is defined as an organisation who has a vested interest in water re-use and whose actions will benefit from a water re-use literate public.

2.5.2 The role and nature of stakeholder consultations

The literature gives guidance on when and how one should engage stakeholders in the development of a communication strategy. Stakeholder consultations are common in the literature as an integral part of modern communication strategies (Freeman, 2010), but they are less common as part of the situational analysis that informs a communication strategy. Mefalopulos (2008) is an exception. He advocates involving stakeholders as partners in the situational analysis as an opportunity to ensure that the objectives of the programme are understood and shared by key stakeholders. For him, early consultation is also a mechanism to consider risks and opportunities in the political context. By listening to the different voices of a range of stakeholders, the developers of a communication strategy can link stakeholder perceptions and knowledge back to the objectives of the strategy. This helps to shape the communication strategy.

In a similar vein Batchelor *et al*. (2017) suggests that solutions to complex problems (in the situational analysis) are more likely to emerge when diverse stakeholders meet, share experiences, learn together and contribute actively to the decision-making process. Khan and Gerrard (2005) add that when one develops a public education programme, it is important to understand, acknowledge and address the knowledge, attitudes and perceptions of stakeholders as they relate to the different issues relating to water re-use. The guidance from the literature was incorporated in the selection of stakeholder consultation instruments that the project employed for the situational analysis.

The stakeholder engagement of this study is discussed in Chapter 6.

CHAPTER 3: DEVELOPING A COMMUNICATION STRATEGY ON WATER RE-USE

3.1 INTRODUCTION

In this section, several aspects of communication theory are reviewed to find a suitable theoretical framework for this study. The first subsection explores the definition of communication strategy and communication strategy development. The second subsection reviews different communication approaches and explores relevant communication models and social paradigms. The third subsection deals with objectives and reviews literature on health, science and water literacy to introduce the concept of water re-use literacy as an objective of the proposed education programme. The fourth subsection explores the public as target audience and its subsets and the relationship between the selection of target audience and sustainability objectives. The fifth subsection focuses on messaging and message framing to address challenges in water re-use communication. The last subsection reviews the channels and media typically used for public education programmes, the challenges of communication in the digital age and it also explores the role of social media.

3.2 WHAT IS COMMUNICATION STRATEGY DEVELOPMENT?

According to Steyn and Puth (2000), a communication strategy provides a framework for the delivery of effective communication plans and programmes tailored to the needs of specific target audiences. A communication strategy comprises the following actions:

- identifying strategic stakeholders
- identifying and describing key strategic issues
- identifying the implications of each strategic issue for each of the strategic stakeholders
- deciding on what must be communicated and setting communication goals for each strategic stakeholder
- developing communication plans and programmes.

Mefalopulos and Kamlongera (2004) define communication strategy development as "a well-planned series of actions aimed at achieving specific objectives through the use of communication methods, techniques and approaches". Mefalopulos (2008) puts strong focus on objectives and outcomes in his list of the basic steps of communication strategy development (Table 3-1).

Table 3-1: Basic steps of communication strategy development

Step	Activities
1. Define communication approaches or tactics	Select the most effective communication approaches (linear or transactional model)
2. Define objectives (by reviewing the problem and its causes)	Develop a framework for objectives and levels of achievement
3. Define target audiences	Decide which audiences should be targeted to achieve the objectives
4. Define type or level of change expected	For each audience: awareness, knowledge, attitude, behaviour
5. Design messages or content topics	Define key content or messages and the most effective way to package them

Step	Activities
6. Select channels or media	Select most appropriate channel or media for each target audience
7. Define expected results and indicators that change has been achieved	Do this for each objective

In the subsections that follow each of these steps will be explored in more detail.

3.3 COMMUNICATION APPROACH

A communication strategy always has an underlying social paradigm and communication model(s). In the subsections that follow, the parallel evolution of social paradigms and communication models and the implications for this study are discussed.

3.3.1 Development communication (DevComms)

In the current context, the concept of "development" is viewed as the thrust to achieve the Sustainable Development Goals. Development communication is a type of communication associated with achieving these goals. This study, which aims to develop a public education programme for water re-use, falls within the scope of Goal 6: Ensure availability and sustainable management of water and sanitation for all. It is therefore a development communication study, which will be based on the theory of development communication. Mefalopulos (2008) defines development communication as "supporting sustainable change in development operations by engaging key stakeholders". Its main functions are to "establish conducive environments for assessing risks and opportunities; disseminate information; induce behaviour and social change". The concept of development has been severely criticised in the past as a Western-centric construct aimed at keeping the Third World dependent on the wealthy nations (Huesco, 2008). Development communication has been modified to address this criticism. The shift in social paradigms and the impact on communication models for development communication is discussed below.

3.3.2 Social paradigms

The evolution of social paradigms and communication models runs parallel in the 20th century and beyond. Two contrasting social paradigms have dominated the discourse of development communication: modernisation/diffusion and participation (Huesco, 2008; Mefalopulos, 2008). The modernisation/diffusion paradigm is underpinned by the philosophy that resources/aid, communication and technology can modernise an underdeveloped world and lead it to development. In innovation theory, the work of Rogers (2003), *The diffusion of innovation*, was seminal in this regard. In the 1970s and 1980s, the dominant diffusion paradigm was challenged and deconstructed by Latin American scholars in particular (Huesco, 2008). They related the dominant development paradigm to neo-colonialism and the extension of capitalist relations (Huesco, 2008). In the eyes of these scholars, the modernisation paradigm is a dependency paradigm.

Huesco (2008) refers to the “First Latin American Seminar on Participatory Communication” sponsored in 1978 by Ciespal (Center for Advanced Studies and Research for Latin America) where scholars at the time concluded that "uses of mass media in development imposed the interests of dominant classes on the majority of marginalised people". Huesco (2008) refers to Escobar (1995) who regarded development aid as an extension of the geopolitical struggle between the capitalist West and the communist East. The Latin American scholar, Paulo Freire (1970, 1973, 1995), was instrumental in a fundamental shift in the

relationship between researcher and subject, teacher and learner, sender and receiver towards "a co-learning relationship guided by action and reflection" (Huesco, 2008). In his theory of dialogical pedagogy, Freire advocated dialogue as the "ethical communication choice" (Huesco, 2008).

3.3.3 Communication models: transmission versus constitutive

The early communication models of the 20th century, such as the models of Lasswell (1948) and Shannon and Weaver (1949), were linear models, a sender or a source, transmitting to a receiver. Lasswell (1948) famously summarised a linear communication process in five questions: *Who says What through Which channel to Whom with What effect?* Linear models of development communication reflected and supported the diffusion paradigm. These models are also called transmission models in which communication is described as a transfer of information (Craig, 1999). Later models, such as the Schramm model (1955) and the Berlo model (1963) expanded the basic linear model to add aspects such as coding, decoding, channel and message. Communication models became more sensitive to the social context in which communication takes place and the reciprocal nature of communication. In the 1970s, Barlund introduced the transactional model of communication, recognising that communication is a two-way process in which the sender is also receiver, and vice versa. The model emphasises the shared experience of those participating in the communication, the relationship between the participants and the shared construction of meaning in the interaction. The transactional model of development communication reflects and supports the participatory paradigm as illustrated in the simplified figure (Figure 3-1) below.

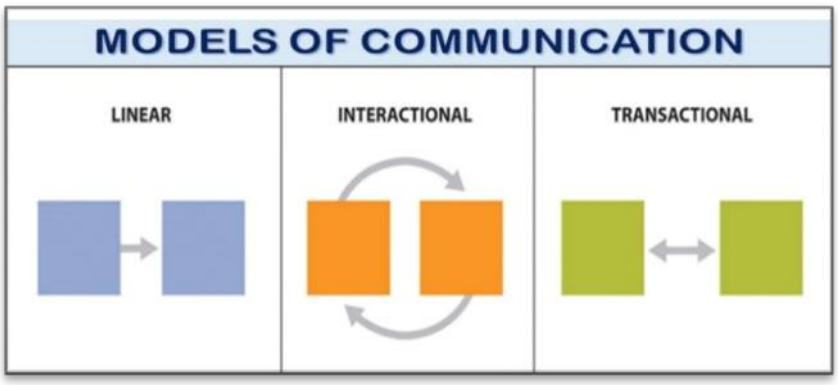


Figure 3-1: Models of communication

Craig (1999) calls transactional models "constitutive", because they conceptualise communication as a process that constitutes shared meaning.

The shift in paradigm led to the rise of the participatory approach and participatory communication in development literature (Figure 3-2). Servaes and Malikhao (2005) refer to the shift in focus as a shift "from a communicator to a more receiver-centric orientation, with the resultant emphasis on meaning sought and ascribed rather than information transmitted". Was the shift in approach in development communication indeed a shift in paradigm or is development communication still operating within the diffusion paradigm, but following a participatory approach to create the illusion that relationships between the developed and the developing world have changed?

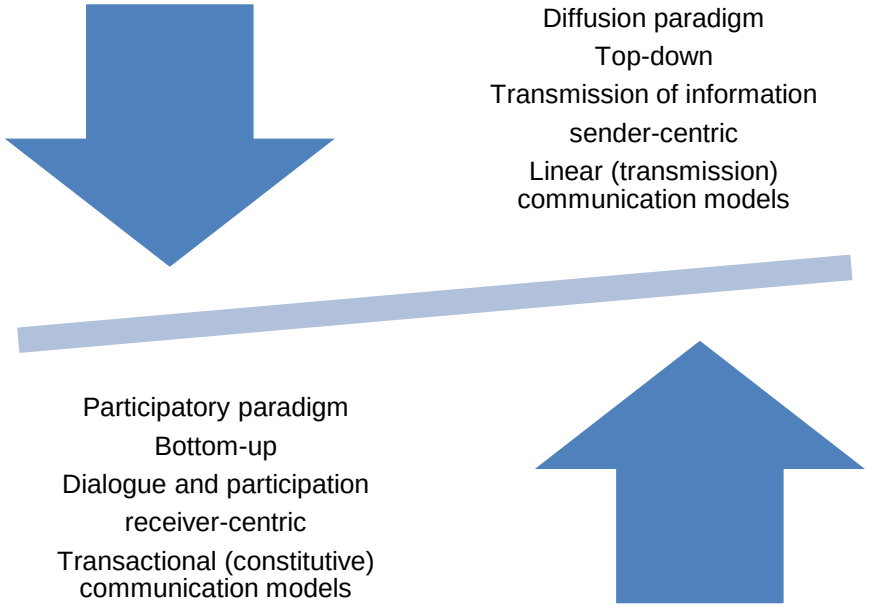


Figure 3-2: Social paradigms and communication models

Huesco (2008) is critical of many applications of participatory communication, but he concedes that the two paradigms are the end points of a spectrum of relationships and communication modes, and that both have practical value. The theory of communication and the shift in social paradigms raise several questions that need to be addressed in stakeholder consultations on a public education programme for water re-use. For example, what communication approach is the most suitable for a sustainable public education programme on water re-use? How should one integrate knowledge dissemination with public participation?

3.3.4 Frameworks for effective communication

The World Health Organisation (WHO) (2017) developed a framework for effective communication that is organised according to six principles:

- accessible
- actionable
- credible and trusted
- relevant
- timely
- understandable.

The six principles of effective communication were applied to develop the communication strategy for a public education programme on water re-use.

3.4 OBJECTIVES AND OUTCOMES

Defining the objective and the desired outcomes are the first step of developing a communication strategy. The National Strategy for Water Re-use (DWS, 2011) defines the objective of 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". Mefalopulos (2008) cites Mazzei and Scuppa (2006) who said that communication objectives are typically about changing specific knowledge, attitudes, and behaviours or practices in individuals and

groups. Therefore, given the above, what would be the desired public knowledge, attitudes and behaviour regarding water re-use that one could define as the desired outcomes of a public education programme? This section reviews literature about public education programmes with reference to the promotion of health, science and water literacy. It will be argued that the concept of literacy can be extended to water re-use literacy. The learnings from these fields were applied in this study to structure stakeholder discussions and design outcomes of a public education programme for water re-use.

3.4.1 Health literacy and public knowledge

In 2006, health literacy was a relatively new field in health promotion (Nutbeam, 2000). Nutbeam (2000) defines it as a set of outcomes and associated communication activities. According to Nutbeam (2000), public education has always been part of health programmes. Over time, the communication methods have become more sophisticated with the introduction of social marketing, but intensive education programmes have failed to achieve the desired behavioural change or to close the health gap between different social groups (Nutbeam, 2000). He argues that simply communicating the benefits of a choice is doomed to fail in changing behaviour; a wider set of measures are needed to reinforce and sustain behaviour change. The comprehensive approach to tobacco is cited as an example. The outcomes model for public health translates such a comprehensive approach into different levels of health outcomes. The outcome of the desired behaviour is at the top level. Below that, different measures have their own outcomes and communication activities that, together, achieve the top-level outcome, as illustrated in Figure 3-3 below.

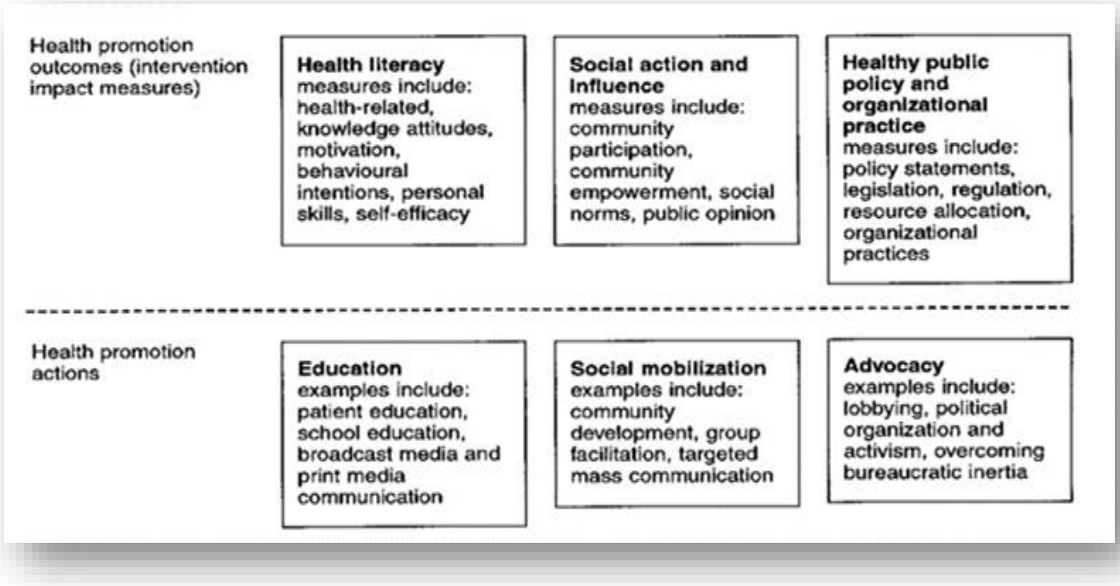


Figure 3-3: Different levels of health outcomes (Nutbeam, 2000)

In this model, health promotion outcomes include health literacy, social action and influence, and a health public policy and organisational practice. Actions include a wide range of interventions: education for health, mobilising communities and groups, and advocacy activities such as lobbying and activism.
What does it mean for a public to be health literate?

In his definition, Nutbeam (2000) links health literacy with literacy levels:

- Basic or functional literacy – the ability to read and understand basic information
- Communicative or interactive literacy – more advanced cognitive and social skills that enable you to extract information and apply it in new circumstances
- Critical literacy – skills to critically analyse information and take control of your situation.

The World Health Organisation (WHO)[9] defines health literacy as "the cognitive and social skills which determine the motivation and ability of individuals to gain access to, understand and use information in ways which promote and maintain good health".

Nutbeam (2000) makes several conclusions for a health promotion strategy that could also be applied to this study:

1. Benefits: progression to a higher level of literacy therefore empowers the individual. Nutbeam (2000) concludes that higher levels of health literacy among a larger proportion of the public also has a social benefit.
2. Content: health education should not only focus on the individual; health education should also raise awareness of the social, economic and environmental determinants of health.
3. Methods of communication: the link with literacy levels implies that communication activities should stimulate interaction, participation and critical thinking. Nutbeam (2000) calls this style of education similar to Freire's "critical consciousness".

Linking health literacy to literacy levels could imply that basic literacy skills are a prerequisite for critical thinking, but Nutbeam (2000), referring again to Freire, and those who have modelled education on his philosophy, contends that it has been successfully demonstrated that critical consciousness can be achieved without basic, functional writing and reading skills.

3.4.2 Science literacy and public knowledge

Holbrook and Rannikmae (2009) give an overview of the wide range of definitions of science (also called "scientific") literacy. The definitions that they advocate are very similar to the definition of health literacy that Nutbeam (2000) proposes. For example, Liem (2005) cites the American Association for the Advancement of Science (1989) definition of the science-literate person as “one who is aware that science, mathematics, and technology are interdependent human enterprises with strengths and limitations; understands key concepts and principles of science; is familiar with the natural world and recognises both its diversity and unity; and uses scientific knowledge and scientific ways of thinking for individual and social purposes” (emphasis added). Liem (2005) states further that achieving science literacy, as defined above, involves more than the transmission of information; it must influence attitude and behaviour, which brings one back to the discussion above of appropriate communication models for a public education programme.

Science communication has evolved from a transmission model to a constitutive model over the previous decades (Trench, 2008) by shifting from one-way communication to dialogue, but Trench (2008) argues that the "bipolar view" of deficit and dialogue is not an accurate account of recent developments nor is it a useful guide to current and future practice. Science communication needs an eclectic approach. He subsequently poses a framework of communication models that includes transmission, dialogue and participation (Table 3-2).

Craig (1999) holds the similar pragmatic view that does not reject any models on principle, but rather consider the full range of models and select according to what is best for the particular context and target audience.

[9] http://www.who.int/healthpromotion/conferences/7gchp/track2/en/

These observations are important to consider, also for the communication strategy to be developed in this project.

Table 3-2: The analytical framework for science communication of Trench (2008)

Base communication models	Ideological and philosophical associations	Dominant models in PCST	Variants on dominant PCST models	Science's orientation to public
Dissemination	Scientism Technocracy	Deficit	Defence Marketing	They are hostile They are ignorant They can be persuaded
Dialogue	Pragmatism Constructivism	Dialogue	Context Consultation Engagement	We see their diverse needs We find out their views They talk back They take on the issue
Conversation	Participatory democracy Relativism	Participation	Deliberation Critique	They and we shape the issue They and we set the agenda They and we negotiate meanings

3.4.3 Water literacy

According to Febriani (2017), the term "environmental literacy" dates to Roth (1968). "Water literacy" is a much more recent term and literature on the topic is scant. In comparison with the more sophisticated definitions of health and science literacy, the definitions of water literacy are limited to having a basic knowledge. The Australian organisation, CRC for Water Sensitive Cities, for example, defines water literacy in a publication (No author, 2015)[10] as "knowledge about water sources, water management and water-related issues". The Water Literacy Foundation is one of the very few organisations that focuses on water literacy. It is a non-governmental environmental organisation, based in Karnataka, India, which strives to raise awareness about water scarcity and the advantages of rainwater harvesting. According to their web page[11], "communities' attitudes toward water" are the main issue that needs to be addressed. Most of the literature on water literacy reports on research to establish levels of water literacy in a community or society, for example Wood (2014) in the East Midlands of England and Dean *et al*. (2016) in Australia.

The 2020 Vision of the Department of Water and Sanitation (2012) introduced a water literacy programme aimed at learners and educators on the value of our water and our rivers, so that "future generations will access safe, clean water". The water literacy programme includes:

- An education support programme focusing on resource materials and educator empowerment
- Baswa le Meetse (BLM) – a competition using arts and culture to convey hygiene and water messages
- South African Youth Water Prize (SAYWP) on science and innovation
- Aqua Enduro (AE) Competition on Drinking water quality
- Intervention Projects (IP) Programme
- A national Essay Competition on Impacts and Strategies for Adaptation to Climate Change
- An Annual Youth Summit on Water and Climate Change.

There is no specific mention of water re-use in the water literacy programme.

[10] https://watersensitivecities.org.au/wp-content/uploads/2016/05/IN_A2-3_WaterLiteracyInAustralia.pdf

[11] http://waterliteracyfoundation.com/about-us.html

3.5 TARGET AUDIENCES

3.5.1 Who is the public of a public education programme?

As a noun, the word 'public' refers to the whole body politic, or the aggregate of the citizens of a state, nation, or municipality. The public is the community at large, without reference to the geographical limits of any corporation like a city, town, or county.[12] Another source defines the term "public" as "the whole body politic, or all the citizens of the state".[13] The public can be divided into subsets on a specific basis. Subsets are not mutually exclusive but overlap and they do not necessarily cover the full set of citizens. For example:

1. Demographic groups based on age, gender, ethnicity, education level, home language, LSM, religion or municipality.
2. For the purpose of scientific communication, groups based on knowledge of a subject: lay persons versus the scientific community. These are fuzzy categories with overlapping boundaries.
3. Membership of an interest group, such as fraternal groups, service clubs, veterans groups, political clubs, labour unions, sports groups, youth groups, service groups, hobby or garden clubs, school fraternity groups, farm organisations, environmental groups, community or neighbourhood groups, social advocacy groups, literature or art study groups, professional or academic societies, religious groups, computer clubs, and “any other organisation.”[14]
4. Other large groups of citizens who share a system, such as government employees, basic education learners, customers of the financial sector, customers of retailers, internet users.

3.5.2 Target audience and the sustainability of public knowledge and awareness

It was difficult to find sources that explore the relationship between a particular target audience and the sustainability of the awareness and knowledge that was created through the programme. There are many definitions of sustainability in the literature. UNESCO (2006) quotes the World Commission on Environment and Development (1987) for a definition of sustainable development: "Sustainable development meets the needs of the present without compromising the ability of future generations to meet their own needs". The definition of sustainability that is proposed for this study is similar: "Sustainability" in the context of water re-use means knowledge, values and behaviour that have become entrenched in the fabric of a society and which are transferred to future generations. The Education for Sustainable Development Toolkit (UNESCO, 2006) suggests that this type of sustainability can be achieved if communities and educational systems within communities dovetail their sustainability efforts: "As communities develop sustainability goals, local educational systems and programmes can modify existing curricula or create new programmes to reinforce those goals."

The UNESCO report (2002) calls for a shift in approach. According to the report, *the way that the environment and sustainable development are presented in formal and non-formal programmes is problematic, because the focus is too narrow. The health of people is usually not linked to the health and sustainability of ecosystems; and students and community members are seldom asked to critique the impact that their activities and those of their families and wider society has on ecosystems. The report also maintains that the separation of the disciplines of social, economic and environmental studies in formal education exacerbates the disintegration of sustainability.*

[12] West's Encyclopaedia of American Law, edition 2. Copyright 2008 The Gale Group, Inc

[13] A Law Dictionary Adapted to the Constitution and Laws of the United States. By John Bouvier. Published 1856.

[14] http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.1004.5809&rep=rep1&type=pdf

In view of the issues described, a shift in approach implies that education for sustainability:

- Does not only focus on a single topic in isolation, but that it always includes the broader context and the impact on the environment, economy and society
- Develop critical literacy skills
- Develop practical skills for individuals and communities to deal with the topic
- Is coupled with public awareness and stakeholder buy-in.

Motion and Kearnes (2014) found that specific interactions with specific target groups work well as a strategy to achieve sustained support and buy-into water re-use. They phrase these as recommendations:

- Target key influencers and community leaders
- Establish independent advisory groups to build public confidence, provide impartial advice and act as ambassadors for recycled water
- Appoint a panel of experts to act as media spokespeople
- Regularly consult with regulators
- Appoint medical experts as spokespeople to address health and safety issues
- Involve representatives of different cultural groups to build relationships, community trust and address social justice issues
- Make sure there is political buy-in from all political parties and at all levels.

The integration of water re-use education into school curricula is an important part of this study. In addition, the communication strategy demonstrates how it will achieve the shift in approach discussed above. The communication strategy also addresses the findings and recommendations of Motion and Kearnes (2014).

3.6 MESSAGES AND ACTIVITIES

3.6.1 Social marketing

Fries (2014) argues that, since risk and benefit are inversely related, it is critical to increase perceived knowledge of the benefit of water re-use. This can be done by emphasising benefits in messaging. This approach is similar to social marketing (Gordon & Oades, 2017). Social marketing sells behaviour or a lifestyle as beneficial for the broader society. It is an approach that has been widely used in health education and could be useful to gain wider support for water re-use. The City of Cape Town applied social marketing successfully in their public education programme during the recent drought.

3.6.2 Message selection

Messaging presents facts about the key issue as a means of educating the individual, community, or society (REACH, 2015). REACH (2015) cites Heath & Heath's (2007) six principles for "sticky" messages, i.e. messages that attract attention and are more likely to be remembered: " (1) simplicity; (2) unexpectedness; (3) concreteness; (4) credibility; (5) emotions; and (6) stories. WHO (2017) emphasises consistency and coordinated messaging as imperative for effective communication.

3.6.3 Message framing

Goodwin *et al.* (2018) refers to Dolnicar *et al*. (2010), Dewulf *et al*. (2009) and Mankad (2012) when they state that the way that people react to information about water re-use is thought to depend on the way that they process the information, and that, in turn, is affected by message framing. Message framing is defined as "the careful selection of emphasis". Goodwin *et al.* (2018) refers to studies that have shown that the choice of particular terminology (Menegaki *et al*., 2009; Simpson and Stratton, 2011), descriptions of water

treatment processes (Dolnicar *et al*., 2010), and information on risks and benefits of re-used water (Price *et al*., 2015) can elicit positive reactions. Menegaki *et al*. (2009), for example, found that people are more like to use water if it is referred to as "recycled water" than when it is called "treated wastewater". In contract, additional information on pollutant levels did not elicit any evaluative response (Fielding & Roiko, 2014). Goodwin *et al.* (2018) warns that there is currently insufficient evidence that these findings will apply to all communities. Existing perceptions can also frame messages. Greene and Burleson (2003) found that perceptions are a key driver of message processing during communicative behaviour. This mean that when key messages for target publics are developed, the public's diversity of perceptions and opinions must be considered and addressed when messages are framed.

Although specific references could not be found in the literature consulted, emphasis on a specific level of literacy as reflected in the underlying communication model and the message's orientation toward the public can also frame messages. See the examples below:

1. The risks and benefits of water re-use (dissemination of information)
2. Let's debate the risks and benefits of water re-use (inviting interaction)
3. Join us in finding water re-use solutions (critical engagement, inviting partnerships).

3.6.4 Message framing in water re-use education

The research of Motion and Kearnes (2014) refers to several aspects of message framing although it is not called that. They found that a combination of information dissemination and engagement is needed in a communication strategy for water re-use to address perceptions. They also found that messages should not only focus on water re-use, but include broader topics, such as the water cycle, climate change and the range of water resources. From lessons learnt from the analysed case study data, Motion and Kearnes (2014) derived message frames, or what they call "narratives", that can guide a communication strategy for a public education programme on water re-use. Their findings and recommendations are summarised below:

1. Strategies to avoid controversy:
    a. Engage in frequent, regular, proactive participative conversations to build sustained support
    b. Explain water demand management – outline the challenges, the range of options, and the various benefits of each option
    c. Establish yourself as a trusted resource – do not shy away from problems, but offer solutions
    d. Listen to concerns – answer questions and address problems
    e. Cooperate – build partnerships with sector partners and industries, to create a coalition of potential advocates, and
    f. Educate politicians and regulators.

2. Strategies to direct the conversation:
    a. Water supply challenges can be translated into narratives about the need for a range of water sources as follows:
        i. Geographic challenges: translate into a narrative about the need to find adaptable water provision solutions
        ii. Severe weather and climate change challenges: translate into a narrative around the need for adaptable water provision solutions
        iii. Political challenges (e.g. elections): translate into a narrative around the need for water security
        iv. Urbanisation and population growth challenges (pressure on infrastructure): translate into a narrative around the need for reliable and sustainable supply
        v. Redress and social justice challenges: translate into a narrative around the need for effective cost management, social justice and equity, and
        vi. Contamination challenges (e.g. groundwater recharge): translate into a narrative around the safety and reliability of water recycling technologies and system.

b. The need for a range of water sources can be translated into narratives about:
    i. Water scarcity and climate change – insufficient water resources, demand exceeds availability, weather pattern changes
    ii. Water security – transboundary issues
    iii. Reliability – resource and supply management issues
    iv. Cost – issues of equity and environmental cost
    v. Adaptability – the need to adapt to less water, drought conditions, a growing population
    vi. Equity and social justice – the fair distribution of sufficient water for all
    vii. Safety – safety norms and standards for re-used water; treatment standards, and
    viii. Environmental impact.

Motion & Kearns (2014) identifies sustainability; the social, economic and environmental advantages of water re-use; the need for a range of water sources to address water scarcity and water security; safety standards and treatment as key message frames for a public education programme for water re-use.
These strategies and message frames will not necessarily be suitable for the South African public. Message frames suitable for South African target audiences was decided on in consultation with the stakeholders.

3.6.5 Targeted messages

There is agreement in the literature that messaging is more effective when it is tailored to a specific target audience. Messages that address the background, culture, preferences, and existing behaviours among individuals in the target audience(s) can guide the development of effective messaging and implementation strategies.

3.7 COMMUNICATION CHANNELS AND MEDIA

3.7.1 Types and criteria for selection

The literature on communication channels and media of a public education programme includes a wide range of options, from mass media channels such as radio, television and print to web-based channels such as websites and social media to traditional channels such as popular theatre, public debates, drums or storytelling. Muanda et al. (2017a: 44), for example, lists the following communication channels and activities that have been used in three countries in Table 3-3.

There is consensus in the literature that selecting the right communication channels and media for the intended objective is an important aspect of communication strategy development (Mefalopulos, 2008).
The literature mentions different sets of criteria. For example, WHO (2017) makes it clear that, for each target audience, it is important to select communication channels and media that are accessible, credible and trusted, and relevant (WHO, 2017). Channels' reach and influence should also be considered. Mefalopulos (2008), on the other hand states that the selection of channels and media depends on factors such as: the objectives of the communication intervention, the characteristics of the target audience, the available media, the cultural context and available resources.

REACH (2015) notes 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. It is their interpretation that target audiences may need to see or hear a campaign's message in multiple, diverse ways over time to before they will acquire the knowledge, change attitudes and adopt the desired behaviour.

Table 3-3: Communication channels and activities used in Australia, the USA and Namibia

Process	Australia	United States of America	Namibia
Public consultation	• Preliminary survey questionnaires and opinion polls • Community consultation • Collaboration with the appropriate agencies and community	• Public Meetings • Establishment of a Data Sharing Memorandum of Understanding (MOU) • Formation of EPA work group • Public involvement campaign	• Community meetings • One-on-one interviews
Information sharing with the public	• Public dialogue • Educational activities • Media programmes	• Information, knowledge, local context, and education • Re-purified Water Review Committee (RWRC) reports	• Media • School programmes • Brochures
Strategies used to inform the public	• Social marketing • Standing national committee • Electronic networking • Workshops or seminars on key issues or for special groups	• Annual reuse conference • State grant programmes • Establishment of Planning Committee(PC) • Framework Development Team (FDT) • Legislative session	Information sharing via: • media • IWRMP • Plant visits

3.7.2 The impact of the digital age on communication

The impact of modern communication technology and social media on the shift towards participatory communication described above should not be underestimated. Participatory communication is the landmark of the digital age, as Orihuela (Not dated)[15] explains in an article that identifies 10 new paradigms of the digital age (reduced for the purpose of this literature review to seven):

1. A passive audience is replaced by an active user who seeks content, exploring and navigating spaces. Users create their own content; they write, they photograph, they interpret, they publish.
2. Online media are multimedia, integrating audio, video and text.
3. Online media is real-time.
4. An overflow/abundance of information.
5. The disappearance of editor-mediated content. Anyone can publish on the web on blogs, webinars, social media platforms, etc. and anyone is free to comment and criticise or agree.
6. Content is not distributed to users; they access and interpret content in an interactive process. They actively search, seek, collate, evaluate, apply and distribute content – the so-called Knowledge Societies (Servaes & Malikhao, 2005).
7. Content is organised in a virtual space that is controlled by the user; it is not controlled by a narrator.

3.7.3 The use of social media in public education programmes

Traditional marketing (e.g. billboards, commercials, PR and print) has historically been the route to take for public awareness campaigns, but as social media's reach and targeting capabilities have grown, awareness campaigns are gaining more and more prominence on social media. However, Motion & Kearnes (2014) cautions that social media presence should not be treated as a campaign; it needs to be understood as a continuous relationship. Branded social media channels allow for long-term utilisation of campaigns and result in a longer, deeper relationship with consumers.

[15] The article is adapted from BlogTalks, the First European Conference on Weblogs (2004) and Towards New Media Paradigms: Content, Producers, Organisations and Audiences (2004). Available from: https://medium.com/@jlori/the-10-new-paradigms-of-communication-in-the-digital-age-7b7cc9cb4bfb

This observation is relevant for a sustainable public education programme on water re-use because it indicates that social media could be used to establish a long-term relationship with target audiences.

3.7.4 Social media use in South Africa

According to the SA Social Media Landscape Report, Facebook is used by 29% of the South African population (i.e. 16 million Facebook users). The figure below shows the usage of Facebook, Twitter, Instagram, LinkedIn and YouTube in South Africa (Patricios & Goldstuck, 2018). Fourteen (14) million out of the 16 million Facebook users use their cell phones or tablets to get access to the platform. Stripped down apps like Facebook Lite, which is often zero-rated for data costs by mobile network operators, allowed the platform to spread through South Africa's entire population.

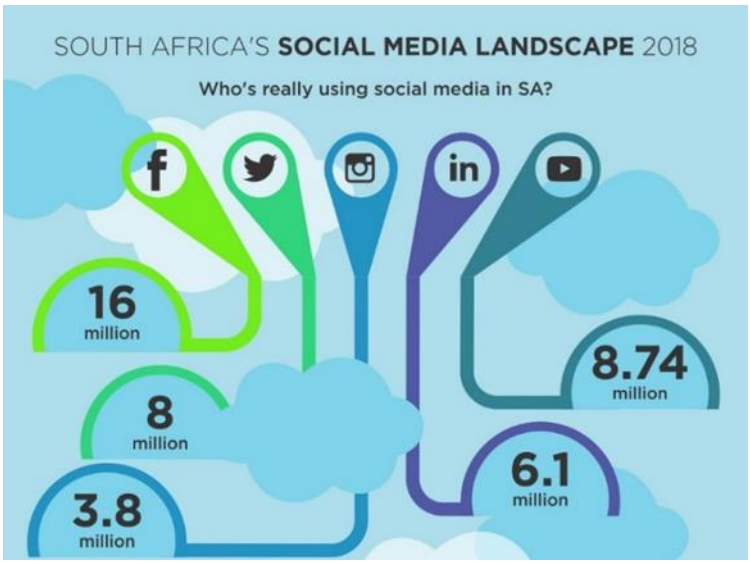


Figure 3-4: Social media usage in SA (Patricios & Goldstuck, 2018)

3.7.5 Social media as a tool to engage with the public

Social media can be a valuable tool in a public education programme for water re-use. It provides opportunities to speak directly to audiences, build connections and relationships, share information and engage in conversations (Motion & Kearnes, 2014). According to the authors, social media allow organisations to avoid media filters and offers an opportunity to post content exactly as they desire. There are also no filters on readers' responses. The net effect is a simulated dialogue. Discussion groups using Facebook or LinkedIn are particularly useful in this regard (Luoma & Barnebee, 2017).

According to Ben-Ahier (2018), it is not easy to send messages to the general public on social media, especially in a heterogeneous society. Ben-Ahier (2018) gives the following advice in this regard: "It's important to invest in segmenting your audience and understanding who is more responsive on which social media channels. Remember, it is not effective to send identical messages to all audiences – invest in a message that suits your target audience. Try creating audience personas by stepping into the shoes of your target audience and understanding their needs and expectations. It will allow you to think more clearly about what to offer them". This is useful advice for this study.

3.7.6 Risks and challenges associated with social media

3.7.6.1 Social media users have free reign

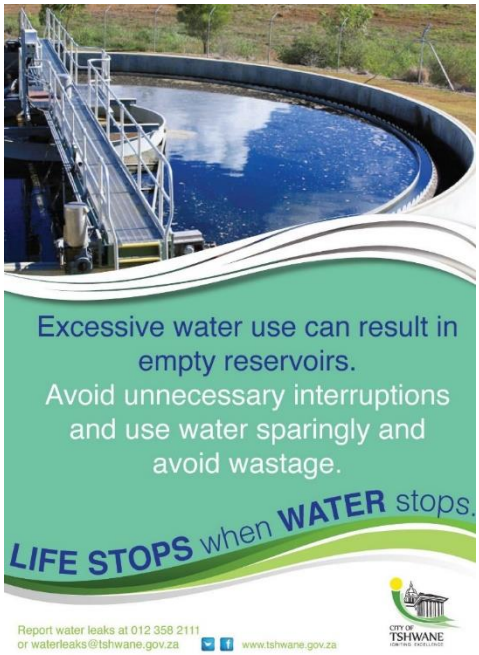
Social media gives free reign to users to say whatever they want, and to post and share their own content (Motion & Kearnes, 2014). This can be viewed as a risk for a public education programme, but, according to Muir (Not dated), the direct interaction with the target audience that social media offers, enhances your understanding of your audiences, and increases over the long term your ability to influence the message.

3.7.6.2 Social media echo chambers

Restricting conversations to like-minded individuals (the so-called echo chambers) is another risk of social media such as Facebook (Quattrociocchi *et al*., 2009; Flaxman *et al*., 2016). Echo chambers expose individuals to largely conforming opinions (Sunstein, 2009). Echo chambers tend to form polarising groups that reinforce their existing views. The cause of the echo chamber effect could be attributed to machine learning algorithms employed by companies like Google and Facebook, which aim to serve their users content that is tailored to their interests. The algorithms effectively filter out search results that are not the same as a user's current viewpoint. The user will therefore never be exposed to new information or a different point of view.[16] The planned communication strategy should take note of this phenomenon and include activities where people from a spectrum of backgrounds and views discuss and debate issues pertaining to water re-use.

3.7.6.3 Reach may not lead to interaction, uptake or acceptance

Posts on social media like Facebook can reach a large number of people, especially if a page has a high number of likes or followers, but one has to be careful that reporting figures are not inflated.
For example, Facebook defines reach as the number of times a post has been displayed on a screen[17].However, a high number of likes and followers does not necessarily mean that the messages posted on the page will be interacted with, taken up or accepted by the target audience.



For example, the City of Tshwane's Facebook page is liked by 90 229 people and followed by 92 415 people. The City of Tshwane posted the picture to the right on their Facebook page. The picture aims to create awareness around using water sparingly and stopping wastage. Although, a large number of users might have seen the post, there was little interaction with the content. On 15 November 2018, the post has received 17 likes, was shared by 11 people, and three people commented on the post. Two of the comments had nothing to do with the post. The third response was positive.

The communication strategy includes social media as a channel. The points raised above will have to be considered in the implementation of the strategy.

[16] https://cs181journalism2015.weebly.com/the-echo-chamber-effect.html
[17] https://www.facebook.com/business/help/675615482516035

CHAPTER 4: DEVELOPING AND TESTING A COMMUNICATION TOOLKIT

4.1 INTRODUCTION

The scope of the study does not include implementation, but a toolkit of communication material was developed. In this section, reference is also made to local and international examples of resource material.

4.2 WHAT IS A COMMUNICATION TOOLKIT?

This phase of a communication strategy entails the development of communication material for specific target audiences, utilising accessible, credible and relevant channels and media (Mefalopulos, 2008).

4.3 EXISTING COMMUNICATION MATERIAL

There is a wide range of resource material on water re-use and related aspects that have already been developed, in other countries and in South Africa. Below are some examples:

- PUB Singapore, the founder of the NEWater initiative, works closely with the Ministry of Education to educate and excite students on water-related topics. They have developed programmes, activities and resources targeted to underscore the importance of conserving water resources.[18]

- New Water ReSources developed evidence-based educational products for Australia and the USA. The products are designed to increase community acceptance of recycled water as an alternative drinking water source.[19]

There are also several examples of locally developed educational material: Water Wise, Rand Water's environmental brand, has edutaining (educational & entertaining) programmes and learning material for schools, teachers and other tertiary institutions. The City of Cape Town has developed a range of communication material, including learning material[20]. According to the 2020 Vision Curriculum Support Programme [21], the Department of Water and Sanitation has developed resource material for Grades 1-9 which is aligned to CAPS as part of the national water literacy and public awareness programmes. According to the NWRS (DWS, 2013), the 2020 Vision for Water and Sanitation Education Programme in schools has reached over 20 000 learners and includes the annual Baswa le Meetse Awards.

[18] https://www.pub.gov.sg/savewater/atschool

[19] http://newwaterresources.com/our-work/evidence-based-media-australia/

[20] http://www.capetown.gov.za/Family%20and%20home/Education-and-research-materials

[21] http://www.dwa.gov.za/2020Vision/docs/2020book.pdf

4.4 PRE-TESTING COMMUNICATION MATERIAL

Mefalopulos (2008) regards the pre-testing or piloting of communication material with a convenience sample of the intended target audience as an integral part of public education programmes. REACH (2015) cites Langford, Litts, and Pearson (2013) in this regard when they note that it was astonishing to find out how many messages have failed to reach their intended audiences because there was no pre-testing. Qualitative research methods such as focus groups or in-depth interviews are usually used for pre-testing (REACH, 2015). In this study, examples of communication material on water re-use aimed at specific target audiences and for appropriate channels or media was designed, developed, and pretested with stakeholders.

CHAPTER 5: MONITORING, EVALUATION AND VALIDATING A COMMUNICATION STRATEGY WITH STAKEHOLDERS

5.1 MONITORING AND EVALUATION

In this section, the concepts of monitoring and evaluation are defined, and some key aspects are discussed with reference to the literature. Motion and Kearnes (2014) cite Babbie (2002)'s definition of evaluation: "the process of determining whether, and to what extent, a certain intervention has produced the intended result". They link evaluation back to the activities of an initial baseline assessment where measurable outcomes must be defined. Monitoring is linked to the development of a communication strategy and implementation plan. The implementation plan of a communication strategy must indicate activities, deliverables and time frames against which progress can be measured and reported. Dashboards are a typical reporting tool to monitor progress. Most international development organisations have excellent monitoring and evaluation guides to which this study will refer (European Commission, 2015; World Bank [Mefalopulos, 2008]; UNESCO, 2006; WHO, 2017, REACH, 2015). Handbooks on development communication also have extensive sections on monitoring and evaluating public communication programmes. The study considered Melkote and Steeves (2001) and Servaes (2007) in this regard.

As this study does not include implementation, monitoring tools did not form part of the study. Evaluation activities and tools are however part of the study.

5.2 VALIDATING A COMMUNICATION STRATEGY WITH STAKEHOLDERS

REACH (2015) discusses various aspects of a formative evaluation of a communication strategy. These include:

- Whether it is aligned with objectives and expected outcomes
- Whether it follows a logical model or framework
- Whether it is internally consistent
- Whether the proposed indicators of success are measurable and realistic.

The draft communication strategy for a public education programme for water re-use was presented to the same stakeholders who were engaged for the baseline assessment, as well as other relevant stakeholders. Chapter 6 provides details of stakeholder engagements undertaken during the course of the study. These stakeholders were tasked to evaluate the communication strategy applying the criteria listed above. Their feedback was subsequently integrated into the strategy.

CHAPTER 6: STAKEHOLDER ENGAGEMENT

6.1 INTRODUCTION

The communication strategy was developed in consultation with stakeholders. The stakeholder engagement entailed several rounds of discussions. Stakeholders were also asked to give their input on specific aspects of the strategy. The sections below give the detail.

6.2 STAKEHOLDER CONSULTATIONS

6.2.1 Stakeholder meetings in 2017

In 2017, the project leader had initial consultations with:

- Ms Isa Thompson, Mr Neil van Wyk and Mr Geert Grobler (National Water Resource Planning)
- The late, Ms Marie Brisley (Chief Director: Policy and Strategy Coordination)
- Ms Mahadi Mofokeng (Acting Director: Strategy)
- Ms Nwabisa Fundzo (Knowledge Management)
- Mr Sputnik Ratau (Director: Media liaison and Content Development, Departmental spokesperson, from Chief Directorate Communications).

The purpose of these meetings was to find out how DWS supports the call for a communication strategy for water re-use and if they would participate in the proposed WRC project to develop such a strategy. All officials emphasised the need for a communication strategy for water re-use to be aligned with the NWRS. They felt that water re-use and the public education programme must be mainstreamed and become part of the DWS planning process. The officials also indicated that a wider consultative process would be needed to get the input of the Directorate(s) that would be responsible for implementation.

6.2.2 Stakeholder meetings in 2018

Three stakeholder meetings took place in early 2018 to get the input of the Directorate(s) that officials identified as responsible for the implementation of the strategy:

- Meeting with Ms Nwabisa Fundzo of Knowledge Management
- Meeting with Water Use Efficiency on 26 January 2018: The officials did not perceive water re-use to be part of Water Use Efficiency
- Meeting with Strategy on 4 May 2018:
    - Dr Kalebaila emphasised that the study will provide guidelines for a communication strategy that DWS can use for implementation.
    - Dr Slabbert said that the focus of the study will be on a public education programme for water re-use; project deliverables include a toolkit of communication material that could be made available to DWS and other stakeholders on a website.
    - There was not clarity on the DWS Directorate/Chief Directorate responsible for the implementation of the National Strategy for Water Re-use.

6.2.3 Stakeholder consultation workshop in 2018

A stakeholder consultation workshop took place on 23 November 2018 as part of DWS's Knowledge Management series. The purpose of the workshop was to engage with stakeholders and get their input on a various aspects of a public education programme for water re-use in South Africa. Invitees included the Reference Group members, DWS officials, WRC, researchers, the Department of Basic Education, the Development Bank of South Africa, Johannesburg Water, Rand Water, City of Ekurhuleni, City of Johannesburg, City of Tshwane, the CSIR and SALGA. Sixty (60) people attended the workshop.

6.2.3.1 Workshop format and programme

The workshop was opened with introductory presentations that gave the background and context. This was followed by short presentations and discussions of five key aspects of a public education programme as highlighted in the literature review. The five aspects were:

1. Water re-use: definition and terminology
2. The correlation between knowledge and perceptions about water re-use
3. Target audiences and sustainability
4. Messaging and activities
5. Risks.

Each aspect was introduced with a short presentation. Each stakeholder received a feedback sheet. After each short presentation, stakeholders were asked to individually answer specific questions on the feedback sheet. The stakeholders shared and discussed their answers with the person next to them. The facilitator then asked a few individuals or groups to share their answers with the audience. At the end of the workshop all the feedback sheets were collected.

6.2.3.2 Input from feedback sheets and comments from the floor

At the end of the workshop, the attendees handed in their feedback sheets. Thirty feedback sheets were handed in. The input on the feedback sheets was summarised and the discussions from the floor were noted.

6.2.4 Stakeholder interviews

The following stakeholders were consulted:

- Mr William Moraka of SALGA
- Ms Priya Reddy, Director of Communication, City of Cape Town
- Mr Isaac Dhludhlu, Communications Manager, Joburg Water
- Mr. Denzel Burgess, Acting Executive Director: Events Management, City of Tshwane
- Mr Andre Kruger, Programme Manager, Africa Investment and Integration Desk, NEPAD Business Foundation
- Mr Albi Modise, Head of Communications, Department of Environment, Forestry and Fisheries.

The interviews followed the discussion guide below.

Background
1. Give background on the National Water Resources Strategy, the Strategy for Water Re-Use and the objectives of this study. 2. International research has found that acceptance of different water re-use options (be it re-using treated wastewater for irrigation of golf courses, re-using greywater to flush toilets or treating wastewater for re-use as drinking water) correlates with public awareness and knowledge.

3. We would like to get your views on such a public education campaign and also build on your best practice and lessons learnt.

Questions

1. What are the challenges that you have experienced in communicating with the general public? PROBE IN DETAIL
2. How did you address, or how do you plan to address, these challenges? PROBE IN DETAIL AND ASK FOR COPIES OF MATERIAL. (PREFERABLY EMAILED)
    a. What approach worked the best?
    b. What were the lessons that you learnt?
3. What is the most successful public education programme or campaign that you've come across? What appealed to you about this programme or campaign? Why was it so successful?
4. What is the awareness and knowledge that you want the public to have on water and specifically water re-use?
5. Who should be the primary target groups? Who are agents of change that will give you sustainable awareness and knowledge?
6. What are your ideas on:
    a. Messages (positive; scare tactics; incentives)
    b. Channels (mainstream media; social media; celebrity endorsement, cartoons, learning material, etc.)
    c. Tone of voice (formal, buddy speak, didactic, edutainment, etc.) that works for the public that you deal with?

Further engagement

We plan to host a stakeholder workshop early in 2020 to present the draft communication strategy and would like to invite you.

The findings appear in Appendix A.

6.2.5 Further stakeholder engagement

In 2019 additional stakeholders were consulted to get their views on a public education campaign for water re-use and also to research best practice and lessons learnt in engaging with, and educating, the public on water-related issues.

- A sample of representatives of water intensive industries: (the research team used the Natsurv reports as a guide to select the industries.
    - Ms Shivani Maharaj, Zone Environment Officer of AB-InBev South Africa
    - Ms Mpho Lethoko, General Manager Communications, Sappi Southern Africa
    - Ms Ritva Muhlbauer, Manager: Water of Anglo American Thermal Coal. Anglo American Thermal Coal is involved in the eMalahleni reclamation plant.

6.3 STAKEHOLDER FEEDBACK ON STRATEGY AND TOOLKIT

Due to the COVID-19 pandemic and the lockdown in South Africa in March-April 2020, the research team could not present the draft communication strategy and the toolkit of sample material at a stakeholder workshop as was initially planned. A PowerPoint presentation of the strategy, the baseline report and the sample material were therefore sent to stakeholders via email and WeTransfer. Feedback was received from the following stakeholders:

- The City of Cape Town (feedback was received via Ms Priya Reddy, the City's Director of Communications)

- Ms Gerda Magnus, Acting Deputy Director General: TVET Colleges, Department of Higher Education and Training
- Universities SA
    - Prof Kobus du Plessis of the University of Stellenbosch
    - Proff Paida Mhangara and Craig Sheridan of the University of the Witwatersrand
- Rand Water (Water Wise)
    - Mr Grant Pearson
    - Mr Leslie Hoy
    - Ms Samanta Stelli
    - Ms Nyree Steenkamp
    - Ms Maria Mphomane
- Gauteng Environmental Education Forum (Ms Shanu Misser [SANBI], Mr Jaliel Mookadam [DBE], Ms Uli van der Merwe [GEEF] and Water Wise representatives)
- Dr Lester Goldman of WISA
- Mr Andre Kruger, Programme Manager, Africa Investment and Integration Desk, NEPAD Business Foundation.
- Mr Johann Lübbe of the Development Bank of South Africa (DBSA)
- Reference Group members:
    - Mr Patrick Mlilo of DWS
    - Ms Nora Hanke-Louw of EWSETA
    - Dr Esper Ncube of Rand Water
    - Mr Chris Swartz, Chris Swartz Utilization Engineers
    - Ms Hlengi Cele of the Water Research Commission.

The research team held follow-up video conferences with DWS, the Department of Higher Education and Training, higher education institutions, Rand Water's Water Wise team, GEEF, WISA and the Development Bank of Southern Africa (DBSA).

6.4 GENERAL COMMENTS

Below are general comments that we received from the stakeholders regarding the communication strategy and the toolkit of sample material. More detailed comments appear in the next section.

6.4.1 City of Cape Town

The overall content and literature provided is very good and we are very supportive of the study and the idea, particularly proposals such as the 'central hub' for shared reference material and resources.

The literature confirms for me what the City of Cape Town has identified upfront, namely that the engagement/communication strategy needs to broadly inform stakeholders and the public about water and future supply options first before one can get into debates about desalination versus re-use or reverse osmosis versus granulated activated carbon. Municipalities really cannot begin to talk re-use until stakeholders and the public have that knowledge.

Much of what has been proposed is 'theoretical' until water service providers/authorities start to implement it. At which stage they will do so within their own population context, through their own planned strategic approaches using their most effective allies, influencers, channels, etc. and means and using their own branded comms materials. Seeing ideas from others is always useful, but not all of the tools, messaging, content and branding, etc. will be applicable or directly relevant.

City of Cape Town requested that successful water re-use in other countries and cities be added to knowledge aspects which the public should know in terms of water re-use and related aspects.

6.4.2 Development Bank of Southern Africa

Well done, it looks great. It is important to set the context: Consider stating that SA is a severely water scarce country and projecting a 17% water deficit by 2030. Also consider adding that the National Water and Sanitation Master Plan has identified water re-use as an essential part of the water mix.

The DBSA is working on the establishment of a National Water Re-use Programme which may be housed in a central Programme Office. The idea is that one of the things that this Programme Office will do is to manage the water re-use communication strategy (not sure what they envisage).

I would like to see the reason why we have to re-use water (because SA is running out of water and we are a water scarce country) come through stronger in the strategy. People will have to realise that we do not have a choice but to re-use our water (not only in times of severe drought, but we need to create the awareness on this now to prevent going into water shortages).

I think I have previously indicated that water re-use can be applied on two levels being (i) household level where grey water is re-used by the household itself and (ii) at a utility level where wastewater / sewerage effluent is treated and re-used for potable or non-potable purposes. If we want to address the projected water shortages in any significant manner, we need to place a very strong focus on the second level. This is also where the public needs to be educated on why we have to re-use water (sometimes for potable uses) and the risks associated with this type of re-use.

6.4.3 WISA

Dr Goldman said that the sample material will be useful for WISA. WISA would be keen to take up the role as implementing institution of the following aspects of the proposed water re-use strategy:

1. Professional development. Dr Goldman reiterated that WISA's core focus is on building skills and capacity in the water sector by complementing and supplementing existing qualifications. WISA does this by offering short courses for CPD points, in collaboration with water scientists. Although webinars are considered as an alternative and less costly learning platform, WISA would still require sponsorships to cover the cost of the presenter and course material.
2. Hosting events that engage with decision makers and influencers. The same risk as for point 1 above applies.

6.4.4 Water Wise

Who would be coordinating the implementation of the communication strategy? Also who would do the monitoring and pushing/follow-up?

Add reasons for water scarcity, Day zero and blackwater to aspects that the public must know.

6.4.5 EWSETA

The time period attached to the plan is 10 years, but to my knowledge, we are heading for a crisis by 2025 already, so maybe they need to fast track the process as quickly as resources allow. I would say that a co-ordinated campaign in primary and high schools is key. No-one can make an adult feel bad about something quite as effectively as a child who chastises a parent for doing something wrong.

6.4.6 Basic Education

Feedback was received from the Gauteng Environmental Education Forum (GEEF) via video conference. The video conference was attended by Mr Jaliel Mookadam of the Department of Basic Education, Ms Shanu Misser of SANBI, Mr Grant Pearson, Ms Maria Mphomane and Ms Nyree Steenkamp of Rand Water, and Ms Ulisha van der Merwe, the secretary of GEEF.

1. Revising the CAPS to cover water and related aspects in a more systematic manner, and address gaps, is not feasible. One should strengthen what is available. **Proposed that recommendations for basic education as a target group of the communication strategy should focus on teacher support and the establishment of a central hub of resources**.
2. Proposed that the research team take up further contact with Ms Shanu Misser and Fundisa for Change to explore synergies with their planned platform for climate change.

6.4.7 Universities SA

Universities SA distributed the strategy and the educational material to their members. Feedback via video conference was received from the University of Stellenbosch and the University of the Witwatersrand. It was proposed that the research team send the strategy and the sample material to the WRC project leaders who are affiliated with a university to get feedback from more universities.

University of Stellenbosch (Prof Kobus du Plessis, Faculty of Engineering)

1. Prof Eugene Cloete represented the university for a number of years on the Board of the WRC. Since the university no longer has this representation, the university would welcome a formal engagement with the WRC where research needs could be discussed, and research projects planned.
2. During the CoCT drought and the looming Day Zero, the university's Facilities Management Division communicated water messages systematically and very successfully to its community. The university will be prepared to share this communication campaign with the WRC project team to that they can put it on the proposed central hub. Prof Du Plessis will coordinate this.
3. Prof Du Plessis is also the Technical Director: Training and Skills Development of IMESA. It is recommended that the WRC collaborate with IMESA in the development of a standardised communication plan for municipal water re-use projects, as proposed in the project report.
4. The content of educational material aimed at the general public must clearly distinguish between the different levels of water re-use: at household level; at municipal level; at industrial level; in agriculture, etc.
5. Emphasise that water is a renewable product.

University of the Witwatersrand (Prof Paida Mhangara; Prof Craig Sheridan, School of Geography, Archaeology and Environmental Studies)

1. Universities equip students with skills (engineering, chemistry, microbiology) that they can apply in a range of fields and professions. Having said that, the curriculum outline could be useful for a water professional degree aimed at, for example, civil servants.
2. Proposed that the research team contact SAASTA and align with their science advancement programmes.
3. Proposed that the research contact some of the African water literacy programmes to align with their communication strategies
4. Proposed that the infographic be distributed to municipal consumers with their bills.

6.4.8 TVET colleges

TVET colleges are agencies of the state and willing to contribute to educating the SA public on water re-use and related aspects and to cooperate with the WRC in this regard. Their spokesperson, Ms Gerda Magnus, suggested the following ways in which such education could be integrated into their existing courses and curricula.

1. Include content on water re-use and related aspects to the National Certificate (Vocational) curriculum

   The NCV is an educational programme is offered at NQF levels 2-4. The curriculum includes three fundamental subjects and four core vocational modules. The TVET colleges are in the position to adjust the NCV curriculum as this is managed by them. It is recommended to include water related content in the trade subjects where this is relevant like plumbing.

2. Add a module on specialised and relevant aspects of water-reuse to the relevant Occupational qualifications, for example the plumber and brick-layer qualifications.

   The Quality Council for Trade and Occupation (QCTO) controls the curricula of these qualifications. A request for such a module will therefore have to be submitted to the Quality Council.

3. Revise the Water and Sanitation programme of the NATED curriculum (Report 191 of 2001) to update it and add water re-use and related aspects.

   However, the current curriculum needs to be updated and should be done in consultation with the Department of Higher Education TVET branch and the QCTO.

In addition, an annual awareness campaign could be introduced to reinforce the basic knowledge of water re-use and related aspects among all students. Such a campaign could run during the annual Water Week and include activities such as:

- A poster campaign (The posters could be taken from the water re-use infographic that was developed as part of the WRC project.)
- A competition that links to the qualifications that TVET colleges offer, for example a technological innovation or artwork with water re-use as theme.

For all of the above suggestions, it would essential to assess the need for these courses and information among students, and the specific content that would be relevant and useful for each occupation. It is recommended that the learning material be suitable for distance learning.

TVET colleges do not have the expertise to develop the content and the learning material of the proposed courses and modules, or the material for the awareness campaign. They will need the support of the WRC and experts for that.

The way forward: Once the final project report with the above recommendations has been published, the WRC will contact TVET colleges to:

- Discuss the identified need for the courses and modules listed above
- Propose collaboration and co-funding with TVET colleges.

6.4.9 Reference Group members

Four of the Reference Group members responded to the request for comments. See detailed comments below.

6.4.9.1 Communication strategy

Organisation	Comments	How was the comment addressed?
Bigger outcome		
City of Cape Town	This should be wider than citizens who contribute meaningfully to scientific debate and decision-making. Developing an understanding of what water re-use is all about and practising sustainable water use is just as important, i.e. it is about education and awareness. It may not be realistic to expect ordinary citizens to make meaningful contributions to scientific debate. What water service providers (municipalities) are more likely to be aiming for is gaining sufficient understanding (amongst residents) which leads to acceptance of re-use as one of the options for drinking/domestic use (and other uses) so that we have a more water-secure future.	Unpack the concept ''scientific debate''
Development Bank of SA	This statement seems very broad. Can we bring it closer to water re-use? Or are we implying that the statement implicitly includes water re-use? Would like to see things like: citizens understanding the reasons why we have to re-use water at scale, the ability to treat water to required standards (technology), an understanding and awareness of different applications of water re-use (direct/indirect + potable/non-potable), etc. In other words, educated and informed citizens when it comes to issues of water re-use	Make the broad outcome more specific
Reference Group: Chris Swartz	Add: citizens who are well informed, which empowers them to…	Include in broad outcome
Water Wise: Leslie Hoy and Samanta Stelli	Unpack ''scientific debate''	Add to strategy
Objectives		
City of Cape Town	Water literacy in general, and re-use in particular are obviously important. But not sufficient. Awareness & education unfortunately does not necessarily equal behaviour change. Building literacy is one thing, but public acceptance for treated wastewater as a drinking water source is	Behavioural change is not the aim of this communication strategy. Public education is. According to the literature (see Chapter 3), public knowledge is the first step towards behavioural change.

Organisation	Comments	How was the comment addressed?
	another thing. The first does not necessarily lead to the other. It does make it a lot more likely, but there are other factors involved, e.g. culture, religion and spiritual practices and the 'yuck factor', cost, etc. Theories of literacy are useful, but not always able to be implemented in municipalities in detail. Sustainability is important, but this is probably fairly obvious to municipalities already. We know that education efforts have to be sustained over time to make an impact – but it's not always possible to allocate budget for all the education initiatives we would like to over many years. Priorities shift, and some decisions are not ours to make. Many municipalities (WSPs or WSAs) really do not have the capacity & resources to educate everyone in their towns/ cities on all of this. So many socio-economic and health issues, etc., so little time – and the context is constantly shifting, e.g. current COVID-19 has pretty much drowned everything else out now. Often need to establish "shortcuts" – practical ways to educate key issues fast? Do not always have the luxury of 10-year timeframes, consistent resourcing, etc.	The multi-layered approach of the strategy addresses this concern. The public will be targeted in different roles and by different implementing organisations. Municipalities are just one of these organisations. The material that was developed for municipalities aims to address this concern, as does the idea of a central hub of resources that municipalities and any other implementing organisation can access.
Reference Group: Chris Swartz	Agree with objectives	
Water Wise: Leslie Hoy and Samanta Stelli	Comfortable with Objectives 1 & 2 SMART objectives. Specific: As new data/information emerges, the knowledge content will have to be updated. Measurable: Consider municipal return flows and even water use as indicators of behaviour change. This could be complemented with surveys on reported behaviour. Also track water consumption with AMR devices. Would be interesting to research behaviour in housing estates. Time-based: revisit 2030 goal. Involve a statistician to model the impact of the different initiatives over time (sustainability model).	Add suggestions to strategy
University of Stellenbosch	Explain the objective of sustainable public knowledge, values and behaviour regarding water re-use in the bigger context of sustainable water for all.	Add to strategy
Roles on which target audiences were based		
City of Cape Town	Agree, but these target audience groupings are quite generic and would have a lot of subcategories. For example we could break it down in terms of selling points – so communicate for those who respond to environmental messages, those who respond to scientific messages, those who respond to economic messages, those who	Add as a role for the implementing institution

Organisation	Comments	How was the comment addressed?
	respond to religious messages, those that support re-use and those that potentially don't, etc.	
Reference Group: Esper Ncube	Special target audience is women groups in communities and NGOs. These groups are very close to water issues and might need the education faster. Once it is disseminated, they will spread it faster	Add suggestions to the strategy
The learner levels (basic education, higher education, professional education, Councillors)		
City of Cape Town	Not clear why it seems that only listed 2ndry audiences for the 'consumer, decision-maker and influencer roles' I do not think that we should distinguish between primary and secondary target audience. Whilst it is important to educate primary school learners, it we are going to get re-use implemented in any meaningful way we need to put an equal emphasis on those with decision-making power and those groupings that can sway or effect public opinion Yes children are important for longer-term re-use literacy, but they are not likely to be the decision-makers for acceptability of re-use consumption (and payment for this) in the short term. They should only be a primary target audience if this is only a longer-term educational comms strategy. SAICE should also be included in list of implementing institutions.	Take out the distinction between 'secondary' and 'primary' target audiences Add to implementing institutions
Development Bank of SA	Should councillor induction not perhaps also be a Primary target audience?	Take out the distinction between 'secondary' and 'primary' target audiences
Water Wise: Leslie Hoy and Samanta Stelli	Water Wise has found higher education a challenge. Are there any inter-faculty bodies that one could engage with? Who will check that the facts are correct in learning material?	Will investigate and add to strategy Add to strategy
Reference Group: Hlengi Cele	Basic education water re-use intervention needs to be well planned and be measurable. I suggest this gets linked to the DWS School Intervention Project. The WRC has recently signed an M0U with DWS to partner in school interventions, Youth Indaba and annual competitions. Will the strategy suggest that the curriculum integrates water re-use, e.g. Senior Phase and FET phases so that by the time they are in grade 12 as assessment is conducted to measure their level of understanding of water re-use? It will be excellent if there would be evaluation tools in place for DWS regional coordinators and teachers to easily take and implement and generate reports. This would ensure that water re-use is sustained in schools. I support the idea of competition topics to include water re-use.	Add suggestions to strategy

Organisation	Comments	How was the comment addressed?
Reference Group member (Chris Swartz)	Learner levels look fine	
The consumer levels (local government, household, individual, large water-intensive businesses)		
City of Cape Town	Refer to comments on learner levels	See above
Development Bank of SA	Same question as for learner levels	See above
Reference Group: Chris Swartz	Agree with consumer levels	
Water Wise: Leslie Hoy and Samanta Stelli	Consider different approaches for different LSMs LG: Water Wise takes learners to the Vereeniging water treatment plant. LG: municipal comms must be regular and ongoing LG: visitor centres – to be considered by Metros to increase availability	Add suggestions to strategy
Influencers and decision makers		
Reference Group: Chris Swartz	Unpack influencers and make it clear that regulators and WSI (WSAs and Water Boards) are included under leaders	Add suggestions to strategy
Water Wise: Leslie Hoy and Samanta Stelli	Add business leaders Consider DBSA as implementing agent Business: Include South African Affordable Residential Developers Association (SAARDA) Be careful of celebrities	Add suggestions to strategy
Reference Group: Hlengi Cele	Add civil society	Add suggestions to strategy
The approach for each target audience		
City of Cape Town	Visits to water treatment works are mentioned but tours to water or waste-water treatment plants are not always practical for learners, because they were generally not designed to handle visitor groups – and especially not groups of younger children who could be unruly and difficult to control. There are usually OHS hazards on sites like this, which are generally not safe for children. Even groups of older children or young adults are often not easy to cater for. Perhaps a better /ideal opportunity would be to visit current re-use facilities and demonstration plants, e.g. Managed Aquifer Recharge in Atlantis in CT (although not that much to see above the ground) Getting it better represented in the school curriculum is an important initiative, but it could take many years. The new national rules about running competitions make it more onerous than before, and they tend to be very capacity and resource-intensive by nature. Message framing is good overall, covers the most important bases.	Note concerns in strategy Note concerns in strategy Note concerns in strategy

Organisation	Comments	How was the comment addressed?
	Yes, definitely needs to be tailored messaging for different audiences. Social media can work well for some municipalities, but it can also be a very negative environment for others – often being a hotbed for residents'' expression of dissatisfaction and vitriol. Not a good landing place for sensitive topics which the city/town wants to be engaged with in a constructive way. Direct communication with key stakeholders is a better approach to start with when introducing the idea to gain some initial traction with key players, using a set of well-crafted comms tools – presentations, videos, leaflets, etc. 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 What happens if the majority of a society say they do not want re-use, but the local government needs to implement it for water security purposes? To what degree is there room for 'collaborative problem solving' (an ideal) versus consensus-seeking versus consultation versus 'for information'. (Idealism vs pragmatism, etc.)	Add to strategy and guideline presentation
Development Bank of SA	I think one needs to draw the net wider than just water re-use when incorporating into the curriculum, for example we need to educate around water scarcity issues, climate change and water conservation/savings	Included in basic curriculum outline
Reference Group: Chris Swartz	Looks comprehensive	
The implementing agents and the proposed time frame		
City of Cape Town	10 Years to develop an introductory understanding of water re-use seems quite a long period. Citizens of drought-stricken areas have learned very quickly about water restrictions and potential consequences of a potential Day Zero. Whilst getting this into a school curriculum may take a longer time, the other stakeholder could be targeted in a shorter timeframe. Does the timeframe have to be the same for all stakeholders?	Partly addressed in strategy; make clearer

Organisation	Comments	How was the comment addressed?
	Suggestions for older students, professional bodies and Cllrs are all good/useful. Not likely that many water-intensive brands of products produced in the private sector would embrace this, if a large proportion of society would be against it for various reasons. Certainly, the likes of food and beverage manufacturers may struggle with a decision to promote re-use if it is seen to be forcing people to consume possibly contaminated water. But, yes, they could be interested in helping to promote general water literacy issues or aspects, e.g. the water cycle in a more generic way. Broader PPPs on this can be tricky too.	Add note to strategy
Reference Group: Patrick Mlilo	Reference the relevant SDG targets	Add to strategy
Reference Group: Chris Swartz	The 10-year time frame looks good and realistic, with added benefit of corresponding with the SDGs	
Reference Group: Hlengi Cele	For the dissemination of water re-use messages, the retail sector should not be left behind. This is the space that buyers and households occupy and there are possible partnership opportunities that exist. The WRC is already in contact with the Consumer Goods Council of South Africa where this idea can be sold. Many retail businesses are affiliated under this body and they have shown interest in adopting water conservation measures. Consider the role that the WRC and DWS can play collectively as part of their MoU.	Add suggestions to strategy
Messaging		
City of Cape Town	Consider the principles and practices used in the Social Marketing approach to behaviour change, which has been globally used for things like public health issues.	
Reference Group: Patrick Mlilo	Develop a hierarchy/ prioritization of messages, e.g. water scarcity, water cycle, etc. Drive a key message at the fundamental level that all water is re-used, and ingrain that to remove “yuck” factor Strengthen the communication strategy beyond awareness, to maybe think “social marketing” of water re-use.	Add to the strategy
The evaluation indicators and instruments		
City of Cape Town	Important methodologies missing, e.g. ‘opinion surveys’ before and after (and even during, depending on timeframes and funding) and focus groups. As per social marketing principles. And the ultimate test which is acceptance or rejection of re-use for consumption.	Add suggestions to strategy

Organisation	Comments	How was the comment addressed?
Reference Group: Chris Swartz	it is important that it be done in such a way that will measure the impact on consumer satisfaction, willingness to pay and motivation to use water as a scarce commodity (i.e. use water wisely).	Customer satisfaction is a function of a range of factors; so is willingness to pay. Motivation to save water will be added as an indicator to the strategy
Water Wise: Leslie Hoy and Samanta Stelli	A report back mechanism on progress is needed from DBE	Add to strategy
Reference Group: Patrick Mlilo	Suggest monitoring and evaluation be continuous, with annual reporting	Add suggestion to strategy
Reference Group: Hlengi Cele	It would be nice to have the strategy integrated in the municipality's reporting to DWS	Add to strategy
A central hub for communication and education material on water re-use and related aspects		
City of Cape Town	Very supportive of the idea	
Development Bank of SA	We are working on the establishment of a National Water Re-use Programme which may be housed in a central Programme Office. Idea is that one of the things that this Programme Office will do is to manage the water re-use communication strategy.	
Reference Group: Chris Swartz	Excellent idea and I support the idea and proposed scope fully	
Water Wise: Leslie Hoy and Samanta Stelli	Supports the idea	
WISA: Dr Lester Goldman	Strongly supports idea. WISA would like to be part of the development. Dr Goldman recommended that such a hub should be hosted by an independent organisation. Funding and implementation should be separated. The model must be self-sustainable. He recommended that interested organisations form a committee to drive the implementation.	
Universities SA	A central hub of educational resources is supported, but it will have to be maintained properly. Wits suggested that research team look at the resources available on www.usgs.gov. (water science school under Special Projects). The material will have to be adapted for South African audiences, for example translated into at least four languages.	

6.4.9.2 Toolkit

Elements	Organisation	Comments	How was the comment addressed?
Infographic	City of Cape Town	Very good and relevant content but too full of text and a lot of detail. Could possibly work at A0 size or be supplemented with something more abbreviated. Or break into different 'bite size' chunks as proposed in 'Opportunities for re-use' document, with dissemination through different tools and channels. Fact about SA being 39th driest country – this was in 2018. Could be a more general statement as fact may not be valid at the time when poster is used. Dating is always going to be challenging with these numerical claims.	Comment noted, but the infographic is planned to be deconstructed for different communication channels. Make this type of factual information more generic to avoid continuous updating
	Development Bank of SA	Very nice. Just worried that it may contain too much information on one infographic. Consider breaking up into different infographics for the various elements addressed.	See response to City of Cape Town
	NEPAD Business Foundation	Quite busy. Will need to be printed at a high quality to be legible. Good detailed information.	See response to City of Cape Town
	Reference Group: Chris Swartz	Well compiled. Perhaps a bit 'busy'?	See response to City of Cape Town

Elements	Organisation	Comments	How was the comment addressed?
	Water Wise: Leslie Hoy and Samanta Stelli; Grant Pearson and Nyree Steenkamp also sent detailed comments on the documents	• Too busy. Content will have to be unpacked in bite size chunks. • Font is hard to read. • PDF needs to be editable so that dates and other info can be changed. • It would be important for consumers to know how to calculate their water consumption before using the sliding scale to judge their progress.	See response to City of Cape Town Suggest an alternative look and feel for the infographic for specific target audiences Added
Opportunities to re-use the infographic	City of Cape Town	Some useful concepts, but larger cities/towns are likely to have their own existing educational materials which have been developed with their own relevant content and branding, etc. Some like City of CT have already developed some quite detailed materials, e.g. the Safe Use of Greywater booklet, which was based on research and expert inputs from public health, academics, food garden experts, etc. Ideas for insertion in curriculum is useful.	Refer to recommendation of a central hub of resources
	Development Bank of SA	Nice!	
	Reference Group: Chris Swartz	Good.	
Greywater poster	City of Cape Town	I think the Greywater poster is a bit problematic: • Hard to see where they move from source to use • Are only two languages going to be used? See City of Cape Town's 'Safe Use of Greywater' booklet.	Reiterate the target group of this poster and refer to other material on greywater use, such as the booklet of the City of Cape Town
	Development Bank of SA	Good, this not only talks to re-use but also being water wise and saving water (water conservation)	

Elements	Organisation	Comments	How was the comment addressed?
	NEPAD Business Foundation	Good.	
	Reference Group: Chris Swartz	Good	
	Water Wise: Leslie Hoy and Samanta Stelli; Grant Pearson and Nyree Steenkamp also sent detailed comments on the documents	• It was difficult to see the difference between washing clothes and rinsing clothes. • Clearly state the target audience of the poster. It is not always practical to say that 'soapy' water can never be used for watering lawns. Many golf courses in Cape Town use only greywater to water their grass.	Make the distinction clearer in the poster Make clearer in the description of the material
Basic water curriculum outline	City of Cape Town	• Some examples given of urban water demand management, but not others – possibly just say water conservation and demand management (for example, x, y and z) • No mention of water quality related aspects	Add to basic water curriculum outline

Elements	Organisation	Comments	How was the comment addressed?
	Development Bank of SA	Good. Recommendations: • Climate change should feature very strongly • Lowering demand should include leak detection and repair, and water theft • Very important aspect that needs to be added is payment for water services. This should include cost reflective tariffs (and this is not the price of the water itself (the molecules) but rather that we are paying for the cost to treat the water, store and convey it to us), the value of water and the obligation to pay for water services (as a personal side note, water is too cheap in SA and therefore not valued – we do not care if we waste water because it is cheap and often for free).	Add to basic water curriculum outline
	NEPAD Business Foundation	Good.	
	Reference Group: Chris Swartz	The outline and scope look good. I assume the content (depth) will be determined by the target audience?	Make this clearer
	Water Wise: Leslie Hoy and Samanta Stelli	Under 'Lowering demand don't say 'tips', be more definite: How to use less water.	Revise basic water curriculum outline

Elements	Organisation	Comments	How was the comment addressed?
	Basic Education	Proposed that the research team expand the curriculum mapping to include Life Orientation (Grades 4-12) and FET subjects such as Agricultural Sciences and Agricultural Economics. Revisit the conclusion that there is no coherent underlying framework. Identify gaps in terms of the basic water curriculum outline. Add ''water and food security'' to the basic water curriculum.	Added
	University of Stellenbosch	Unpack the basic water curriculum outline in a PowerPoint presentation and distribute widely. This will make it more visible and easier for higher and professional education institutions to add aspects to their current curricula.	Outside scope
	University of the Witwatersrand	Add water monitoring and measuring technology such as satellite technology. Proposed that the curriculum outline gives one example of how a topic can be expanded in more detail. And also gives an example of how certain aspects of the curriculum outline would be relevant for a specific profession, for example that of a plumber	Add to curriculum Noted
Guideline presentation on public education	City of Cape Town	Quite an effective presentation – handout and notes supplement it well. Nice to see what some other municipalities and other organisations have done or propose in general.	

Elements	Organisation	Comments	How was the comment addressed?
	Development Bank of SA	Consider adding a slide or slides on some international case studies. Good to show that we are not the first country to be doing this and that it has been done across the world (primarily in first world countries) and also for some years already.	Add to presentation
	NEPAD Business Foundation	Very good.	
	Water Wise: Leslie Hoy and Samanta Stelli	• Slide 26: Add that it would be important to have dedicated resources to monitor and respond to messages • Note regarding slide 27 and 28: National Treasury has strict rules regarding municipal competitions. • Use social media to distribute presentation to municipalities in bite size chunks	Add to presentation

6.5 KNOWLEDGE DISSEMINATION EVENT

A final stakeholder workshop was hosted by WRC on Zoom on 15 July 2020. The workshop was attended by 70 people who participated enthusiastically. The purpose of the workshop was to summarise the feedback that was received on the draft communication strategy and report on how this feedback had been integrated into the strategy. In addition, key stakeholders discussed the contribution that their institutions can make to achieve the goal of a public who understands and supports the role of water re-use in sustainable water management in South Africa. The workshop programme appears in the figure below. A recording of the workshop is available from the WRC.

Introduction	
15:00 – 15:05	Welcome remarks - **WRC**
15:05 –15:10	Purpose of the workshop - **Dr Nonhlanhla Kalebaila, WRC**
15:10 – 15:30	Development of a communication strategy for water re-use - **Dr Sarah Slabbert**
Summary of stakeholder feedback and actions	
15:30 – 15:40	Implementation of the strategy at national level – **Mr Patrick Mlilo, Department of Human Settlements, Water and Sanitation**
15:40 – 15:50	Targeting municipalities under the national water re-use programme – **Mr Johann Lübbe, DBSA**
15:50 – 16:00	Umgeni Water's Learning Forum -**Ms Megan Schalkwyk, Umgeni Water**
16:00 – 16:10	Improving municipal messaging & communication – **Dr Karen Nortje, CSIR**
16:10 – 16:20	Targeting basic education: teachers and teacher educators - **Ms Shanu Misser, Fundisa for Change**
16:20 – 16: 25	Targeting basic education learners through the 2020 Vision for Water and Sanitation Education Programme - **Ms Hlengiwe Cele, WRC**
16:25 – 16:35	Fast-tracking water professionals and public education through influencers and decision makers - **Dr Lester Goldman, WISA**
16:35 – 16:45	Leveraging the support of the business sector - **Thembisile Mkhize, NEPAD Business Foundation**
16:45 – 16:55	Social marketing as a messaging strategy. M&E and Toolkit: summary of feedback – **Ms Nadja Green**
16:55 – 17:00	Central hub of resources - **Dr Sarah Slabbert**
17:00 – 17:15	Discussion
17:15 – 17:30	**Closing remarks - WRC**

Figure 6-1: Final workshop programme

6.6 CONCLUSION

As described above, the stakeholder input and feedback fed directly into the development of strategy in all its phases. This made the communication strategy a truly collaborative effort. Part 2 sets out the final product of this collaboration, the strategy itself and the toolkit of sample material. Part 2 also outlines how the strategy can be taken into action in collaboration with these stakeholders.

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ANNEXURE A: FINDINGS OF STAKEHOLDER INTERVIEWS

A1. Challenges experienced in communicating with the public

- According to Ms Priya Reddy, the drought situation in the Western Cape forced the **City of Cape Town** to focus their communications on educating the public as well as changing their behaviour. Communicating bad news to the public was a further challenge. For example, during the drought there were tariff increases even though consumption has gone down considerably. Another challenge was how to deal with fake news surrounding the drought.
- Mr William Moraka from **SALGA** and Mr Albi Modise from the **Department of Environment, Forestry and Fisheries** both mentioned that it is a challenge to communicate the realities of water scarcity to the public. Mr Moraka said that people don't understand water scarcity in South Africa. Mr Modise phrased the challenge as: *How do you tell people that South Africa is a water-stressed country when they have water in their taps? People don't take water seriously unless there is a crisis.*

Industry has their own unique challenges in communicating with the public:

- **Sappi** operates mostly in rural communities. For years, Sappi has been working on educating these communities on the technology that they use in the plantations and the mills, but people still believe that Sappi is taking too much water. Ms Mpho Lethoko said it is difficult to get people to understand how the technologies work and that the company does not take more water than licenced.
- **AB InBev** (who acquired SABMiller in 2016) has different breweries across South Africa. Each brewery has their own challenges. For example, the Newlands brewery had to share water from a spring in Table Mountain with surrounding communities after the municipal water was cut because of the drought. This required constant communication and negotiation with the communities. It is also important for AB InBev to build relationships with their suppliers, i.e. the farmers who grow their barley. Ms Shivani Maharaj admitted that they do not talk enough to the public about water.
- Ms Ritva Muhlbauer from **Anglo Coal** also said that they do not communicate enough with the public. *We do have a lot of good news stories. We do lots of positive things on saving water… [that] we often neglect to present to the public.*

A2. The best approach in communicating with the public

- Several respondents including Ms Reddy praised the **City of Cape Town** for a very successful public education programme during the drought**.** The main focus of the programme was to change people's behaviours, i.e. to reduce water consumption. Ms Reddy explained it as follows: *We wanted to create an environment where those who saved water became ambassadors and those who did not save water became outliers. At braais people would talk about whether they've used 2 litres or 3 litres a day. Things like brown vs green lawn were topical. Brown lawns became very fashionable… our communication encouraged competition in reducing water usage.* Ms Reddy added that *having something like green dot map* (see example below) *was a huge tool for people to brag about their good behaviour.* The behaviour-modification tool attempts to acknowledge good savers and encourage those who have yet to join the efforts:
  - Dark green dot: household using less than 6,000 litres per month;
  - Light green dot: household using between 6,000 and 10,500 litres per month;
  - Grey dot: estimated readings when the water meter is not read for some reason, or if no information is available for the property. [22]

[22] https://www.capetownetc.com/news/green-light-for-cape-town-water-map-despite-objections/

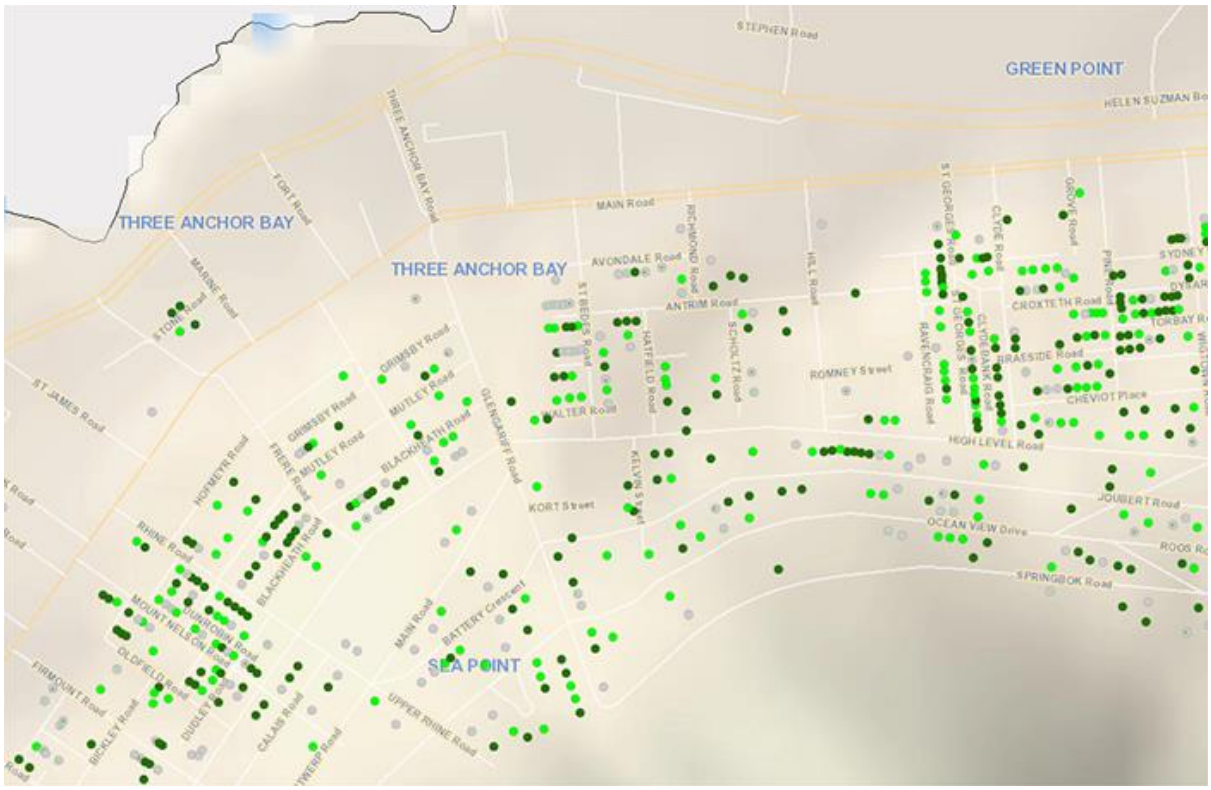

Figure A-1: Example of City of Cape Town's green dot map

Even though the lower usage was well sustained since the end of the drought, the municipality does not ever want to be in the same situation. They are looking at a range of water sources and has launched a small-scale direct re-use pilot. They have looked at the Singapore lessons and are learning from international best practice. A strategic company is on board to help them with a plan to get public buy-in to drinking treated wastewater. Some ideas for communication include bottling the treated wastewater and running an Instagram campaign to remove the 'yuck' perception. They have also found that testimonial campaigns work better than scientists or politicians speaking. *We rather had the normal people speak about how they have changed their behaviour.*

- **Joburg Water** sends out bulk SMSs from their database when there is, for example, a planned outage, but Mr Isaac Dhludhlu said that social media works best for them. *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.*

- The best way for **SALGA** to communicate with the public is through mayors and counsellors visiting communities and listening to their debates, and outreach programmes, such as the Imbizo programme. Mr Moraka also mentioned that it is important for municipalities to have had successful communication campaigns. For example, City of Tshwane's campaign on water leaks was very successful. 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. The online forum is used to communicate any interruptions and registered users report any leakages. They can take pictures of leakages and send them to the municipality.
- Mr Denzel Burgess from the **City of Tshwane** said they follow a general environmental awareness approach when communicating with the public. The water leaks campaign taught people about basic plumbing and the result was that there are now less plumbers going out to fix leaks.
- For the **Department of Environment, Forestry and Fisheries** it works well to frame their messages under the banner of South Africa being a water-scarce country and that, with climate change, certain parts of the country will experience more extended periods of drought. People must understand that

"there is a today, but there is also a tomorrow". *Our message is that we need to be alive to the fact that climate change is here.* The Department has a climate change awareness programme where they go to schools to speak to children about climate change and the effects thereof.

- **Sappi** engages with the public through community forums. They use internal sub-committees to tackle the specific environmental matters of each community. A face-to-face approach works best. Media and flyers don't work so well. They spearhead their communications through councillors. Ms Lethoko explained why this works so well: *This way we are recognising them as leaders where we are not just doing our own thing but consulting and showing that their leadership role works.* Sappi also targets the youth. *We call them Abashinshi, the game changers.*
- **AB InBev**'s approach for each brewery is unique but is based on the principle of working closely with the local authority and community. They conduct a risk assessment for each site to determine the best possible local solutions. For example, at the Newlands site, they constantly talked to the community about the drought. The media was also involved, and journalists would often talk to the Newlands team. Honest, upfront and consistent communication worked best for AB InBev. *With Newlands we were transparent to say it is not our water, it is spring water that belongs to all of us.* It is important to have a single contact person who does all the communicating especially with the high-risk sites.
- **Anglo Coal** has a communication department that does all their external communications. As a unit of Anglo American, a lot of communication is also done through the Group water manager, Johanita Kotze. The mine water coordinating body (a neutral platform for a number of coal mining companies) communicates important information to the relevant stakeholders.

A3. Lessons learnt in communicating with the public

Respondents mentioned the following lessons that they have learnt in communicating with the public:

- Communicate as quickly as possible and give people enough information without scaring them;
- Don't go public if do not have all the necessary and relevant information;
- Have a proper plan in place for crisis communications;
- Be proactive in your communications, especially when you are dealing with communities. Also, respect the authorities and the local leaders in the communities;
- Be open and transparent in your communications;
- Public education programmes should be done on a regular basis not only when there is a crisis like a drought;
- Read and respond to the feedback that you get from the public. But, keep your emotions in check when responding;
- There will always be elements of disagreement. People will not always agree, and politics are part of this element of disagreement.

A4. Most successful public education campaign

Respondents mentioned the HIV/Aids campaign and the campaign of the City of Cape Town during the recent drought as the most successful public education campaigns that they have encountered. Mr Modise said that the HIV/Aids campaign not only raised awareness but also brought together NGOs, civil society and the Government through the Department of Health. Mr Burgess and Ms Maharaj said the City of Cape Town campaign was successful because people not only in Cape Town but also across the country now take water more seriously. *It was always in the news. I'm in Joburg however I heard about it all the time.* Ms Lethoko added that Capetonians to this day still behave like day zero coming up. *There was a long-term effect.*

A few respondents also mentioned City of Tshwane's water leaks campaign and Eskom's load shedding campaign although that was more aimed at changing behaviour through a public information campaign than through educating them.

A5. What knowledge on water and water re-use should the public have?

Even though respondents gave many answers to this question, the answers were disparate, and it was not always clear if the answers were personal opinions or based on experience or any other information.

The suggestions below are not speculative but are based on respondents' actual experience:

- The environment and water cycle should be taught as a life orientation subject at schools.
- Children can visit a 6-star rated green building like the one of the Department of Environment, Forestry and Fisheries that is designed for saving energy for water re-use.
- Teach people that they can save a lot of water by re-using it, e.g. using greywater to flush toilets, wash cars or irrigate lawns.
- Teach people the benefits of re-use, i.e. sludge for fertiliser or effluent re-use for irrigation.
- Industry and companies: You can use technology (that already exists) to treat water for your requirements.
- We must not be afraid of re-using water. Teach people about the safety aspects of re-using water.
- Companies and industry should share their best practices. For example, a lesson from AB InBev: *Anything to do with product, we use freshwater and anything that we do not need freshwater for, we re-use the water.*
- South Africa is a water-scarce country; water is a scarce resource.
- Educate people about dam levels. *Yes, we are still safe in terms of water however, you cannot count on that. The Vaal dam has dropped under 60% within this week. That is very worrying.*
- Educate people about treatment processes and seawater desalination.
- 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-uses.*

A6. Primary target audience and agents of change

Respondents identified children and the youth as the primary target audience. *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.* A respondent mentioned that for the education programme to be sustainable, children should definitely be targeted.

Respondents mentioned that all three spheres of government: national, provincial and local, are agents of change. Municipalities are however also target audiences. *Our municipality must be communicated to.*

Industry players spearhead communication campaigns and education programmes. *Every corporate has a responsibility especially those in the manufacturing and agriculture sectors. It is also their world; they need to be part of the solution. We need to engage our farmers.*

Big companies in the private sector like Coca Cola and SA Breweries were identified as important role players and agents of change. It is important for these companies, especially those who use water to produce their products and who already have a re-use element, to educate their workforce and the surrounding communities.

NGOs and community-based organisations are important because they are rooted in society where government cannot reach. Faith-based organisations and the media were also identified as agents of change. Respondents mentioned that the education programme should be spearheaded at the highest level like the president. *South Africa is a country that wants to see the leaders walk the talk*.

A7. Messages, channels, tone of voice

Respondents suggested the following for messages, channels and tone of voice for a public education programme on water re-use:

	Messages	Channels	Tone of voice
Ms Priya Reddy **City of Cape Town**	• Get people comfortable with technical information, but don't bombard them with scientific language • Get people to drink the treated water • The journey of water and how it is treated	• Social media and mainstream media • Have a visual campaign where people see clean sparkling water and not dull brown water • Big public events where important people like the mayor drinks the treated water • Testimonials of influencers about the taste of the treated water • Share videos like Singapore new water's success story on WhatsApp and other media and play them at public and townhall meetings • Speak to the Muslim Judicial Council and other faith-based organisations	• One of dialogue and confidence; we need to show people that we have done our own rigorous testing • We have to be the trusted authority. • We have to let the public know that we have done everything to ensure that the water is safe to drink.
Mr Denzel Burgess **City of Tshwane**	• We cannot live without water. We can do without food for a while but not water. Without water we are doomed. • You don't want to traumatise people but show them the results of not having water, i.e. show them a dry, barren piece of land. • Incentives: Give people grants especially the lower to no income people where the water is actually wasted because people know that government will provide. The people that don't pay for the water, waste it.	• Going to the people directly. Currently our Executive Mayor has been going to townships personally • Social media, it is part of our daily lives. • Talk to Institutions like the Department of Higher Education for ideas. • Schools to come up with ideas. • Communities to come up with ideas. Let them teach us. We have degrees and possibly apply long processes that we have learnt from professors. These people have simpler ideas that work.	• Positive approach • Firm tone but not harsh. A harsh tone will make people negative. There must be no jokes (humour) either. • Build relationships with the people. • Talk to even the guy that sleeps under the bridge, engage and respect people. • Go in as human beings.
Mr Isaac Dhludhlu **Joburg Water**	• Be specific • Look at the City of Cape Town campaign for ideas	• Social media • Email • WhatsApp work well for us – we are reaching people in different areas • Incentivise with T-shirts and flasks	• Young people prefer slang language • Formal and to the point

	Messages	Channels	Tone of voice
Mr William Moraka SALGA	• A 'did you know' campaign like the Chappies wrappers • Look at the SDG 6 requirements such as delivering better for communities	• Let the three largest Metros run a campaign at the same time, i.e. synchronised • Do branding of municipal cars • A highway patrol awareness drive from Johannesburg to Sandton • Billboards with moving adverts	We wanted to pinch the idea of yellow suits of StatsSA. Have the mayors wearing a particular suit at particular events. Even the president and the cabinet. Also have ward committees at municipality level.
Mr Albi Modise Department of Environment, Forestry and Fisheries	• It is important to treat water as a resource because we might not have it tomorrow • South Africa is a water stressed country	• Television and radio adverts • Community theatre, edutainment • Social media • The print element will make sure the message lives longer with more space to explain the ad • Ambassadors like comedians (Skhumba), reality TV stars (Papa Penny) and soccer players.	• 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 • Have a narrative where you get the nation talking
Ms Mpho Lethoko Sappi	• Stress the urgency. They say the new world war is going to be about water. • The messages must be factual not scare tactic. Be incentivising as well, i.e. if you can prove that you use less water in your home. • Tax incentives for corporates. • Facts need to come very strongly not too deep. Give facts on the situation in South Africa in relation to the rest of the world.	• Local radio; don't waste time with TV • Social and mainstream media • Local newspapers and magazines • Messages from leaders in our country, DWS and the president • Corporates can also share what they are doing in innovation. • Get an ambassador like Maps Maponyane. He is serious, fun and respected by business. He also works with WWF. He is approachable too.	• Use a positive tone. You don't want to be too negative.

	Messages	Channels	Tone of voice
Ms Shivani Maharaj **AB In Bev**	• Tax rebates for big business to drive them to do more and move quicker from a legislation perspective • Fine people that waste water (positive reinforcement)	• Social and mainstream media • Radio and TV • Community newspapers • Use big brands to run campaigns and drive messages, e.g. Black Label's campaign about domestic abuse • Sport teams	• Municipalities need scare tactics • Business: serious and to the point • General public: a positive message. It can be done. • 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. • Communities and farmers: encouraging and inspiring; Madiba type of message
Ms Ritva Muhlbauer **Anglo Coal**	• From the mining perspective, you need to talk to the Mine water co-ordination body as well. There's Carla Hudson (programme director from the NEPAD Business Foundation in Sandton) that can give a general coal mining overview. 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. • 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.	Social media… but I am of the older generation, I read articles in the newspaper and online.	• A positive tone • 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. • You need to tailor it for different audiences. • If you're addressing someone that concerned about the impact, like industry and farmers, you need to be more serious.