SPRING PROTECTION GUIDE & TOOLKIT

A Grassroots Approach To Spring Protection In Rural South Africa

UMZIMVUBU CATCHMENT PARTNERSHIP

doing more together since 2013

ACKNOWLEDGEMENTS

This document is a compendium of experiences, processes, and lessons learned in efforts to protect freshwater springs in the Eastern Cape province of South Africa. Thanks to the collaboration of partners in the Umzimvubu Catchment Partnership, the region's springs are starting to be sustainably managed and serve as a climate resilient water supply that supports the health of people and nature in rural areas.

ABOUT UMZIMVUBU CATCHMENT PARTNERSHIP

The Umzimvubu Catchment Partnership (UCP), formalised in 2013, aims to conserve the full extent of Umzimvubu River system (from source to sea) through the sustainable restoration and maintenance of the catchment area in a manner that supports economic development and job creation for local people and enhances flow of benefits from ecosystem goods and services to people and nature.
www.umzimvubu.org

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CITATION

Rose, C., Mojela, M. S., Msomi, T., Matandela., F. and McLeod., N. (2021), A grassroots approach to spring protection in rural South Africa. South Africa: UCP.

This publication would not have been possible without the contributions from members of the UCP. Contributions include lessons learned from long days in the field, participation in online workshops and document review. The lead authors would like to acknowledge and thank:

Rosanne Stanway, Perushan Rajah, Silindile Mtshali, Nompumelelo Tenza, Alice Barlow-Zambodla, and Sarshen Scorgie (Conservation South Africa)
Chris Jackson (Lima Rural Development Foundation)
Joyce Loza and Xolani Sibiya (Maloti Drakensberg Transfrontier Programme)
Dr Lara Jordan (Endangered Wildlife Trust / International Crane Foundation Partnership)
Dr Bennie van der Waal (Tsitsa Project and Catchment Research Group, Rhodes University)
Pamela Sekese (World Wide Fund for Nature)

We are grateful to the US Agency for International Development and Africa Biodiversity Collaborative Group (ABCG) for their contributions to the integrated Freshwater Conservation and WASH resources underpinning this guide, lessons learned process and the development of this guide. We also thank the Pisces Foundation, GF (a private donor), and the World Wildlife Fund (WWF) for guidance and support for this important conservation and human well-being work.

DESIGN

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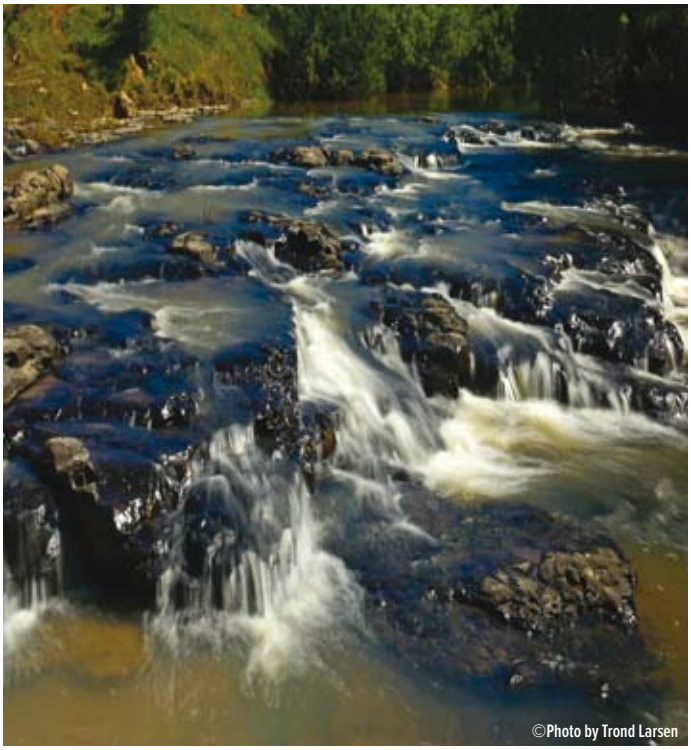

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ACRONYMS

ANDM	– Alfred Nzo District Municipality
CA	– Conservation Agreement
CBA	– Critical Biodiversity Area
CBOs	– Community-based Organisation
CI	– Conservation International
CSA	– Conservation South Africa
DEA	– Department of Environmental Affairs
DFFE	– Department of Forestry, Fisheries and the Environment
DEMF	– District Environmental Management Forum
DM	– District Municipality
DWS	– Department of Water and Sanitation
EA	– Environmental Authorisation
EbA	– Ecosystem-based Adaptation
ECA	– Environment Conservation Act
EIA	– Environmental Impact Assessment
ERS	– Environmental and Rural Solutions
IAP	– Invasive Alien Plant
IDMS	– Infrastructure Development and Municipal Services
IDP	– Integrated Development Planning (local government)
LM	– Local Municipality
MoU	– Memorandum of Understanding
NEMA	– National Environmental Management Act
NGO	– Non-Government Organisation
ODK	– Open Data Kit
PPE	– Personal Protective Equipment
PMU	– Project Management Unit
POPI Act	– Protection of Personal Information Act
SDG	– Sustainable Development Goals
SWSA	– Strategic Water Source Area
UCP	– Umzimvubu Catchment Partnership
WASH	– Water, Sanitation and Hygiene
WCDM	– Water Conservation Demand Management
WiW	– WASH in Watersheds
WSA	– Water Services Authority
WSP	– Water Services Provision
WWF	– World Wildlife Fund

EXECUTIVE SUMMARY

Water security is a global challenge that affects the sustainably of freshwater resources that we all rely on to live. It is understandable that one might wonder why, given that 70% of our planet is covered in water, but only 3% of this is freshwater that we can drink, bathe in and irrigate with. South Africa is acknowledged as a water scarce country, and rural communities are particularly impacted by the changes in weather and extreme events brought about by climate change. This is a crisis that affects millions of people, particularly those living in the country's communal landscapes where there is little access to productive, clean, natural water sources. It is estimated that South Africa faces a R33bn funding gap[1] to achieve water security in the country.

In the highlands of the Eastern Cape, KwaZulu Natal, Limpopo and Mpumalanga many communities live in water rich mountainous areas that form part of the Strategic Water Source Areas (SWSA) of the country. These regions typically have abundant fresh water in the form of seeps, springs and streams - yet communities lack access to safe, clean potable water in their homes. This lack of access is exacerbated by flooding or drought events, waterborne diseases and the increasing numbers of invasive alien plants (IAPs). IAPs are intensive water consumers that reduce the country's mean annual runoff by 1,4 billion cubic metres a year[2].

Despite steps already taken to address this water deficit, the nationally mandated Water Services Authority (WSA) is still faced with the enormous task of providing potable water to all South African citizens. Integrating natural water sources such as protected springs to existing municipal infrastructure, provides a low-cost development opportunity that has a high environmental impact. In addition, it helps government to deliver on its water services mandate and encourages collaboration between environmental organisations and the WSA. Furthermore, this process integrates natural resource management with water services management and creates an opportunity to improve water health and hygiene.

While government has traditionally focused on large infrastructure solutions, e.g. dams, recent efforts to implement Ecosystem based Adaptation (EbA) by restoring natural springs has led to resilience of nature and the people who rely on that water. It also links nature-based solutions with engineered solutions in the face of a changing climate. Of paramount importance as part of this process is creating awareness and building resilience within these communities to enable them to manage their natural resources to sustain life and livelihoods for themselves and for future generations.

This guide presents experiences from the Umzimvubu Catchment in the Eastern Cape of South Africa. These experiences have led to the protection of 25 springs, employment opportunities for 42 people and a sustainable supply of water to 16 villages in the region. It shares the context, our processes, lessons learned, resources and references for organisations and WSA interested in replicating this process. It is hoped that other organisations, committed to creating a water secure future, will find this information useful and will share their own lessons and implementation experiences with the Umzimvubu Catchment Partnership (UCP). This manual is a living document that will continue to be updated as new lessons and tools are tried and tested over time.

Info

ABOUT THIS GUIDE

The purpose of this guide is to share experiences and lessons from conducting rural spring protection work in the Eastern Cape region of South Africa. This guide seeks to:

1 Provide guidance on working with communities to implement spring protection measures to optimise water access in remote rural villages.

2 Increase awareness of human behaviour with regards to natural resources and the impact of that behaviour on the health of the environment, climate change adaptation, livestock, and people.

3 Set guidelines for partners to replicate the approach used by UCP.

4 Outline how civil society and community can work in a collaborative manner to support the local WSA and complement its work.

The aim is to complement the recognised water authority's mandated efforts to provide potable water to all citizens, through securing existing spring-fed village supply sources with local maintenance. This guide is not a 'recipe' for conducting spring protection activities but rather aims to guide the reader through the process using a loose project management approach. In addition, it provides contextual information for those who might be less familiar with this approach and presents information and resources to be considered at various points in the process where key decisions need to be made.

The material presented here has been gathered in the high altitude grasslands and middle regions of the Eastern Cape Drakensberg in the Alfred Nzo District Municipality (ANDM) around the towns of Mount Ayliff and Matatiele. The upper part of the catchment borders Lesotho and forms the watershed of the Umzimvubu Catchment. On the South African side the watershed is currently undergoing a declaration process to form the Maloti Thaba Tsa Metsi Protected Environment, driven by seven Traditional Authorities. It is supported by the UCP and various authorities including the ANDM, Matatiele and Umzimvubu Local Municipalities, Eastern Cape Parks and Tourism, SANParks, together with the Departments of Economic Development, Forestry, Fisheries and Environment, Water and Sanitation and Rural Development and Land Reform.

This guide includes steps taken from the inception of spring protection activities in this region in late 2015 and which continue today. It outlines the steps taken and recommends alternatives that can make implementation more effective. Lessons learned are included and it is hoped that this material will provide answers to some of the questions that may arise when approaching such a project. It also provides options to be considered when decisions need to be made.

ASSUMPTIONS

Some important assumptions have been made on behalf of the reader or organisation interested in using this guide, and they include the following:

Assumption 1 *The organisation is already established and is operating within a rural setting.*

Assumption 2 *The organisation has an environmental and/or development focus.*

Assumption 3 *The organisation has the necessary capacity and technical competencies to conduct this work.*

Assumption 4 *The organisation has an existing relationship with members of the community, the community leadership and the municipality, and that there is an established level of trust.*

Assumption 5 *The organisation is responding to a need voiced by the community (and not in its own interests).*

Assumption 6 *The organisation has a level of local knowledge and awareness of the challenges facing the community.*

DISCLAIMER

There is no one-size-fits-all approach to spring protection, and this resource is intended to serve only as a guideline.

Individual experiences may differ between communities and springs.

It is important that decisions that need to be made are well-informed.

It is necessary to take anything mentioned here with a degree of variability and adapt it to suit the specific demands and needs in each site.

These assumptions are important as this process requires credibility and trust between the implementing organisation and the community. A reasonably good knowledge of the area, its environmental strengths and challenges, and access to local knowledge, helps to grease the wheels of any process.

This guide includes experiences and lessons learned by members of the UCP, specifically Conservation South Africa (CSA), Lima and Environmental and Rural Solutions (ERS) working across different geographical areas within the catchment. It has been designed with non-governmental organisations (NGOs), Community Based Organisations (CBOs) and other implementing agents in mind. The value of this guide will therefore be its applicability to similar geographic areas and river catchments where reliable natural springs are found.

BACKGROUND

Basic water supply for South Africans

25L
Per Person

98%
Service Reliability

10L/s
Flow Rate

200M
From Household

Between 2002 and 2015 the United Nations has put in place a variety of actions and resolutions that prioritise the rights of people to affordable water. These rights are recognized as basic human rights that 'ensure availability and sustainable management of water and sanitation for all'. They are enshrined in the United Nations (2015) Sustainable Development Goals (SDG) 6.

In South Africa, access to "sufficient food and water" is a Constitutional right outlined in the Bill of Rights (1996) in Chapter 2, 27, 1.b. The Reconstruction and Development Programme (RDP) made provision for all South Africans to have equitable, sustainable, and efficient access to water for their basic needs, including drinking, cooking, personal and household hygiene. Whilst rural areas have received investment in water infrastructure that improved water access, many rural communities are unable to pay for the newly installed water services. In 2000, the Free Basic Services Policy was announced making provision for 6 kilolitres of free municipal water per household per month (Department of Water Affairs and Forestry, 2004b).

However, even in 2021, there are many rural villages in South Africa that still do not have reliable access to clean water through municipal service provision. This situation necessitates communities to make use of the ecosystem services provided by their natural environment. The challenge of obtaining an adequate supply of water for life and livelihoods has resulted in many communities using informal sources such as local springs or rivers for their water needs. However, there are risks associated with these unprotected sources as they can become compromised by poor water hygiene practices, overuse, contamination, or damage to their structural integrity. These risks may be increased by climate change, with increasing water borne diseases, droughts and other extreme events.

The Eastern Cape Drakensberg, of which the Umzimvubu Catchment forms part, has been identified as one of the SWSA in South Africa (WWF-SA, 2013).

The catchment and river system lie along the northern boundary of the Eastern Cape and extend over 200km from its source in the Maloti-Drakensberg mountains through the Eastern Cape Drakensberg to its estuary at Port St Johns where it joins the Indian Ocean. This river catchment provides fertile ground for grasslands in its upper catchment, pockets of indigenous forests in the middle catchment and supports both formal and informal agriculture throughout. It covers more than two million hectares and comprises almost 70% communal land thus falling under both traditional leadership and municipal structures. Only 30% of this area is privately owned and used for commercial farming.

An awareness of the impacts of poor upstream planning on downstream users is also important. Water flows through landscapes and poor sanitation or management decisions upstream are felt by water users downstream. It is important to note that currently there is little or no benefit to a rural community for protecting and regulating the water resources in their area, beyond meeting their own needs. The water that flows downstream is used by domestic and industrial users in the cities but is degraded and contaminated by the time it reaches the end user. This inequality in the governance structure affects the long and short-term sustainability of the ecosystem services that are essential for life. Regulation in upstream areas will positively impact the ability of downstream users to cope with the water related impacts of climate change and to better manage their water needs.

The UCP formalised in 2013, aims to conserve the full extent of Umzimvubu River system (from source to sea). It does this through the sustainable restoration and maintenance of the catchment area in a manner that supports economic development and job creation for local people, and enhances flow of benefits from ecosystem goods and services to people and nature,

In 2015, CSA expanded its rangeland management and alien plant clearing activities to include restoring and protecting spring sources within villages.

To follow the spring protection process the following seven steps are recommended:

This was under the WASH in Watersheds (WiW) approach designed in collaboration with Conservation International (CI).

WASH is an acronym referring to water, sanitation and hygiene and is a term that is used internationally. Work related to WASH is usually undertaken by development organisations rather than conservation organisations, through the provision of infrastructure to address the hygiene and sanitation deficiencies and through conducting behaviour change campaigns for improved hygiene practices. Therefore, there is opportunity for collaboration and integration of these activities for greater health and environmental benefits and impact within rural communities.

More recently, spring protection has taken place in the upper catchment as part of the watershed stewardship effort by ERS, supported by WWF in the SWSAs. This too has involved alien plant clearing and rangeland restoration within a wider framework of enhancing the good landscape governance that underpins improved livelihoods.

This is the premise of the WASH in Watersheds approach, that through the integration of freshwater conservation and WASH activities, communities will engage and be empowered as land and water stewards to protect their health and the health of the ecosystems that sustain them. Through this heightened awareness there will be conservation, and human health and well-being benefits that contribute to building the resilience of communities to the impacts of climate change.

For this to work, it is essential that the critical links between the health of the environment and the health of people and their livestock is well understood in communities. Understanding the role of the hydrological or water cycle creates a foundation for addressing the importance of caring for their natural resources and maintaining the available ecosystem services. Through protecting these resources, communities have an opportunity for increased adaptation in the face of climate changes. Water is an essential resource for sustaining life and having an adequate supply of clean and safe water has become one of the most basic human rights observed all over the world.

The absence of reliable water access and related challenges around meeting this basic human right was further accentuated by the COVID-19 pandemic. One of the simplest recommendations to prevent the spread of the virus was to wash your hands properly using soap and water for 20 seconds. This perceived ‘simple act’ increased the spotlight on existing failures in meeting this human right.

The upper reaches of the Umzimvubu Catchment are home to many communities who rely on natural resources for their water and livelihoods. There are plentiful springs in this area, some are flowing strongly, while others have been negatively impacted by the presence of alien plants, erosion, overuse and pollution. Spring protection offers a low-cost opportunity with high environmental impact to complement the work of the municipality by providing access to water to remote rural communities. It also creates opportunity to reinforce and embed simple WASH activities whilst building the resilience of communities to climate change.

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1 Engage

STAKEHOLDER ENGAGEMENT

Any organisation or individual involved in community-based operations will be familiar with formal and informal stakeholder engagement processes and protocols, and will know that this is a critical, ongoing, and multi-step process.

'Stakeholders' are a broad and sweeping category of people and organisations who need to be included in this process. It is also important that you are clear on how stakeholders are viewed, as this will assist in defining your relationships from the start. It must be clear that you want to work with identified stakeholders because their important role in this regard is recognised. Defining the stakeholders and conducting some analysis is helpful to frame the work and identify key groups to involve in the project.

1.1. STAKEHOLDER IDENTIFICATION

Who Is A Stakeholder?

A stakeholder is either an individual, group or organisation who is impacted by the outcome of a project. They have an interest in the success of the project and can be within or outside the organisation that is sponsoring the project. Stakeholders can have a both a positive and a negative influence on the project.

Stakeholder Management: *The Ultimate Guide to Project Stakeholders (https://www.projectmanager.com/stakeholder-management)* (accessed 14 October 2020)

Stakeholders have influence or power over the activities. (Pfeiffer & Dunne, 2020).

As a starting point, it is necessary to first identify key stakeholders from within the immediate environment who are relevant to water use and water management, as well as those who may not be resident in the community but who will play a role or may influence the process, e.g. the municipality. Stakeholders should represent the diversity of the community (i.e., age, gender, livelihoods, and status) and its leadership, (i.e. traditional, local, or district level role players) as well as other organisations.

Possible key stakeholders may include:

- Traditional Authorities
- Ward councillor
- NGO partners
- Community members – consider if they are representative of gender and/or age groups in the community
- Municipality - local and district level
- Other NGOs or organisations operating in the area
- Others specific to your region

Stakeholders will start to understand and agree how they may be involved. This will assist in identifying whom to engage and when at various stages in the project, as well highlighting any other stakeholders who might also need to be involved. The following table provides a formal description of different stakeholder categories.

STAKEHOLDER CATEGORY	DESCRIPTION
USERS	The people who will directly benefit from the products and/or services of the project.
GOVERNANCE	The people or groups of people who have an interest in how things are managed on the project.
PROVIDERS	The individuals who actively participate in the work of the project.
INFLUENCERS	The people who can change the direction (positively or negatively) of the project.
DEPENDENTS	Those who want something from the project other than the planned final product or service.
SUSTAINERS	Groups responsible for supporting the product or service after the project is completed.

It is important not to 'box' stakeholders only according to these identified project management categories.

Stakeholders As Partners

"The core of excellent stakeholder engagement involves perceiving and engaging stakeholders as partners – not merely as users, targets, beneficiaries, or informants, from the get-go".

(Pfeiffer & Dunne, 2020).

Identifying a diverse group of stakeholders is crucial to the success of the project. The next step is to understand each stakeholder's level of interest in the project and how they can be approached to participate. Customizing your approach to each stakeholder group is important to explicitly acknowledge differences in the planning process.

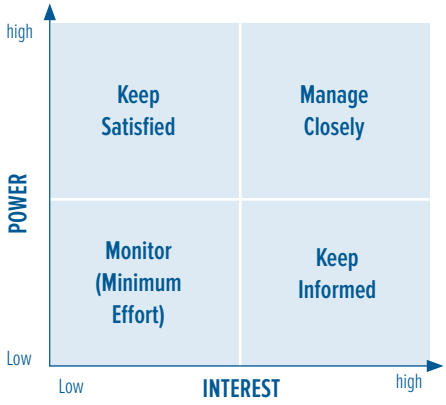
1.2. STAKEHOLDER ANALYSIS

The success of a project or intervention depends on stakeholder participation. Experience shows that when stakeholders are excluded or misunderstood, or are poorly engaged during a project, it can result in unexpected and undesirable outcomes.

The benefits of understanding stakeholders include having a:

- Clearer understanding of the individuals, groups and institutions that will be affected by project activities.
- Better indication of the capacities of stakeholders.
- More informed understanding of who could influence and contribute to the success of the project.

The Power/Interest Grid, adapted from Mendelow (1981) www.mindtools.com



The **first part** of the analysis process to establish a stakeholder's level of interest involves:

1. Exploring what stakeholders might gain or lose through the project
2. Investigating what resources they can commit
3. Understanding their expectations
4. Identifying stakeholder capacities and possible roles they could play

The **second part** necessitates understanding the influence of each stakeholder. This relates to their ability to make decisions, or to influence the project activities either positively or negatively. Are they likely to cooperate or clash with other stakeholders?

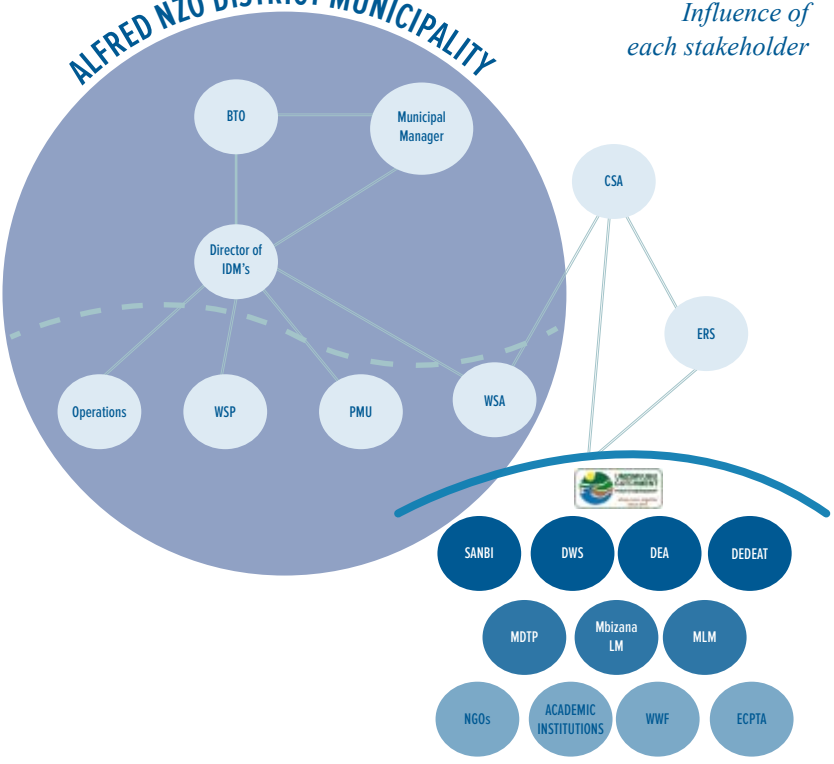
After stakeholder identification, a stakeholder matrix prioritises them according to their power over the project and their interest in it. Stakeholders are allocated a position on the grid according to their levels of power and interest. Their position on the grid then indicates the nature of the actions or steps needed to be taken with them.

Another way to map the analysis and to illustrate the relationship dynamics between groups is through a stakeholder mapping exercise such as the example illustrated here. This is a mapping process from the perspective of one (or a group of) stakeholder/s and is used to plot the nature of relationships between the stakeholders and how they may influence the project or each other. The size of the circle illustrates the amount of influence or power a stakeholder may be able to exert. The circles are placed relative to each other highlighting the closeness or strength of a relationship.

Detailed instructions of these two different participatory methodologies for stakeholder mapping can be found in the IRC Advocacy Strategy Workshop - Appendix 4.

INTEGRATED PLANNING

Understanding the Influence of each stakeholder



RESOURCES

More information on the Power / Interest grid is available at: https://bit.ly/3j2P17E (accessed 1 February 2021)

A similar methodology is the Alignment, Interest and Influence Matrix (AIIM) which is outlined in the IRC Advocacy Strategy Workshop Appendix 4. (Walter, Sorto, Edmond, Mercurio & Rozenburg, 2020).

Project DPro. (2020). Project Management for Development Professionals Guide (PMD Pro) 2nd Edition.

men and women have different roles related to water use

1.3. GENDER ROLES

When selecting key local stakeholders, it is important to consider that men and women have different roles related to water use. Women are primarily responsible for care work that occurs within the domain of the home, which includes cooking, cleaning, and caring for children and the elderly. Their high influence over water usage at household level means that they are generally more responsible for seeking and securing water resources. It is therefore critical that women are considered key stakeholders and are included in this process and in decision making from the start.

Water Use & Gender

A small sample gender analysis survey conducted in 2016 by CSA reflected that men and women have significant differences in how they use water daily. The report highlighted that overwhelmingly, women collect water for domestic household tasks that include bathing, drinking, cooking and irrigation/gardening. Whereas men typically use water to care for livestock and to make bricks to build houses. In communities, water is often accessed from different water sources that include a natural springs as well as community and municipal taps.

(Edmond, Kwayimani, Sorto & Ajroud, 2017)

Examples of Stakeholder Engagement Meetings

1.4. SUGGESTIONS FOR SUCCESSFUL MEETINGS

When preparing for and requesting meetings, the following points should be considered to ensure that you, as the implementing organisation, are adequately prepared and the right people are present.

- Be clear on the purpose of each meeting and communicate that to the participants.
- Understand how to approach the community and who to approach in the community, (gather information from known community members if appropriate).
- Prepare an agenda and the relevant information to be discussed at the meeting.
- Identify and communicate clearly who is to be invited – i.e., the leadership or gate keepers, the whole community, or an agreed core group.
- Dress code and etiquette.
- Understanding an observing of local cultural practices.
- Outline the desired next steps.

In each situation, once the target audience is identified, it will be important to consider a meeting time when those attendees are available. It may also be possible to present at an existing meeting when the targeted audience is already gathered. The planning and preparation will be determined by the purpose of the meeting, what is to be discussed and will help focus the process. It is important not to include too much information at one time.

Protocol generally dictates that comprehensive minutes of all meetings are taken and if this is not usual, it is strongly recommended that minutes are taken and made available to all who were present. This promotes accurate record keeping, and that decisions and concerns raised in the meetings are captured accurately, along with recommended actions and the responsible person. This ensures that everyone is on the same page. Attendance registers should be kept at every meeting too.

Important to remember ASSUMPTION #4

The organisation has an existing relationship with the community members and leaders and that there is an established level of trust.

REFER TO

1.3 Importance of Gender Roles
STEP 7 WASH Activities & Veld Sanitation

Important to remember ASSUMPTION #5

The spring protection work carried out by the members of UCP has grown out of the established and trusted relationships that exist with communities. This work was initiated following specific requests from the communities for assistance to secure reliable water sources.

RESOURCES

How to write concept notes - guide: https://bit.ly/37flimc

The **initial meeting** will be formal and is held with the community leadership which, depending on local norms, may be the Traditional Authority and/or the ward councillor. This introductory meeting is a critical part of the process. As discussed, it is assumed that the organisation is known to the community and that a relationship has already been established. At this meeting it would be appropriate to acknowledge the known challenges around water access and availability and to invite the community to be partners in the proposed process. The opportunity to establish a baseline assessment of existing water resources could be introduced, and then the subsequent process of feedback and decision making based on the outcome of this assessment. Introducing the links between hygiene and human health with the health of the livestock and the environment should be included.

There are likely to be several subsequent meetings before the process commences and additional tools, useful in gathering information for this process, are detailed below and in the Tools and References. The length of time from inception to action will depend on the nature of the relationship between the community and the organisation and how long and how well it has been established.

A concept note is a high-level summary of the proposed project activities. It is not generic, and it outlines the specific project details for a specific community. It contains a brief description of the project idea and the objectives to be pursued. It is presented to the stakeholders who can then determine if the project meets their approval. It is an opportunity for stakeholders to comment and make suggestions on the project. Ideally it should be researched and referenced appropriately.

1.5. THE STRUCTURE OF THE CONCEPT NOTE

- The Title – A concept note should include a title and a date. The title should be short while reflecting the overall idea of the project.
- Introduction or Background – This should state the problem to be addressed and the root causes. It also outlines the 'opportunity' for intervention to address the problem.
- Goal and Objectives – This is the long-term desired impact and the specific objectives, including timeframe. It is important to outline the specific types of goals, i.e. social and/or environmental goals here.
- Project Life Cycle - This is a summary of the different phases of the project and outlines the roles and responsibilities at the different stages. It will also highlight the decrease in responsibility for the implementing organisation and the increasing responsibility for the stakeholders as part of the sustainability plan. It should also include an estimated timeline and specific milestones that can be identified.
- Expected Results - This section briefly outlines the expected specific results of the project.
- Innovation - A separate section explaining the uniqueness of your project will be very useful.
- Budget - The last section of the concept note will be the budget. This will be an overview rather than a detailed analysis. Make note of the main items and any funding already secured.
- Comments and Responses - You should give the community an opportunity to comment and input into the project design at the onset to ensure inclusivity.

TOOL #1

Additional tools to better understand the community:

- Visioning
- Needs Assessment
- Skills Audit

Tools for commitment:

- Memorandum of Understanding (MoU)
- Conservation Agreement (CA)

Once permission is granted for the implementing organisation to conduct the village and household level assessments **(Refer to Step 3 - Assessments)**, it is anticipated that it will take 4-5 weeks to complete these comprehensive assessments, depending on the size of the village, and the number of people involved in data collection. Following these assessments, it is recommended that a community meeting be held to share the results. This meeting would involve all community members, and the information would be presented in a manner that highlights the current situation in a clear and concise manner. This process also allows for feedback from the community and can help to test whether the initial assessments were accurate.

This is an opportunity for the implementing organisation to reinforce that this process actively involves the community, and their ownership and participation is essential. The purpose of this project is water security, as this is needed by all community members for their health, their livelihoods, their livestock and agriculture.

1.6. MUNICIPAL ENGAGEMENT

In Umzimvubu Catchment, the ANDM is both the WSA and WSP and is responsible for service delivery, implementation and provision of adequate water and sanitation services to all communities within the region.

It is acknowledged that different municipalities are constructed differently and that the experience shared here may not be reflected exactly in another District. The Departments within the ANDM that were most relevant to our experience were the Infrastructure Development Municipal Services (IDMS) and Community Development Services. The roles of these departments have been outlined to assist other organisations to identify the similar departments within other municipalities.

The units within the IDMS and their functions and responsibilities are:

- Water Services Authority (WSA) – Project Planning & Compliance
- Project Management Unit (PMU) – Project Implementation & Social Facilitation
- Water Conservation Demand Management (WCDM) – Water Catchment Management & Demand
- Water Services Provision (WSP) – Water Infrastructure Operations and Maintenance

The ANDM also has a team of ‘Social Facilitators’ who are part of the IDMS. They are a team of communicators who visit a village ahead of a new campaign to briefly introduce the new ideas and to prepare the community for the new information or expected behaviour change intervention. Within Community Development Services, the Municipal Health Services and Disaster Management Unit may be useful.

TIPS TO CONSIDER

It is critical to have municipal involvement from the start of the project. As the WSA, the municipality can help to identify gaps in the system, unlock access to material and financial resources, strengthen the decision making process and contribute to a more integrated planning process.

It will be valuable to foster good relationships between the community and the municipality. This is important in all projects of this nature but especially where there has been a historical breakdown of trust between the community and the municipality. In addition, the municipality owns the existing infrastructure and would need to give consent for any enhancement to the systems.

1.7. COMMUNICATING WITH THE MUNICIPALITY

Communicating with the municipality can be conducted through either Administrative or Political Offices. The selection of the office depends on the type of message to be communicated.

If your approach is through the administration channel, then it will be either through the Office of Municipal Manager or a specific Technical Office. If you choose a political channel, then you would start with the Office of The Speaker as all official and political related communications are managed through the Speaker of Council.

Within each municipality there are various platforms where engagement can occur around the different activities and it is important to identify what options are available to your organisation. It is also critical to establish timeframes for responses and results as these may vary between municipalities.

UCP members have engaged with both district and local municipalities around the Municipal Integrated Development Planning (IDP) process. Other channels have included specific technical offices relevant to the issue at hand and the District Environment Management Forum (DEMF).

Benefits of municipal support and involvement:

- Opportunity to promote an integrated approach to water service provision.
- Opportunity to link natural water resources to municipal infrastructure.
- Opportunity to promote the restoration and protection of ecosystem services as a cost-effective green infrastructure development plan for government.
- Potential access to water testing and quality analysis.
- Potential access to material resources.
- Potential access to technical knowledge and skills.
- Opportunity to leverage approaches and lessons learned through implementation across the scale of the municipality's footprint.
- Accesses to legislative advice.

The development and use of an advocacy strategy has been beneficial and has helped to consolidate thoughts and actions around the desired outcomes. This was focussed on District Municipality level and a resource is included.

TIPS TO CONSIDER

Hosting site visits at the springs for municipal colleagues and the community is important for all parties to meet each other. This process also helps to build trust and provides concrete examples and experiences for the municipality and the community to consider as they plan.

It also creates opportunities to unlock access to municipal knowledge and skills through the involvement of an Area Manager who is familiar with the existing infrastructure and pipelines.

RESOURCES

Walter, Sorto, Edmond, Mercurio and Rozenburg (2020) Freshwater Conservation and WASH Advocacy Strategy Workshop – Facilitators Guide. Washington DC: Africa Biodiversity Collaborative Group and IRC (June 2020): https://bit.ly/3ykWIMY

2 Consider

RISK MANAGEMENT & SUSTAINABILITY

Risk is important to consider at the start of any project. Risk is the potential effect of uncertainty on the project activities, outputs, and outcomes. A risk event is something that may happen. Is something that could prevent the success of the project, a possibility? (Project, DPro, 2020)

A comprehensive approach to risk management involves the following steps:

2.1 Identifying Risks
2.2 Categorising Risks
2.3 Assessing the Impact and Probability of Risk
2.4 Developing Risk Response Strategies
2.5 Monitoring and Controlling Risks

2.1. IDENTIFYING RISKS

There are two key ideas related to risk that need to be considered and explored:

Probability – i.e. risk that is related to the probability of uncertain future events.
Impact – i.e. risk that has the potential to impact the project.

Possible risks identified through these experiences include:

- Risk of providing access to water that may be unsafe for human consumption
- Lack of clarity about ownership – long term maintenance issues
- Risk of contamination from ground water, permeable geology or soils
- Risk of flooding to the spring site
- Risk of drowning
- Risk of vandalism
- Risk of damage to spring source through project intervention (with possible cultural implications, possible loss of water or damage due to poor construction practices)

2.2. CATEGORISING RISKS

A Risk Assessment is the process of quantifying the risks identified. It addresses two difficult challenges:

- **Prioritising Risks:** Using criteria agreed upon by the project team and key stakeholders, risks are ranked according to their probability and impact.
- **Identifying Risk Tolerances:** where the project team works with key stakeholders to identify which risks are acceptable, and which need to be actively managed.

2.3. ASSESSING THE IMPACT AND PROBABILITY OF RISK

To be able to respond to a risk, it is important to understand how serious the risk will be and what impact it will have on the project. Be specific in the risk statement and clearly state the impact it will have on all aspects of the project. By being specific, a suitable response strategy can be developed to reduce the probability of it occurring or reduce the impact that it may have.

2.4. DEVELOPING RISK RESPONSE STRATEGIES

Risk identification and assessment form the basis for sound risk response options. It is important to be aware that it is not possible to eliminate all risks. It is also important to remember that risks may change over time, and so need to be regularly reviewed and assessed according to their probability and impact. It is therefore necessary to review and update the response strategies to ensure they remain relevant to the context and type of risk.

If the project decides to actively manage a risk, response strategies may include the following (separately or in combination):

- Risk Avoidance – Do not do (or do in a different way) a part of the project that carries.
- High-impact and/or a high probability of risk. For example, you may choose not to work in.
- A specific area because it is politically unstable.
- Risk Transference – Shift (or share) the risk for some aspect of the project to (or with) another party.
- A common example of risk transference is insurance.
- Risk Mitigation – Act to reduce the probability and/or impact of a potential risk.
- Risk Acceptance – If the perceived risk probability and impact are assessed as reasonable, the organisation may choose not to act.

TIPS TO CONSIDER

When work is due to start on a spring, there are often community concerns regarding the impact of the work on the water flow.

This may reflect cultural or spiritual beliefs about the impact of interfering with the eye of the spring in such a way that the water might disappear.

These concerns need to be discussed openly with the stakeholders as part of the risk assessment to ensure that everyone shares a common understanding from the start and are included in any mitigation measures.

2.5. MONITORING AND CONTROLLING RISKS

Risks must not go unrecognised or ignored. Where a risk is accepted, it must be regularly monitored. The decision to accept the risk is based on a process of identification, assessment, and response. Thereafter, a plan of action must be created for the risk response activities chosen. Every risk management plan should be documented.

As the project evolves, some risks will be resolved or diminished, while others may surface and will need to be added to the list. It is important to continually revisit the question of risk from the start of the project and throughout the implementation.

Below is a generic format for a risk register.

RISK NAME	PROBABILITY	IMPACT	RISK SCORE	RESPONSE STRATEGY	RESPONSIBLE PERSON

Risk Register

RESOURCES

Project DPro. (2020) Project Management for Development Professionals Guide (PMD Pro) 2nd Edition, 2020

OPTION 1

This model is handed over in entirety to the DM to manage and implement, and all procurement and implementation is the responsibility of the DM.
This places the responsibility firmly with the provincial DM and the Department of Water and Sanitation (DWS) and creates an opportunity for these services to be provided in a coordinated and seamless manner by one service provider.
The immediate disadvantage of this is that the DM processes can be cumbersome and time consuming and their backlogs of water service provision are often high.

OPTION 2

Civil society leads the delivery process under the mandate and blessing of the DM. The implementation is therefore funded and carried out by civil society groups and NGOs with the blessing of the DM and DWS. This option has the potential to provide quick results as NGOs are generally more agile and flexible than their municipal counterparts and can therefore respond quickly to the need and address it. This is, however, unsustainable as it is dependent on donor funding and to some extent removes the responsibility from the DM for water service provision which it is mandated to provide.

OPTION 3

The DM provides funding to civil society partners to deliver and implement this model. This is made possible through a Memorandum of Understanding (MoU) and has the support of different departments in the Infrastructure Development Municipal Services (PMU, WSA, WSP etc.). As with all MoUs, good governance and clear responsibilities would need to be in place with regular checks and balances and audit requirements to ensure that these systems were adhered to.

Embedding Long Term Maintenance And Advocacy

One way to manage risk and encourage independence and sustainability of a project would be to educate and create local advocates within the community and its leadership. In some villages a water board was established, in others the traditional leadership retained that role and in others, it fell to interested or concerned community members. There are several ways to do this:

A) Information sharing of legislation and community water access rights.
This enables the community to have informed, strong voices when raising issues with the municipality and to know that they have a legitimate demand. Where there are existing governance structures such as municipal rural water operators it is important to recognise and engage such resources.

EG.

The municipality provides the water testing service, it is important that the community or the leader can exert pressure to ensure that the water ***is*** tested. This process could also be linked to health clinics and concerns can then be flagged through two systems – Health and Infrastructure.

B) Training community members in citizen science activities
This empowers the community to identify and address problems themselves when they discover discrepancies in their water supply.

Empowering communities with information that enables them to make informed decisions and legitimate demands, also allows them to negotiate and advocate results for themselves.

Sustainability

It is important to start with the end in mind and to consider the long-term sustainability of the project. This section has been included as part of stakeholder engagement and positioned close to the section related to municipal engagement as they are ideally closely aligned.

While this 'model' provides immediate and short-term solutions, you must look at the longer-term sustainability of this water supply and its maintenance. This is also important when risks such as climate change have been identified.

Fostering strong links to the municipality are critical for the sustainability of this work. While these activities can occur without their participation, in the long term it is better if they can be achieved together, with clear accountability and role clarification for the management of these sites. There are no 'best practice' options and there may be other options that have not been included here. Three options are suggested for consideration.

REFER TO:
STEP 6: WASH Activities & Veld Sanitation

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3 Analyse

ASSESSMENT

Before starting a project of this nature, it is important to have a good understanding of the context of where you want to focus your efforts.

The process of gathering information is critical to ensure that the expressed needs of the community are addressed appropriately. Once the scope of the project is agreed, the implementing organisation in collaboration with local community representatives can conduct assessments and gather information relevant to the project.

These assessments include:

- 3.1 High level assessment
- 3.2 Legal framework review
- 3.3 Village level assessment
- 3.4 Household level assessment
- 3.5 Spring site assessment or hydrocensus
- 3.6 Water quality assessment

A project level baseline assessment provides a critical reference point for assessing changes and impact, as it establishes a basis for comparing the situation before and after an intervention, and for making inferences as to the effectiveness of the intervention. It provides information and data, can establish knowledge or awareness levels and provides context.

Qualitative and quantitative data must be collected during this process as both are important for the monitoring process. There are important differences between these data types and they both provide valuable contributions to this process.

QUANTITATIVE DATA is information about amounts and can thus be counted, measured and expressed using numbers. These data collection methods are more structured. They emphasize objective measurements and the analysis of data collected through questionnaires and surveys. Examples include water flow, oxygen levels, conductivity, turbidity, rainfall, temperature, indicator organisms etc.

QUALITATIVE DATA is descriptive, and documents that which can be observed but not measured, such as language. It is descriptive and conceptual and can be categorized based on traits and characteristics. Qualitative data collection methods include unstructured and semi-structured techniques such as focus groups, individual interviews, and observations. Examples include the spring name, whether it is seasonal or perennial, fenced or open, the presence of a latrine or livestock kraal above or near the spring, the presence, and density of IAPs around the spring etc.

Once the informal scoping of the village and its surrounds has taken place and there is a sense that the environment will support spring protection activities, a project level baseline assessment can be undertaken to ensure a sound understanding of the existing water-related situation in the region. This initial assessment can be conducted to ensure that a comprehensive view is obtained at both micro and macro levels and includes awareness of any planned municipal infrastructure and any potential backlogs.

3.1. HIGH LEVEL ASSESSMENT

A high-level assessment will involve a desktop review of existing policy and research reports. These provide information that assists in understanding the natural biodiversity of the region, available water sources, risks to water sources, water quality as well as municipal supply and other water interventions. This also provides context and a framework of what is planned in the area and thus helps to identify any potential areas of conflict.

This high-level information can be sourced from documents such as:

- Local and district municipal IDPs - *Municipalities of South Africa* - *www.municipalities.co.za.*
- District level climate change response plans, indicators, and district level data - *Lets Respond Toolkit* - *http://www.letsrespondtoolkit.org/municipalities.*
- Climate change vulnerability assessment tool- *Let's Respond Tookit* - *http://www.letsrespondtoolkit.org/vulnerability-assessment.*
- National water sector climate change indicators - *National Department of Environmental Affairs Climate Change Portal* – *http://environmental-impact.org.za/site/projects/climate-change-case-studies/.*
- *National Water Resources Strategy (NWRS)* - *https://bit.ly/3iaek8y.*
- District level health information - *District Health Barometer* - *https://www.hst.org.za/publications/Pages/HSTDistrictHealthBarometer.aspx.*

3.2. LEGAL FRAMEWORK

An awareness of the national legislation related to activities of this nature is important and each organisation needs to determine the necessary parameters for their intended activities. As with municipal processes it is important to bear in mind that timeframes for results may vary between provinces too and that this needs to be clearly understood and considered in the planning process.

Below are links to the relevant regulations that guide these activities and/ interventions:

- Objectives, interventions, and outcomes to enable the country to meet its obligations under the Paris Agreement, and implement the National Development Plan 2030 (NDP) vision of creating a low-carbon, climate resilient economy and a just society, with a focus on adaptation to climate change. *https://bit.ly/3j6o8ja*

WHAT IS AN EIA?

The Convention on Biological Diversity (2010) defines an Environmental Impact Assessment (EIA) as a process of evaluating the likely environmental impacts of a proposed project or development, considering inter-related socio-economic, cultural and human-health impacts, both beneficial and adverse.

- *South Africa's National Climate Change Adaptation Strategy (NCCAS)* outlines objectives, interventions, and outcomes to enable the country to meet its obligations under the Paris Agreement, and implement the National Development Plan 2030 (NDP) vision of creating a low-carbon, climate resilient economy and a just society, with a focus on adaptation to climate change. *https://bit.ly/3xfF5Na*
- The framework for the sustainable management and protection of the environment is provided by the National Environmental Management Act (NEMA) (Act no. 107 of 1998). *https://bit.ly/3ifcF1m* **OR** *https://bit.ly/3fjzkI3*
- The framework for the protection of water resources is provided by the *National Water Policy White Paper (DWAF, 1997) https://bit.ly/3ij5Mwd* and the National Water Act (NWA) (Act No. 36 of 1998). *https://bit.ly/3jdbL4K.*
- The Environmental Impact Assessment (EIA) process is guided by the GNR326 EIA regulations (2017) *https://bit.ly/2WKrBwf* promulgated in terms of NEMA (Act No. 108 of 1998).
- In Terms of the Municipal Systems Act (Act No. 32 of 2000) it is important for municipalities to go through an Integrated Development Plan (IDP) process to prepare a strategic development plan for their areas of jurisdiction. The IDP process, specifically the Spatial Development Framework component, shall be based on a bioregional planning approach, which is meant to achieve continuity in landscape and to maintain important natural areas and ecological processes.

Environmental Impact Assessment (EIA)

In South Africa, an EIA became a legal requirement in 1997 with the promulgation of regulations under the Environment Conservation Act (Act 73 of 1989) (ECA). The EIA regulations under the ECA were repealed but continue to apply to applications started before the new regulations came into effect.

The Amendment to the EIA regulations (2014), published in the Government Gazette, No. 40772 on 7 April 2017, defines an environmental impact assessment as 'a systematic process of identifying, assessing and reporting environmental impacts associated with an activity and includes basic assessment and Scoping and Environmental Impact Reporting (S&EIR).' It is therefore a process by which the environmental consequences of a proposed activity or project are evaluated, and alternatives are analysed.

NEMA also calls for a 'Duty of Care' to ensure that any development is responsibly undertaken and not implemented at/to the detriment of the surroundings or stakeholders, both now or in the future.

NB.

While a formal EIA is not required for most spring protection work as the activity is below NEMA regulations threshold, it is important to check the footprint size in the regulations to confirm this as each spring site will be different.

In Critical Biodiversity Areas (CBAs), which are defined for specific geographic areas, there are more stringent thresholds for developments, which are listed according to provinces, and define the 'triggers' for requiring an Environmental Authorisation (EA). In general, any spring protection work which infills or removes less than 10m^3 will not require an environmental assessment.

RESOURCES

NEMA Guidelines - https://bit.ly/3xc0yq8
http://www.dwa.gov.za/Projects/WARMS/
e-WULAAS - Authorisation Process: https://www.dws.gov.za/ewulaas/WUA.aspx

The National Water Act (Act 36 of 1998) requires water users to register their water use with the department as outlined in the Registration Guide: Raw Water Related Water Uses. A guide for the registration of Raw Water Use information under the National Water Act, (Act 36 of 1998). If you are partnering with the municipality, they can assist with this.

Spring protection activities can be considered as relief or emergency water provision to provide rural communities with reliable water access. As such they fall under Schedule One under 'water taken for reasonable domestic use in a person's household from any source'. This is true if the project remains at a small scale and the water is not accessed for commercial benefit.

Generally, water licensing related to springs has not been undertaken or registered. However, information and data about springs gathered through activities such as those described in this guide, provides valuable information to the DWS that supports their long-term monitoring of the ecological reserve. The actual registration process is under discussion, but the intention is to provide DWS, as the national water sector regulator, with basic information on the protected springs, including location, flow, quality, number of households supplied, threats and basic protection completed.

REFER TO:
STEP 2:
Risk Management & Sustainability

To cultivate water stewardship at community level and promote long term sustainability, Traditional Authorities need to be made aware of the relevant legislation around water use. This is to encourage the development of greater independence for them within the process.

The following assessments described in 3.3 and 3.4 provide useful information to the implementing organisation regarding the resources available and accessible to the village, and information around the usage patterns and perception of water by the community members. This information may already be known to the implementing organisation but it is useful to provide the context of the issue. When collecting personal information from community members, it is important to be aware of the Protection of Personal Information Act (POPI Act) and the principles of Free, Prior informed Consent or FPIC.

TOOL #3
Village Data Template

3.3. VILLAGE LEVEL ASSESSMENT

The next step would be an engagement with leaders and key decision makers within the community. **This meeting introduces a village level assessment which focuses on demographics, resources, services, and facilities available to their community.** This information may be gathered from the Traditional Authorities and/or the Ward Councillor (possibly in separate meetings).

TOOL #4
Water focused Household Survey

3.4. HOUSEHOLD ASSESSMENT

This assessment aims to gain a clear understanding of the situation on the ground at a household level related to water security and use. **This information provides insight into the context for individual households and enables decisions regarding the prioritising and selection of springs to be both informed and equitable.**

Essentially, this information includes the nature of existing water provision, its reliability, location of water collected by each household, state of existing infrastructure, sanitation facilities and water usage patterns. It also asks basic questions related to knowledge around personal, household, and environmental hygiene.

3.5. SPRING SITE ASSESSMENT OR HYDROCENSUS

This assessment is arguably one of the most important steps in spring protection and will be informed by earlier levels of assessment.
The aim is to identify springs whose protection will undoubtedly yield the greatest benefit to the community.

The reality is that there will be several springs in a community, but some will be better suited for protection than others. A thorough audit of the water resources and ecosystem services should be conducted together with representative community members to ensure local knowledge. It involves ongoing dialogue with community members.

This audit serves several purposes, primarily:

1. To identify sources of water available to the community.
2. To understand how the community utilises their water resources, (link to household assessment).
3. To identify existing challenges (if any) that the community has accessing water.
4. To identify potential solutions to water access challenges in the community.
5. To identify and understand the water quality status of proposed protection sites
6. To help gauge the required intervention against the implementing organisations capability.
7. To help gauge potential outcomes resulting from the intervention.
8. To identify spring catchment management needs.

An audit of local water sources will take time to complete thoroughly and will require long walks. It is critical that all known springs and water sources are included, as this information combined with the technical inputs will substantiate information gathered in the household survey regarding different locations. This will enable priority springs to be identified.

The ideal spring will be one with strong evidence of use, acceptable water quality, with safe access for both protection and collection activities. Information can be collected on the ODK Collect or mWater apps or using the templates provided in **Tool 5**.

Feedback on the use of the free to operate mWater app has found it to be a streamlined, user-friendly experience. The recent hydrocensus conducted in the upper catchment across seven Traditional Authority areas by 20 youth Eco-champs used the mWater app to collect data and photographs of more than 300 spring sources. This process has enabled the app to be tested and refined. The app collates the data into an Excel spreadsheet for screening and sorting, and displays the locations spatially in Google Earth with linked information to the data for each spring site. This allows for detailed ranking according to parameters such as funding availability, community need, accessibility, etc.

ODK Collect is a similar open-source software for collecting, managing, and using data in resource-constrained environments. This offline, paperless data collection method allows users to collect data on mobile devices in remote communities with limited mobile connectivity. Users can obtain geolocation as well as upload pictures. Submission of the data to a server is achieved when Internet connectivity is available, but the app itself can be used without a mobile data connection. It runs on the Google Apps platform for a small US dollar fee. It is designed to monitor changes in the landscape, using specific environmental indicators, and can be used to measure variables such as temperature, rainfall, biomass, spring condition.

TIPS TO CONSIDER

When conducting a hydrocensus it is important not to look at springs alone as springs are often used concurrently with or in lieu of other sources. Depending on the state and capabilities of these other sources, choosing to protect a certain spring or group of springs may not always yield the best return on investment.

Understanding the prevailing trends in weather patterns provides additional context. Another source of information is the historical records section of the South African Weather Service website. Local data collected can be viewed quarterly or annually against climate impact such as changes in rainfall. *https://bit.ly/3xcOjtj.*

RESOURCES

Open Data KIt or ODK Collect
https://opendatakit.org/
mWater
https://www.mwater.co/surveyor.html

Experience shows that once the app is set up, and people are trained to use it, the information received has been timeous, accurate and consistent.

During implementation, all contributors found that the following resources were essential in gathering this information:

1 Local Community Water Committees Or Boards

As the residents and main beneficiaries, they know the landscape well and can provide local knowledge about the location of springs, usage patterns and seasonal history. They are also a rich source of information about other ecosystem services such as cultural practices that may have been impacted by lack of water.

2 Self-Verification

It is critical to independently verify the information obtained from the community. This will require revisiting some of the springs to ascertain that the information is accurate, to check flow rates and take **hydrogen sulphide (H_2S)** coliform samples.

H_2S

Hydrogen Sulphide

The presence of H_2S coliform bacteria in water samples indicates contamination by E Coli (or faecal bacteria).

TOOL #5 & #6

Hydrocensus Form

Hydrocensus Spring Source Database

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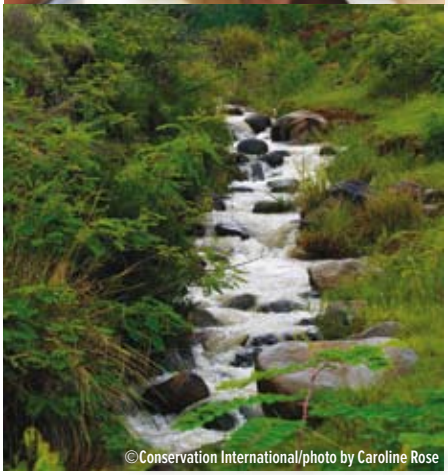

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3 GIS & Other Technology

One of the outcomes of the initial hydrocensus is to create a database of the springs, their locations and features. Plotting all the springs on mapping software like Google Maps helps to visualise the footprint of an individual spring and how the springs are interlinked. It can also be helpful in determining the locations of springs that may have been missed or other factors that may prove useful upstream.

These results should be integrated with the assessment findings and community recommendations gathered during the initial surveys. All this information is captured in the **Hydrocensus Spring Source Database** and can then be used to identify the priority springs for protection and help determine the best protection approach to be used at each site. Consideration of community recommendations ensures that the results address the actual, rather than the perceived needs of the residents.

3.6. WATER QUALITY ASSESSMENT

One of the main reasons that springs are protected is to limit the likelihood of contamination of the water source, and in so doing help provide users with safe drinking water. To this end, it is important that the water provisioned to communities through a certain spring is of an adequate quantity and quality. This water quality assessment should be done in parallel to the spring site assessment or hydrocensus. Both assessments inform decision making on which springs to protect to optimise results and minimise risk.

Every country in the world has its own rules and regulations that set the standard for what can be deemed as water of an acceptable drinking quality. In South Africa we use the SANS 241 standard *https://bit.ly/3y9q2pr.*

This standard requires the comparison of the physical, microbiological, chemical and aesthetic properties of a given water sample against specified limits to assess its fitness for use.

REFER TO:
STEP 6: WASH Activities & Veld Sanitation

In performing this quality test, the services of an accredited laboratory must be enlisted. An alternative means of assessing the quality can be the use of field test kits which are capable of providing a quicker overview of the given results at a cheaper cost. This convenience does come at a cost however, as the accuracy of the field tests is at times far less and they might require skilled personnel to run.

While the goal is to ensure compliance with the given regulatory standard in each area, this is not always possible given locally prevailing circumstances. What could be argued is more important is to ensure that the users of a given source of water, are fully informed on what the condition of their preferred water source is, and what implications (if any) that using its water will have on their wellbeing. Experience has shown that in most rural communities where springs are used heavily, microbiological contamination resulting from poor sanitation practices or livestock interactions is often the biggest quality concern.

In the initial stage of a water quality assessment, the table below can be used to determine what sources of contamination could prove problematic based on various pollution sources in an area. It is acknowledged that this table provides more pollution sources than you would expect to find in a rural area, but they are included for completeness.

POLLUTION SOURCE	TYPE OF CONTAMINANT
Agricultural Activity	nitrates; ammonium; pesticides; faecal organisms
In-situ Sanitation	nitrates; faecal organisms; trace synthetic hydrocarbons
Gasoline Filling Stations & Garages	benzene; other aromatic hydrocarbons; phenols; some halogenated hydrocarbons
Solid Waste Disposal	ammonium; salinity; some halogenated hydrocarbons; heavy metals
Metal Industries	trichloroethylene; tetrachloroethylene; other halogenated hydrocarbons; heavy metals; phenols; cyanide
Painting and Enamel Works	alkylbenzene; tetrachloroethylene; other halogenated hydrocarbons; metals; some aromatic hydrocarbons
Timber Industry	pentachlorophenol; some aromatic hydrocarbons
Dry Cleaning	trichloroethylene; tetrachloroethylene
Pesticide Manufacture	various halogenated hydrocarbons; phenols; arsenic
Sewage Sludge Disposal	nitrates; various halogenated hydrocarbons; lead; zinc
Leather Tanneries	chromium; various halogenated hydrocarbons; phenols
Oil and Gas Exploration/Extraction	salinity (sodium chloride); aromatic hydrocarbons
Metalliferous and Coal Mining	acidity; various heavy metals; iron; sulphates

Table: Common groundwater contaminants and associated pollution sources (Source GW-MATE Briefing Note Series, Note 8, 2002 – 2006)

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Once identified, consultation with industry experts and locals would then be the best way of assessing the risks from the contamination and identify applicable mitigation measures.

Possible Contamination Of Water From Materials Used In Formal Structures

Concerns can arise about polluting the water through the introduction of foreign material during protection efforts. While the possibility exists, the likelihood of contamination of water from materials used in structures is very low and is not a big concern. The reasons behind this are:

1. In most structures, a significant portion of the materials used are materials occurring naturally in the landscape i.e. rocks and sand and thus present no significant contamination threat to the water.
2. Where foreign substances are used, they are selected from materials developed specifically for water transport and storage applications.
3. While there could be concerns about some of the substances in the cement/ concrete mixture leaching into the water, this is only a concern in the first few days when the mixture has not yet cured. However, once it is stable there is little contamination risk.
4. The 'residence time' of the water (or how long the water spends in the chambers) in protected springs is small and generally does not allow for contamination.
5. One risk that may be incurred with both formal and informal structures is damage to the spring environment by project works. This can arise from a range of factors including poor trenching techniques or mixing of concrete on inadequately prepared surfaces. The result being that the environment suffers as a result. Ultimately, it is important to ensure that the correct legislation and protocol is followed during any project work, with the aim to keep any damage done to the environment at a minimum.

TOOL #6

Hydrocensus and Spring Source Database

3.7. SPRING SITE SELECTION

Once the Spring Source Database or spreadsheet has been produced from the hydrocensus using a mobile app, a list of priority springs can be identified. When the implementing party is confident in its ability to undertake the work, these options can be presented to the community leadership and governance structures. This meeting should include representatives of all stakeholder groups, as it is important that everyone is heard and informed of the findings. The meeting should include youth, community members of all genders, Traditional Authorities, ward councillors, and municipal representatives if they are to be involved going forward.

During the meeting, the results of the hydrocensus will be presented for discussion before decisions are made on which springs to protect. It is important that the most viable springs for protection from the implementer's perspective are considered alongside recommendations from the community. This way a meaningful intervention is guaranteed. If necessary, allow time for the community, with their leadership to decide on which springs to protect within the implementers stipulated constraints.

The meeting agenda should include:

1. Presentation of the hydrocensus results, detailing the characteristics of the identified priority springs, what is possible at each site and the anticipated impact, direct or indirect benefits for the community.

2. Discussion and question time to discuss the presentation should be allowed.
3. Discussion of other planned developments (if any) in the area that may interfere with protection efforts or spring functionality beyond project phase.
4. This hopefully will lead to agreement with the community of which sites are to be declared implementation sites and why.
5. It is necessary to outline what skills and resources (financial, labour, material) will be needed for the implementation, where they will come from and how they will be obtained.
6. The material and in-kind costs and responsibility of maintenance to be outlined and presented.

Again, all discussions and points raised in the meeting should be recorded in the minutes and shared with all stakeholders at the end of the day.
This ensures that there is no confusion later as to what was decided.

At this point, it will be important to highlight the approach and preparatory steps to be taken ahead of starting the work. This includes explaining the following points:

Scope Of Work

While this guide is focused predominantly on spring protection, it is likely that this work is undertaken with supplementary activities depending on the mandate of the implementing organisation or the funder. Common examples include the removal of alien vegetation, helping manage waste in the area, promoting good water, sanitation, and hygiene (WASH) practices. It is important to ensure early on that the community and leadership are informed and aware and will be able to play their role where required.

Timeframes

It is important that a reasonable estimate of the project timeframe is communicated with the community and all stakeholders. This is to allow the project activities to be coordinated and executed properly. It also assists where other stakeholders will be providing labour or material. It ensures that everyone is aware of what is required of them. This will help ensure the smooth running of the project. In our experience, once the meetings and engagements are completed, the project implementation time frame can vary between three and six weeks. However, this will also depend on other factors, for example the number of people involved in implementation, the weather, and the terrain.

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4 Plan

PREPARATION FOR INTERVENTION

Taking the time to plan ahead can help to identify possible delays or challenges that can derail progress on your project. Proper planning can help save time, money and reputation with your stakeholders. Do not underestimate the importance of this step.

Together with knowing the time frames for the project execution, it is important to know how these activities might disrupt the lives and activities of the community. For example, during the construction of an engineered spring the capability of the spring to deliver enough potable water might be temporarily affected, and alternative sources would need to be identified. It is therefore essential that the community is briefed well ahead of the disturbance so they can prepare themselves. A reasonable estimate of the duration of the disturbance should also be given to the community so they can plan appropriately.

4.1. COMMUNITY PARTICIPATION AND LABOUR CONSIDERATIONS

Depending on the resources available, it is anticipated that some assistance will be required from the community and/or other stakeholders in the implementation phase. This may involve the supply of some materials, provision of specific labour for the construction and storage facilities for tools and equipment.

The issue of labour is a sensitive one and must be handled with extreme care as this is where tensions tend to arise. To avoid any confusion, it should be very clear from the onset of the project what the labour requirements are and how they will be managed. Over and above any existing project labour, if additional labour is required for the project, it is preferable that they are recruited locally where possible. The main benefit is that this helps promote optimism and creates a sense of local ownership for the project.

Local leadership can assist in suggesting possible candidates for recruitment as they know their community. These projects require mostly unskilled labour, and the ease of replicability makes it relatively easy to participate in the work. Remember that as the implementer, there should be parameters for the labour, i.e. physically fit, specific knowledge or skills (if available or required) or level of literacy, if required. All recommendations from the community should be screened and the implementer should make the final decision regarding who is taken on.

lesson learned

It is recommended that a screening process be adopted for all community members suggested by the local authorities, to identify any limitations or competency issues.

Early on, labour candidates were appointed without a screening process. These candidates were sometimes family members of the traditional authority which led to some unhappiness within the community.

Some candidates had undeclared health issues and posed a threat to themselves and their colleagues when handling tools and equipment.

In the case of the engineered springs the following key roles were identified:

Spring Architect – is responsible for designing the spring capture and ensuring that relevant materials are sourced either locally (stone, sand etc.) or purchased (cement, pipes, manhole covers, etc.) according to a bill of quantities.
Team Leader –will oversee all proceedings on site and is the main link between the office and site personnel. All instructions on site are carried out through the team leader who is responsible for ensuring that work is carried out as instructed. They must have some technical competency.
Bricklayer – oversees building the structure.
Mixer – works alongside the bricklayer and is responsible for managing supplies.
Fittings Specialist – will oversee the spring plumbing.
Office Support – is responsible for gathering the necessary materials and ensuring that they are in adequate supply. The office will ensure that the work on the ground aligns with project mandates and budget constraints.

The personnel above are not limited to their spheres and can work together if there is a clear line of command among them. Job descriptions, roles and responsibilities need to be made clear from the start. Labour can be added or subtracted from the above list depending on spring complexity and the available construction time. The key is to ensure that everyone understands what is to be accomplished and is adequately equipped to do so.

Remuneration for labour will depend on the resources available to the implementing organisation, and it is recommended that the issue of remuneration be discussed openly at initial meetings to avoid any misunderstandings. Project resources will also impact on specific training or other capacity development needs that need to be met.

While it is not only important to consider the individuals directly involved in the construction process, there are also implementing organisational level implications to be considered too. These aspects need to be considered and risks planned for. They can include:

- Field staff time, travel, procurement and vehicle maintenance
- Health and safety responsibility
- Cost of training, PPE and tools and equipment
- Public opinion of organisation by target community
- HR and Finance team input

4.2. TRAINING

Once the team is established, it is important to equip them with the skills and knowledge necessary for their work tasks. This is to ensure that everyone is clear and has a basic understanding of the work to be done. Training is necessary regardless of whether there will be a full-time project supervisor on site or not. Once completed, there will be a level of assurance that everyone understands and is clear what is to be accomplished and how it will be done.

Training could incorporate the following suggested elements:

- The different types of springs. (**Refer to Tool 7**)
- An introduction to climate change
- How to capture the water from the different types of springs

RECOMMENDED PPE


overalls
(pants & jacket)


sunhat


clear goggles


heavy duty
gloves


gum boots


saftey boots
hard/steel tips

- Natural features of healthy vs unhealthy water sources and wetlands
- How to locate the various aspects of a spring
- Different types of fittings and plumbing used in spring protection
- Clearing of alien plants. This may be limited to techniques to ring bark them, but if the growth is substantial, then either training on chain saw use would be necessary or employing a contractor to remove them **(Refer to 4.6.)**

The extent of the training will depend on several factors, but it should be noted that, the more effort directed towards this, the better equipped the team will be for protecting not only the springs in the project, but many others beyond the project phase.

4.3. PERSONAL PROTECTIVE EQUIPMENT AND TOOLS

Regardless of whether the spring protection structures will be formal or informal, tools and personal protective equipment (PPE) will be required to complete the work safely and well. These items should be included in the initial budget as they are essential to ensure a safe working environment.

It is recommended that a register of tools purchased for the project be created and a dedicated person identified to take responsibility for the tools, their storage and upkeep.

4.4. BUILDING MATERIALS

Depending on the degree of protection required for a given spring, different approaches can be used. The protection approach and requirements will dictate what building materials will be required, and the quantity needed. Most materials can be purchased from the local builder's yard or hardware store and can be easily transported to site using a bakkie. It is very important that the logistics of getting all the necessary material to site are planned carefully so the on-site teams spend as little time as possible waiting on their procurement.

Whilst bricks are not used in the less formal structures, challenges related to the delivery of materials on site remain the same. Depending on ease of access to the location, some can be delivered by a bakkie and then by wheelbarrow.

TIPS TO CONSIDER

In places that are hard to access it may be necessary to be creative with the transport of materials. The budget should therefore allow for some contingency plans.

Suggested Tool List For Informal Structures


TROWEL


BUCKET


FLOAT


PICK AXE


TAPE MEASURE


PANGA


PIPE WRENCH


WHEELBARROW


SHOVEL


HAMMER

Suggested Tool List For Formal Structures


HAMMER


WHEELBARROW


CHAINSAW


TAPE MEASURE


SPIRIT LEVEL


FLOAT


PICK AXE


HACKSAW


BUCKET


SHOVEL


BUILDERS SQUARE


TROWEL


PIPE WRENCH


BUILDERS LINE


PANGA

Important to remember ASSUMPTION #2 & #3

The organisation has an environmental and/or developmental focus.

The organisation has the necessary capacity and technical competence to conduct this work.

4.5. SITE AND PROTECTION ZONE PREPARATION

It is anticipated that the implementing organisation is already involved in related catchment management activities, such as invasive alien plant clearing, managed livestock grazing, wetland monitoring, land use planning discussions etc. and will be able to bring their experience in these activities for the benefit of the spring protection work.

Typically, an area 10m-20m around the spring is designated the 'inner protection' zone and should be fenced and planted with grass to prevent runoff and erosion. Trees should be removed within this zone, especially if they are IAPs. However, if they are indigenous species then there is more to consider, and opinion should be sought from the community leadership.

Removal of IAPs such as black wattle (*Acacia mearnsii*) and silver wattle (*Acacia dealbata*) is an important step in the preparation of the site. It is known that IAPs are thirsty plants that remove a significant amount of water from the environment. Removal of alien vegetation, to a distance of at least 100m from the water source helps to ensure that all available water is accessible to the spring and that the IAPs do not compromise the available water.

TIPS TO CONSIDER

Whilst all plants need water, and their roots naturally seek out this resource, root systems can have a detrimental effect on construction activities in the long term. In the case of IAPs their removal is expected.

However, in our experience, the removal of indigenous trees must be considered very carefully. Community leadership in various villages have spoken strongly against the removal of indigenous trees around springs.

Therefore, it is recommended that the possible removal of indigenous trees should be very carefully considered, and no decisions rushed. It would also be important to establish the environmental impact of the root networks before any decisions are made.

There are many reservations around removal of indigenous trees and the opinion of community leaders should be valued.

Techniques for removing wattle can be demonstrated and taught by the implementers or by suitably qualified organisations. Again, full PPE, will be required for this activity. Pangas are generally sufficient for ring barking or bark stripping if the growth is not well established, however, chainsaws may be required for well-established trees. In this case, specific training or experience is required and recommended. It is often easier to contract out this activity unless specific skills are present within the implementing organisation. Regular maintenance and follow up of these cleared areas are critical as plants reshoot, and these new shoots must be removed each year.

A sturdy fence should be erected around the water access point, ideally with a securable gate. This fence needs to be strong enough to prevent access by livestock and unauthorised people. The community must be involved in the erection of this fence and decisions around access so that all members can have water security. Environmental management activities within the protection zone, will help to ensure the long-term sustainability of the water source. Maintenance of this zone around the spring will require monitoring and attention by the community in the long term.

Besides the monitoring of regrowth of IAPs, this protection zone should not be used for:

- habitation by people
- livestock kraaling and grazing
- pit latrines above the water source or within the zone
- light industry
- dumping of rubbish

The dumping of rubbish is a significant problem in rural areas as there is no formal collection service and the issue of waste management should be discussed with the village leadership and community members during this work. This is essential to prevent contamination of the groundwater.

RESOURCES

IAP Clearing
https://bit.ly/2UWQ80J

WWF - A practical guide to managing invasive alien plants
https://bit.ly/3lbAMQm

TIPS TO CONSIDER

An additional advantage of clearing dense vegetation is that visibility is increased and the safety of people, particularly women and children, is enhanced while collecting water.

This may not be a concern in all areas but is an important consideration and benefit to the broader community.

The spring site itself must also be protected from surface water run off during periods of heavy rain. This may take the form of retaining walls, gabions or the creation of a drainage ditch to divert water flow away from the source and the chambers. Ideally these structures should all be within the fenced area to prevent damage from livestock or others. Planting grass and ensuring ground cover in this inner zone also assists to prevent erosion from water runoff.

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5 Design

TYPE OF INFRASTRUCTURE

Based on the experiences in Umzimvubu Catchment, the choice of infrastructure design and type will depend on the purpose, the location, and the unique features of each spring site. It is also critical to consider the available budget. It is at this point that the quality of the initial assessments and the value of local knowledge form the foundation of decisions to be made going forward.

In Umzimvubu Catchment, springs are plentiful in the upper and middle catchments where the land rises towards the Southern Maloti Drakensberg range. The top of the upper catchment appears suited to the construction of more formal structures due to less vegetation around each spring and generally easier accessibility. Springs that are hard to access will require additional piping or storage tanks to bring the water to a place in the village where people can collect their water more easily.

Experience in this catchment includes construction of both formal and informal structures in different locations within the catchment and an overview of each, together with their benefits and limitations are presented below.

There are two main resources to consider when protecting springs.

The first, is a comprehensive manual - *Spring Catchment by Christian Meurli and Karl Wehrle (2001)* which was produced by SKAT in Switzerland. It is Volume 4 in a series of manuals on drinking water supply.

The second is a report for the Water Research Commission (2003) on the *Reliability of small spring water supply systems for community water supply projects.* It contains three volumes on related topics: *Volume 1 – Assessment of characteristics of spring flows in small springs* by Ian Pearson, *Volume 2 – The hydrogeology of South African Springs*, by John Weaver and *Volume 3 – Spring assessment and construction methods* by Philip Ravenscroft. Volume 3 draws on the first resource but with specific context in South Africa.

In *Pearson et al, (Volume 3, 2003)*, Ravenscroft outlines two types of spring protection that have been commonly used in South Africa. Firstly, the spring box method that has been used in South Africa and secondly the spring catchment and chamber method, which is used in Lesotho. Details of these are outlined in the report.

Generally, all protected springs will have the following key elements in their design: the eye, a silt or settling chamber and a collection or storage chamber with a tap or access point. However, these structures differ greatly from site to site and between the formal and informal structures.

lessons learned

While this information will have come to light during the initial assessment, it is important to be aware that one spring does not generally provide water for all households in a village.

This needs to be considered when selecting springs to ensure equitable water access through this project. .

THE EYE

The Eye is the point where water emerges from the ground. All spring protections efforts begin here and water is then channelled to subsequent chambers for collection. Protecting the eye ensures continued water supply and the location and geology of these eyes vary from spring to spring. An intake chamber is usually built around this point.

Above - The first image shows an eye on the edge of a stream, flowing into the stream. In the second image, the eye emerges from hollowed out rock material.

Above - These two photos show springs emerging from under rock structures.

RESOURCES

Meuli, C. & Wehrle, K., 2001. Spring Catchment, vol 4 of series of manuals on drinking water supply, SKAT, Swiss Centre for Development Cooperation in Technology and Management, Switzerland. Available at https://bit.ly/2Vq92gh (accessed 6/04/2021).

Pearson, I., Weaver, J. & Ravenscroft, P. (2003) The reliability of small spring water supply systems for community water supply projects. Water Research Commission Report No.859/1/03. Available from https://bit.ly/3C3HPRj (accessed 15/11/2020).

THE SILT OR SETTLING CHAMBER

The Silt or Settling Chamber is where the silt and other sediment settles out of the water before it is drawn away for collection. In formal structures this is achieved by having two outlets to the chamber; an upper outlet where cleared water is drawn out and a scour at the base of the tank for releasing sediment.

A **formal Silt Chamber structure** with the three outlets from the chamber visible; an overflow outlet, a scour and a mainline for drawing out settled water. The structure is covered to prevent the infiltration of outside material into the spring system.

This Silt or **Settling Chamber** is under construction. The water feeds into the tank from the pipe on the right. There is hole on the left of the tank where the pipe will be inserted to transfer the water to the collection chamber.

THE COLLECTION CHAMBER

The Collection Chamber and tap or access point is where water is stored for collection. Excess water is released through an overflow outlet where it is directed downstream for livestock and other uses. Depending on available space, the silt chamber and collection chamber can be one unit. Depending on the yield of the spring and the water quality, the collection chamber is not always completely necessary and water can be withdrawn at a collection point directly after the settling chamber. Should treatment of the water become necessary then the storage chamber can be used for this purpose.

In engineered structures, multiple outlets will have to be incorporated into the spring design. These serve primarily to provide alternative flow paths should any of the outlet paths become blocked which helps to avoid unnecessary pressure on the spring.

Above - A formal collection chamber sits behind the access point where water can be collected from the tap.

Above - This collection chamber receives water from the pipes at the back of the tank and the overflow at the front is available for collection as needed.

5.1. COMMUNITY ENGAGEMENT

It is recommended that meetings be held with a select group of community members to explain and discuss the possible option/s. This discussion should include the benefits and/or limitations of each option. If appropriate, the structure could then be co-designed with a core group of community members based on the following considerations:

- Purpose – i.e. for human or livestock use.
- Volumetric output of spring. This can be measured by holding a 500ml or 2l bottle at the eye of the spring and timing how long it takes to fill the container with water. ***For more options to measure spring flow refer to Pearson, Weaver & Ravenscroft 2003) Volume 3, pages 7-9.***
- If the water is safe for consumption or if significant quality gains can be made through protection efforts.
- Protection needs e.g. improved accessibility, clearing of invasive plant species, fencing off from animals.
- Available budget and resources for construction and maintenance needs.
- An engineered option if appropriate and resources allow.
- Option to link to existing municipal infrastructure (if available or suitable) *this requires municipal permission and if this is an option then the municipality must be involved at this meeting too.

It is necessary to be transparent about the resources and budget available as this helps to manage community expectations.

lessons learned

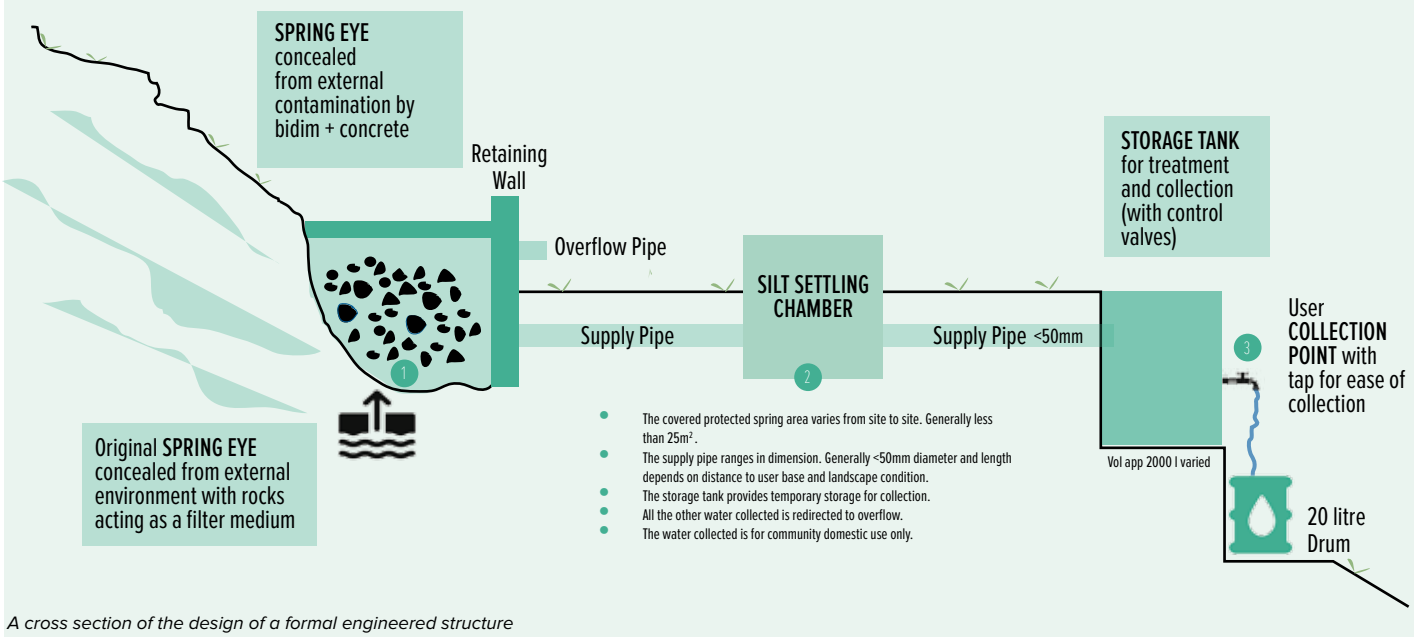
Take care not to 'over engineer' any protection structure as this can cause the costs to rise dramatically.

Any planned work should always weigh up the extent of community benefit against the available resources. This is important when working on multiple spring sites where the protection costs can fluctuate significantly between springs.

The true extent of work to be done sometimes only reveals itself after excavation work has been completed. It is therefore important to be able to manage any gains made carefully so they can spill over into subsequent protection sites.

5.2. FORMAL, ENGINEER DESIGNED STRUCTURES

In the figures below, users can be seen collecting water from formally protected springs. In each case the spring structure has been equipped with a storage system and tap to allow water to accumulate in the system for collection. These structures provide a focal point in the community and water can be gathered with ease from the tap. Some of the construction may be underground and not visible to the community.



A cross section of the design of a formal engineered structure used by ERS. It is based on the Spring box method.

BENEFITS OF FORMAL STRUCTURES	LIMITATIONS OF FORMAL STRUCTURES
Modern infrastructure is aesthetically pleasing and not out of place.	Generally, higher cost due to infrastructure i.e. bricks, taps, tanks, fuel and organisational time.
Based on the community tap model which provides community dignity.	Requires specific engineering expertise.
Stored water is covered and protected from external influences.	Labour required is intensive and daily. Full time construction management and site monitoring is needed.
Run off can be used for livestock watering and overflow continues as a stream.	There may be minimal run off.
Water can be stored for later collection. This is useful for low flow springs with large numbers of dependants.	They can be difficult to maintain after project phase as they require skilled labour.
Run off can be regulated to prioritise the needs of upstream or downstream users.	They can be prone to vandalism by community members seeking to use the equipment for their own benefit, i.e. uprooted taps and pipes. This disadvantage needs to be incorporated into design and risk management.
Water can be channelled to where it is needed most.	
Provides skills development for participants. Some structures still replicable by local masons.	

Comparison of the benefits and disadvantages of formal engineered structures.

This spring is located a distance from the village on a hillside. The eye is protected and the cage is kept locked to prevent contamination or interference. Water is transported to the village using gravity through pipes that were dug in by the community.

5.3. INFORMAL STRUCTURES

The middle catchment is hillier and springs are often found in steep ravines or water gullies in forests. These springs, while plentiful can be more challenging to access due to steep, rocky slopes, alien and indigenous vegetation.

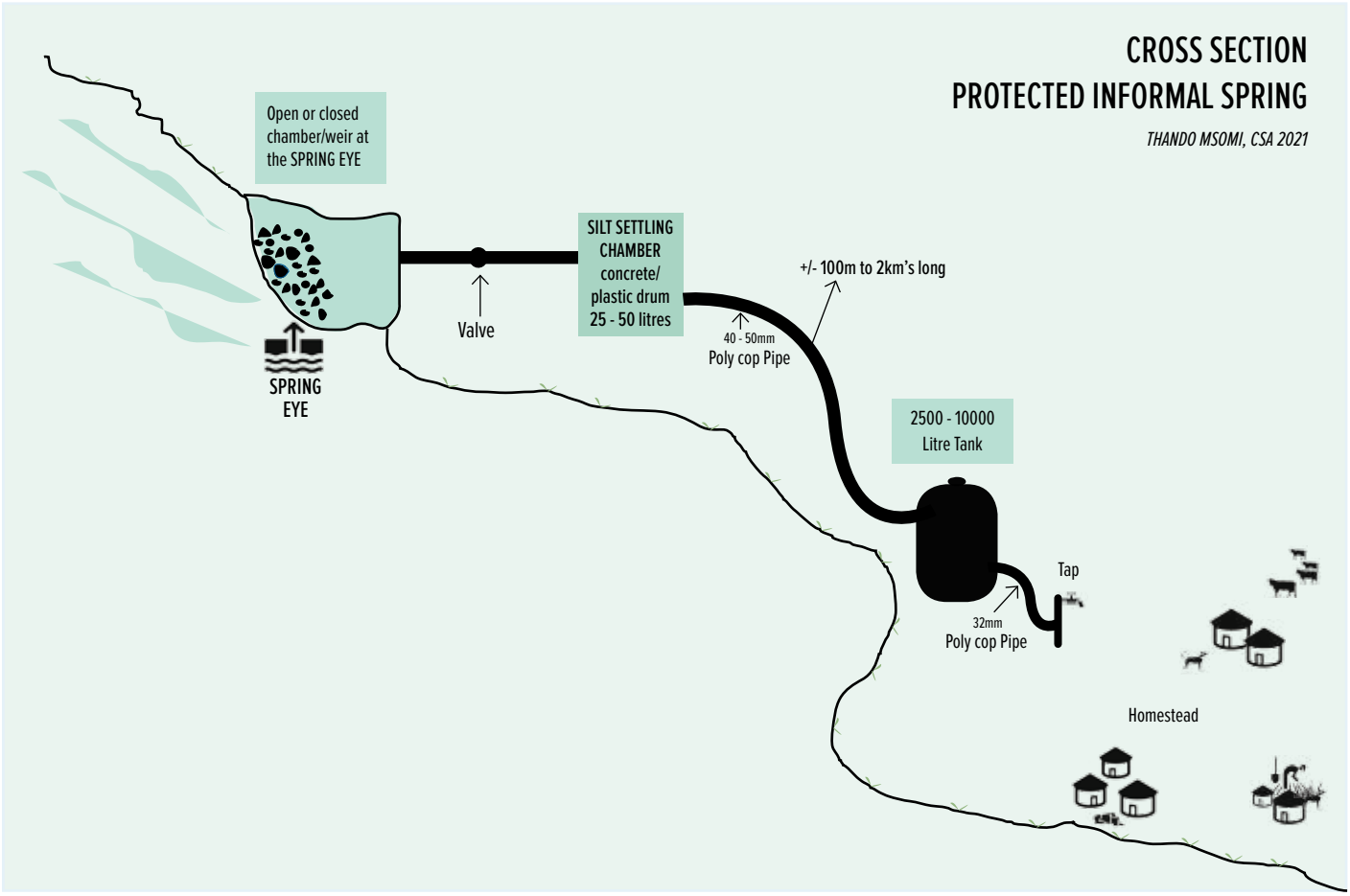
These structures have a low impact on the environment as they are mostly constructed using local materials; stones, rocks and sand collected in the area. They are situated at the eye of the spring and comprise two chambers or reservoirs. The eye is connected to the silt or settling chamber by means of pipes or concrete channels. Pipes again link the settling tank to the collection chamber where there will be an access point from which water is collected. Most structures are visible above ground which allows for easy repair, however if the pipes are very long they are usually dug into the ground to prevent injury to or damage by livestock or people.

These sites are ‘open systems’ and water flows through the system unrestricted. The overflow from the access point is directed away from the fenced area to re-join the stream or wetland below, and often services an area where livestock drink.

Depending on the location and accessibility of the protected spring, the infrastructure is designed to achieve specific purposes. Left and on the next page are some examples of different informal protected springs. The different styles can be influenced by available resources, locations or needs.

This site is located within a village and is surrounded by households. The collection chamber has a tap for access. Both chambers in this site are covered with shade cloth to prevent contamination and the area is fenced.

This protected spring is a short walk from the closest homesteads and services only part of the village. The eye is on the left of the image and feeds the collection tank on the right via the pipes. Water flows freely from the access point in the collection tank and rejoins the stream at the front of the image. The water then flows into livestock access points below this complex and continues downstream.



BENEFITS OF INFORMAL STRUCTURES	LIMITATIONS OF INFORMAL STRUCTURES
Low environmental impact.	Structures can become more difficult to construct with increased spring complexity.
Cheaper (fencing, poles, cement).	Can be left uncovered, leaving water prone to contamination by airborne debris.
Uses natural, local materials which reduces transport costs.	Large stones need more cement/mortar which can increase costs.
Minimal external materials required – which encourages ease of replication and maintenance.	Access is often awkward due to their location on slopes, gullies, and surrounding vegetation.
Easy to replicate at community level.	Structural integrity not always sound.
Run off can easily be made available for livestock and support of ecosystems e.g. wetlands.	Unless properly fenced off, it becomes vulnerable to tampering by community/livestock.
Generally, it is a free-flowing water system.	
Can be fenced to control unwanted access.	

Comparison of the benefits and disadvantages of these informal structures.

5.4. ACCESS TO SPRING SITES

Ensuring safe access to all spring sites is important as they will be used daily by many people. It is important that access routes are factored into the planning to prevent degradation to surrounding soil or wetland areas.

In some situations, the area around a spring can be very wet and additional pressure from people or livestock can cause significant environmental damage. Pathways to the spring site must be clear and able to cope with human or livestock traffic. Where runoff creates a water point for livestock, it becomes critical to have some hardened surface (stone pack or similar) to avoid them trampling the saturated soils. This type of degradation is common at unprotected productive springs and there needs to be planning to avoid this issue.

5.5. COMBINING SPRING PROTECTION AND MUNICIPAL INFRASTRUCTURE

A recent development in some spring sites has involved collaboration between the DM and the community. This has been important as it has practically linked nature-based solutions to engineered municipal infrastructure using an EbA approach. This was facilitated by CSA and resulted in improved water access for larger numbers of people. Following site visits and discussions, budgets were allocated by the DM for the infrastructure (i.e. pipes, tanks) and in some cases the labour requirements were undertaken by the community, i.e. to prepare the ground by digging trenches or flattening land for tanks. This required close work with the Municipal Technical Team who are familiar with the existing infrastructure layout and materials needed to achieve the desired result. Involvement of the rural water operator (RWO) in each village is important in this process.

There are many positives to linking existing municipal infrastructure with protected springs, both formal and informal. The main advantage being that water can be provided to more households through links to greater infrastructure. There is also opportunity for water quality testing and maintenance to be taken on by the municipality as these aspects fall under their mandate as the WSP. Care must be taken to ensure the compatibility of the two systems when linking a formally protected spring to municipal infrastructure.

Flood Mitigation Measures Important In The Planning Stages:

Not planning adequately for dry and wet season variability in the spring flow and spring environment can cause unwanted problems.

As construction usually takes place during the dry season when the water flow is often lower, it is critical to consider the possible impact of flood and heavy rains on construction and to plan accordingly. This will include consideration of the diameter of the pipes selected to cope with higher water flow. This is important to prevent the spring structure being overwhelmed with the flow supply during the wet season.

Other aspects to be considered include construction of retaining walls, gabions or a drainage ditch to divert water away from the spring site in the event of flooding or heavy rainfall.

Accessible pathways should be planned for the safe transportation of water in all weather conditions.

REFER TO:

STEP 1:
Stakeholder Management
1.6. government engagement

STEP 2:
Risk Management & Sustainability

5.6. MAINTENANCE

It is important to establish in the planning phase, which parties will be responsible for maintaining the infrastructure once it is completed. These decisions, responsibilities and accountabilities need to be documented and made apparent. A MoU may be required between the relevant parties to ensure that these decisions, responsibilities and accountabilities are made clear. Site maintenance will include follow-up of cleared areas of wattle as well as the actual protected spring site. Aspects that need to be discussed include:

- Who will be responsible for day-to-day maintenance, especially in the rainy season?
- Who will they report issues to?
- Who will be responsible for repairing leaks etc?
- Who will be responsible for what aspects of the infrastructure (This will be important if there are different responsibilities for different parts of the structure)?
- Over what time frame will maintenance issues be addressed?
- Who will collect climate data at the site?

5.7. COMMON ERRORS TO AVOID DURING CONSTRUCTION

Meurli and Werhle (2001) provided a list of 20 errors to be avoided, which were revised and expanded on by Ravenscroft in V*olume 3 of Pearson et al (2003).* Ravenscroft's full list has been included here, however, given the multitude of different approaches and techniques that can be employed to protect a spring system, it is important to note that not all these points will apply to every spring. It is critical for the implementing organisation to be able to identify and address those points that apply to their specific design.

All the following points must be considered by the implementing organisation, together with the section on Risk Management.

- No or insufficient monitoring of the spring flow prior to development results in the spring being unable to provide the 'planned' water demand. Lack of knowledge of the high flow conditions can result in too small pipes being used, causing back pressure and spring failure.
- Trees not cleared (and kept clear) from the inner protection zone cause roots to damage the spring box.


©Conservation International/Photo by Tessa Mildenhall

- Insufficient excavation means the spring is constructed in unstable material.
- Mechanical excavation or unsupervised excavation damages the impermeable layer or results in back pressure on the water bearing layer.
- The excavation extends too far to the sides resulting in a long barrage wall requiring unnecessary work and expenditure.
- No scour facility installed.
- No manhole cover or an inappropriate manhole cover that does not seal, provide security of the source or cannot be removed by one person.
- Manhole level with slab and the slab not sloped away from the manhole results in contamination of the water source with surface water.
- Geofabrics used in the source block with sediment causing back pressure and failure.
- Galvanised steel pipe used in corrosive water.
- No flanges or pipe roughening at the interface of pipes with concrete results in leaks developing around the pipe.
- Barrage wall not built with waterproof materials.
- Outlet and overflow pipes built above the level of the source.
- No isolating valve on the outlet.
- No air valve on the outlet (vacuum breaker for pipeline).
- No water meter for measuring water abstracted.
- No or not big enough drainage channel above the spring results in surface storm water contamination and erosion.
- No or inadequate fence and no locked gate in the fence to control access.
- No protection of the slopes behind and to the sides of the spring protection results in erosion and collapse of the walls onto the spring protection.
- Pools of water allowed to form around the spring protection by not providing drainage for scour and overflow water away from the area of the spring.

6 Amplify

WASH ACTIVITIES & VELD SANITATION

When freshwater conservation integrates the WASH in Watersheds approach it can achieve multiple project objectives, simultaneously. As in the approach taken here, the project demonstrates that addressing water access, supply and health, sanitation and hygiene, and land management practices in a more holistic and effective way to achieve local water stewardship.

6.1. THE BIGGER PICTURE

Why include activities related to hygiene and sanitation in a guide to spring protection?

- Water for human consumption can easily become contaminated when there are inadequate sanitation or poor hygiene practices, jeopardizing human health.
- Water sources in rural South Africa are generally linked to natural areas that are being damaged and polluted through overuse or mismanagement.
- Climate change is affecting the way the environment can supply communities with water and other natural resources. Sharing of water sources by people and animals is more common during periods of drought.
- When people and animals use the same water sources, there is an increased risk of disease spreading from animals to humans.
- Water sources often have high bacterial levels due to poorly managed or maintained upstream areas. This affects people living downstream too.
- Rural communities are becoming increasingly aware of the interrelatedness of the health of their environment and the health of their livestock and families.

WASH is an acronym for water, sanitation and hygiene and is used internationally to refer to projects that address water supply, water infrastructure or behaviour change for improving sanitation and hygiene practices. WASH programming combines these three components i.e. to increase access to clean water, provide access to latrines and to educate about proper handwashing and hygiene methods because they all interconnected. They are often described as a three-legged stool: access to clean water is one leg, healthy behaviours are another and building infrastructure, such as latrines, are the third. All three legs for the stool are required to balance. Work related to WASH is usually undertaken by development organisations rather than conservation organisations. While conservation organisations do not directly aim to meet developmental needs there is an opportunity to integrate these activities for greater benefits and impact within rural communities.

hygiene [noun]

The degree to which people keep themselves or their environment clean, especially to prevent disease.

sanitation [noun]

The systems for taking dirty water and other waste products away from buildings in order to protect people's health.

The sharing of this information provides communities with resources and information that can be used to make decisions that are informed and specific to their community. For clarity – the definitions of 'hygiene' and 'sanitation' from the online Cambridge English Dictionary are important to keep in mind.

Formal sanitation is not dealt with directly in this guide as it was not part of the interventions undertaken in Umzimvubu. It is loosely covered through suggestions related to land use through the recommended location of toilets and new households etc. There are strong connections between personal hygiene, community hygiene and the impact on the environment for these links to be made.

Management of household rubbish is a significant and growing challenge in rural areas where there is no formal waste collection and typically no allocated landfill sites. Significant identified challenges relate to the dumping and disposal of nappies, solid waste (plastic) and building rubble. With the increased use of convenience packaging (plastic wrappers, bottles, containers etc.) and disposable nappies these items are creating a significant waste management issue in rural areas.

6.2. WATER FOR LIFE

Water is an essential resource for sustaining life and without it, life would cease to exist. In rural areas, without regular access to piped water, every drop of water must be collected and taken to the household. The challenge of obtaining an adequate supply of water has left many communities with no option but to use informal sources such as local springs or seeps for their water needs.

Improved hygiene practices require behaviour change. For this to happen, there must be meaningful understanding as well as access to infrastructure to support these new bahaviours and a clear understanding of the long and short-term benefits.

RESOURCES

A Selection Of WASH Resources

Veld Sanitation – good practices for water, livestock and people in rural South Africa (Rose, 2019)

Handwashing Handbook, (Global Handwashing Partnership, 2020)
https://bit.ly/3xgU7SE

Centre for Affordable Water and Sanitation Resource library
https://resources.cawst.org/

IRC WASH Systems Academy
https://bit.ly/3rLLEFW

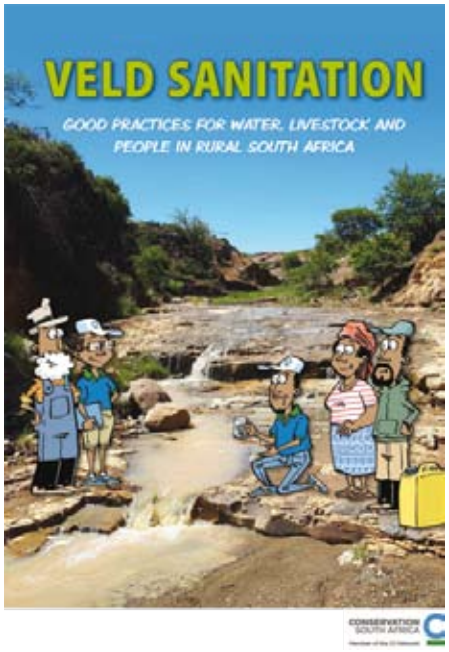
This list is by no means exhaustive and you may have your own preferences.

WASH Resources

There are many WASH resources to choose from. 'Veld Sanitation' is a term used by CSA for the 'WASH' behaviours that support the spring protection work. This guide was developed to help communities make the links between the health of their natural environment and the health of their livestock and families. It was initially aimed at raising awareness with herders but has been expanded for broad applicability within rural communities.

The objectives of this guide are to:

- Create awareness amongst communities on the value of water resources;
- Create community awareness around good sanitation and hygiene practices;
- Educate communities on water related diseases;
- Encourage people to take part in waste management activities in their communities;
- Provide practical guidelines to address challenges experienced within communities.



Veld Sanitation – good practices for water, livestock and people in rural South Africa (Rose, 2019)

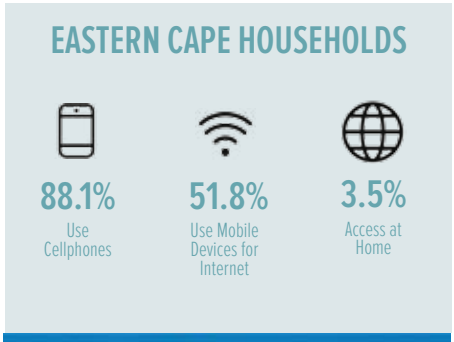
The first section of the manual highlights the links between the health of the environment and the health of the people and livestock that live there. It focuses on the concept of veld sanitation, South Africa's biodiversity hotspots and veld types or biomes, the concept of climate change and the importance of veld.

The second section contains six key messages informing communities on how to improve sanitation, hygiene and land use practices for both human and livestock health.

6.3. SHARING MESSAGES IN RURAL CONTEXTS

Awareness of **literacy levels** is important to consider in the development of awareness raising materials. A report compiled by Statistics South Africa on education indicates that the Eastern Cape has the lowest literacy rate in the country (Statistics South Africa 2017a - *https://bit.ly/3xbFS1y.* Here, 10.4% of the population aged between 15 and 34 years cannot read and write. Although technological access may be available, literacy levels may impede the understanding of the content that is developed. It is critical that the materials developed are simple, can be easily understood, and that they should be image heavy, with limited text.

The experience of the COVID-19 pandemic in South Africa from March 2020, meant that face-to-face meetings to share information was not possible. The messages were critical to support the general health of communities and to prevent the spread of the virus and so alternate means of communication were identified.



According to the 2017 *National Household Survey*, most South African households (88.2%) rely exclusively on cellular phones for telecommunication. In the Eastern Cape, this figure is 88.1%. (Statistics South Africa 2017b - *https://bit.ly/3IfHTYh.* In terms of internet access, 51.8% of households in the Eastern Cape have access to the internet either at their work, place of study, home or an internet cafe. This is lower than the national average of 61.8% and would not accurately represent the rural areas. Furthermore, only 3.5% of households in the Eastern Cape have access to the internet at home. (Statistics South Africa 2017). Mobile devices have made the internet more accessible, especially in rural areas (Statistics South Africa 2017). Mobile devices, such as cellular phones and 3G cards are used to access the internet by 50.5% of households in the Eastern Cape.
Social media use is growing in South Africa, with 15 million people using social media platforms in 2017. Approximately 13 million South Africans access social media platforms from their cellular phones, with the most popular platforms being Facebook, YouTube, and WhatsApp (Olfsen 2017 - *https://bit.ly/3j44aW9.*

6.4. WAYS TO SHARE THE KEY MESSAGES

The key messages referred to here are outlined in the Veld Sanitation Guide which can be used as a resource during stakeholder engagements. This allows for participatory discussions, problem solving and development of strategic plans by the community.

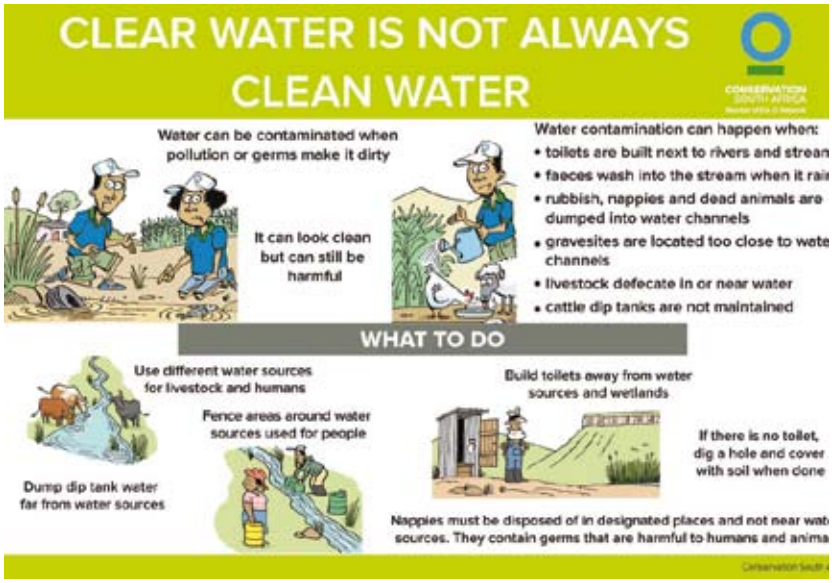
Broad overview and general concepts can be shared at large or small gatherings, while personal or specific messages can be shared in smaller groups or via social media.

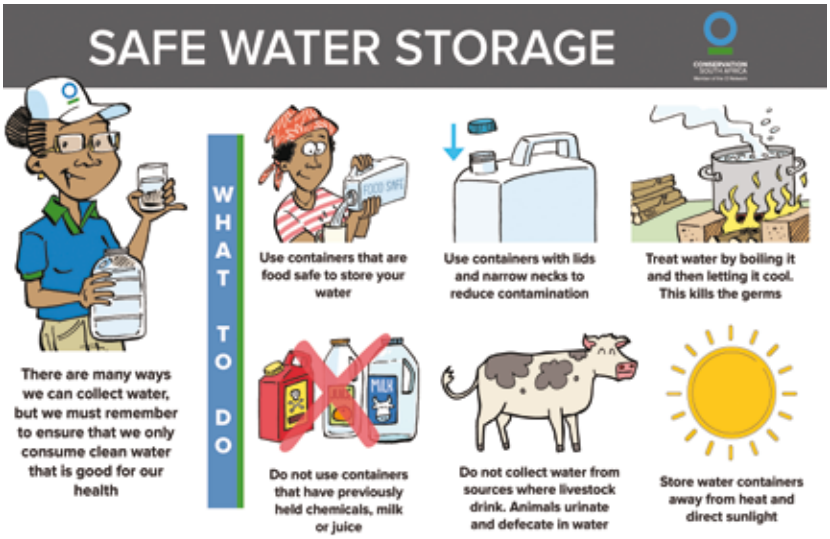
Images from the guide have been used to design additional formats for the key messages for use in different contexts.

Source: Conservation South Africa - Veld Sanitation, Good Practices for Water, Livestock and People in Rural South Africa, 2019

Why Mobile Messaging?

Based on statistics drawn from Worldometer and Statista, in 2019 South Africa had a population of 58.56 million and 101.9 million mobile subscribers spread across five main mobile network operators. Using these two numbers, the unique subscriber ***penetration rate*** *comes out to* ***170%,*** *meaning that there were more mobile subscriptions than people living in South Africa. A great tool to increase your reach!*





WhatsApp Messaging

This was identified as a quick, free and personal way to share key messages. Messages were grouped into different themes.

Phase 1 – Personal Health and Hygiene Awareness

- What are germs?
- When to wash your hands
- How to wash your hands
- How to make a tippy tap (English only)

Phase 2 – Household Health and Hygiene Awareness

- Safe water storage
- Managing your waste
- Clear water is not necessarily clean water
- Water borne diseases
- Insect borne, water related diseases (areas where malaria and bilharzia are present)

The key messages in each phase are listed above and are available in isiXhosa, Sesotho, Sepedi, Xitsonga, Afrikaans and English.

Phase 3 – Environmental health and its systems

A third phase on environmental health and its systems was identified but these are complex messages and harder to simplify for a short WhatsApp message.

These messages and themes provide important context to communities as they start to understand the benefits of natural resources in their environment. Educational material is being developed to address the following themes through discussions and experiential learning opportunities.

- The Hydrologic or Water Cycle
- Benefits of wetlands
- Invasive Alien plants and water sources
- Importance of Veld
- Climate Change

Learning Modules - Sanitation & Hygiene Practices

Five 'modules' have been prepared to organise and share more detailed information on themes from the Veld Sanitation Guide. They can be offered separately or as a series. The modules are;

1. Veld and Sanitation
2. Biodiversity and Environmental Systems
3. Waste Management
4. Clean and healthy water
5. Washing your hands

Each module is based on information from the guide. They are presented in sections: 'Why it matters', and 'What to do', followed by sections for discussions. These sessions are facilitated to encourage suggestions of possible actions or problem-solving activities to be considered by the participants. Each session can be adapted for the specific conditions and challenges in the area and can help to target specific issues.

Key words and concepts have been identified for translation as it is important that concepts are understood in local languages and that facilitators are familiar with the translations.

A **pre- and post-training questionnaire** has been developed for use prior to starting the sessions and again afterwards. Ideally the questionnaires can be administered individually, (anonymously) but they could also be administered in a group and the responses counted. For example - 'X%' of the group could identify the correct times to wash their hands compared to 'Y%' at the start.

For planned face-to-face meetings with targeted community members i.e. grazing associations, women's groups, church groups, school children etc., a focus group is an appropriate format for facilitating discussion, encouraging problem solving and behaviour change within communities. These sessions can be reinforced through sharing the relevant WhatsApp messages in the appropriate language

TOOL #8 & #9

VSG Concepts & Keywords
Pre & Post Training Questionnaire
WhatsApp Messages

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7 Track

MONITORING

Monitoring allows the implementing organisation to observe and check the progress or quality of something over time. It is a continuous process that aims to provide all stakeholders with early, detailed information on the progress or delay of the ongoing assessed activities. Its purpose is to determine if the outputs have been reached so that action can be taken to correct any deficiencies as quickly as possible.

Monitoring is a critical step in ensuring the protection of springs in the target communities and catchments. Monitoring data combined with routine assessment and evaluation can indicate if the project is reaching its intended goals and objectives, and assist with suggesting adjustments to activities. It is also important to consider opportunities for the community to be involved in establishing what is monitored, collecting information, and determining corrective actions if the monitoring uncovers a problem. Additionally, stakeholders play an important role in the learning and potential replication of project successes, and the public engagements, education and transparency measures that create enabling conditions for sustainability.

The specific monitoring needs will be determined primarily by the implementing organisation's mandate and the information needed to report back on obligations to the donor. It is important to establish what data should be monitored and to build these longer-term needs into the initial baseline assessment or hydrocensus so that there are enough available data prior to intervention against which progress can be measured.

The process of monitoring and evaluating project activities is ideally an iterative process that includes research and learning steps too. The combination of these four steps is known as MERL, and they are defined below.

M	E	R	L
Monitoring	**Evaluation**	**Research**	**Learning**
Monitoring is the process of using indicators to measure programme changes over time. Post implementation monitoring is undertaken after installation of the WASH/conservation service or programme.	Evaluation is the long term systematic and objective assessment of an ongoing or completed project, programme or policy and its design, implementation, and results. Evaluations should be performed by an external third party.	Research is the systematic investigation and study of data to gain a better understanding to be able to address problems identified through monitoring and evaluation results.	Learning is the process of incorporating lessons learned into ongoing practices to increase effectiveness and sustainability over time.

MERL

The steps in this iterative process may occur in sequence or concurrently. Ideally monitoring and evaluation results inform the next two steps which in turn inform future monitoring and evaluation.

The following questions help to guide the monitoring process and will be determined by the implementing organisation and the donor:

7.1. WHAT INFORMATION IS CAPTURED?

From the outset there needs to be agreement and clarity on what variables or indicators need to be monitored through this project. These variables or indicators should be aligned with the spring protection activities being conducted.

It is important to consider what is driving the change that you are attempting to address and how the activity will affect variables or indicators of the spring. There are a multitude of parameters: i.e. chemical, microbiological and physical that can be monitored, based on the capabilities of the involved stakeholders.

Remember that consent is required, and it is important to be aware of the guidelines of Free Prior and Informed Consent (FPIC) and the Protection of Personal Information Act (POPI Act) when engaging with community members.

REFER TO: STEP 3: Assessments and the relevant Tools.

NB.

Protection Of Personal Information

It is important to be aware of regulations around the collection of data related to personal information. In South Africa we have the Protection of Personal Information Act or POPI Act.

The Protection of Personal Information Act sets conditions for responsible parties to lawfully process other people's personal information. The purpose of the Act is to protect people from harm by protecting their personal information and thus their general privacy. It sets out how data can be collected, stored and sets conditions for when it is lawful for someone to process someone else's personal information.

Resource:
POPI ACT: *https://bit.ly/3yhsn1L*

7.2. WHO COLLECTS IT?

Involvement of community members in citizen science activities can prove to be an effective mechanism for collecting ground-based data relating to spring conditions. This includes; usage, depletion or demand on spring, supply potential of spring, compliance monitoring and governance of stream.

RESOURCES

Edmond, J., Sorto, C., Davidson, S., Sauer, J., Warner, D., Dettman, M. & Platt, J. October 2013. Freshwater Conservation and WASH Integration Guidelines: A Framework for Implementation in sub-Saharan Africa. Washington, DC: ABCG, CI and TNC.

Monitoring should be done by a trained individual who is identified at the start of project phase. This individual must be of sound character who can collect spring data without compromising its quality. It is important than this person understands how the protected structure operates and should be able to do basic maintenance on it.

In addition, community-based monitoring programmes can provide more ground-based data to explain external drivers that could counter-act the activities outlined by the spring protection guide. Some examples of ground-based data that can help us explain spring condition trends include communal activities around stream (i.e. cattle grazing, spring usage, what the spring water is used for, frequency of collection from spring and existing infrastructure around the spring).

The role of the municipality in conducting routine water quality testing will provide much needed supplementary information to the spring protection efforts. Water quality is an essential variable that the spring protection activities seek to improve, hence routine and timeous water quality testing will inevitably provide context and scale to the spring protection activities.

7.3. HOW FREQUENTLY IS IT COLLECTED?

It is recommended that conditions at the spring are routinely monitored, at least once a month and after any severe weather event. Relatively speaking, spring water is stable and apart from seasonal changes, the water quality does not fluctuate very often. However, regular monitoring of the spring structure and water quality should make it easier to identify any potential problems as soon as they arise.

7.4. HOW DOES IT LINK BACK TO THE BASELINE?

Spring monitoring data can be used as comparative information to the baseline measurements.

- This comparative analysis with baseline data will provide context for the activities associated with the spring protection guide.
- Subsequent comparisons to the baseline data will allow one to build a temporal database for analysis of trends to gauge implementation and success of activities.
- Comparison to baseline data can be used to adjust spring protection activities and, in some cases, can bring to light drivers of spring degradation that were possibly omitted in the first iteration of Monitoring and Evaluation (M&E) framework.

REFER TO: STEP 3: Assessments.

7.5. HOW IS IT CAPTURED?

The easiest way for data to be captured is using a clipboard with a data set and a pen. However, where technology and resources are available a cell phone App can be setup to capture both qualitative and quantitative information. The two apps currently being used are mWater and ODK Collect.

Photography also provides an important visual record and can be used to confirm or verify different types of data.

7.6. WHERE AND HOW IS IT STORED?

If the implementing organisation is using a mobile data collection app, the information will be cloud based. Access to the cloud database may be restricted to the implementing organisation's data custodian as per standard data use management protocols.

Implementers should be familiar with the POPI Act and ensure that any personal data is stored in line with the conditions set out in the Act to ensure confidentiality and privacy is maintained.

7.7. WHO ANALYSES IT?

Within implementing organisations the analysis of data is often assigned to a 'data custodian' within the organisation (e.g. M&E coordinator). Although all data captured and stored via mobile applications have open-access data clouds, the responsibility of allowing access to data should be assigned to a data custodian who will then be responsible for disseminating the data. Data findings should be captured in short, concise technical reports explaining the developing trends as compared to baseline measurements.

7.8. WHO IS IT SHARED WITH?

Data findings and results should be shared with partners and other organisations via relevant National, Provincial or catchment level Freshwater platforms (e.g. at Quarterly UCP meetings). Data should also be available to relevant partners involved in similar spring protection activities.

Ideally a platform should be made available to the broader public where they can inform relevant stakeholders about conditions at the spring. This is important because as the primary users, stakeholders are often first to observe any deviations from the norm at the spring site and can help initiate early responses.

The data will then be communicated to all relevant stakeholders including:

- The persons/organisation in charge of spring maintenance.
- The persons/organisation responsible for community water relations.

The latter is required to keep the community informed about the quality and quantity of their spring water, and when necessary, will advise on appropriate measures to ensure these. The goal of this is to ensure that reasonable efforts are taken to ensure that the water from the spring is safe for consumption.

As a final measure, the user community should still be advised on good drinking water management techniques. This requires sharing information on appropriate ways to treat and store water intended for consumption.

7.9. WHAT IS IT USED FOR?

Data gathered should be used by the implementing organisation (and relevant partners) to monitor changes and to alert them to any early warning signs in changes of condition at the spring. Ideally the data should be used to monitor both short and long-term changes in conditions at the spring site. Lessons should be learned from the data gathered and used in the adaptive management of the programme.

It is critical to pay special attention to factors that can have an adverse impact on the health of the users. Data observed in a lab through a full analysis will always yield the most informative results.

- Data can be shared with partners or government scientists to contribute towards the pool of data that is used to understand the past and current condition of springs being monitored. It can also be used to collaborate on upscaling spring rehabilitation work within the catchment and to make informed environmental decisions.

TOOL ONE

UNDERSTANDING THE COMMUNITY

1

UNDERSTANDING THE COMMUNITY

Below are suggested participatory tools that can be used in the initial phases of the engagement process. They help to;

1. Validate the need for the project through visioning
2. Establish the capacity of the community with a needs assessment
3. Lay the foundation for skills development opportunities with a skills audit

1. Visioning

This is a technique that is used to support a group of stakeholders to develop a shared vision for the future. It is done in a workshop setting and involves asking a group of participants to appraise their current situation and where they can realistically expect to be in the future thus capturing their perceptions and needs in their words. Important links can be made with participants to any changes in climate conditions and weather patterns that they have observed. The impacts of these changes on their environment and activities previously engaged in can be discussed.

RESOURCE

Visioning Resource:
https://stanford.io/3C4DOfl

2. Needs Assessment

This is a more advanced, systematic, process for determining and addressing needs or "gaps" between current and desired conditions or "needs" (rather than "wants"). This is also done in a workshop setting but **requires a highly skilled and experienced facilitator to lead this process.** It is usually conducted before the project work begins and can be reviewed following changes in external factors that influence the process. This assessment confirms that the need exists for the project and is a priority for the community, stakeholders, and beneficiaries. It helps to define the parameters of the project through data and feedback from stakeholders and improves the quality of program decisions. This is a useful tool that improves project performance and the accomplishment of desired results.

More information regarding how to define 'need' can be found in the writings of John Bradshaw who created a framework of different types of need.

REFER TO:

Cookson, R., Sainsbury, R. & Glendinning, C. (Editors) (2013). Jonathan Bradshaw On Social Policy, Selected Writings 1972 -2011. Chapter 1, p1-11, York: York Publishing Services Ltd.

3. Skills Audit

The purpose of a skills audit is to identify existing skills within communities that may be leveraged in this and other projects. It provides a platform for community members to learn about each other and to start to work together.

These tools help to establish an awareness of what is important to the community and provides a baseline of skills that are present in the community. They can also assist the organisation to understand the level of awareness of the community regarding their possible role going forward. This is important in understanding the motivation of stakeholders to participate and contribute towards the desired behaviour change. It is important to consider the balance of power in these conversations or engagements.

Depending on the nature of the relationship with the community and the Traditional Authority, it is suggested that you introduce the idea of the community being custodians or stewards of their assets. Where possible, solutions to challenges should be encouraged from the community rather than the organisation providing a top-down approach. This helps to build confidence and agency within the community.

TOOL TWO

FORMALISING COMMITMENT

2

FORMALISING COMMITMENT

Once willingness to participate has been confirmed, there are options and tools to formalise the commitment between the organisation and the community. These may take the form of a Memorandum of Understanding (MoU) or a Conservation Agreement (CA)

2.1. Memorandum Of Understanding (Mou)

This is a less formal and non-legally binding agreement that documents an understanding between two or more parties and defines each party's commitment. If the project intends to involve the municipality and link the project to existing municipal infrastructure, then it is anticipated that a separate MoU or agreement be undertaken with the municipality. A separate MoU would be needed between all involved parties. A simple example of a partnership MoU template from the Stanford Social Entrepreneurship Hub is provided as a resource.

RESOURCE

Stanford Social Entrepreneurship Hub MoU Partnership Template:
https://stanford.io/3C4DOfl

2.2. Conservation Agreements (CA)

Another consideration is the use of a Conservation Agreement. This offers direct incentives through a negotiated benefit package in return for conservation actions by communities. It is a negotiated agreement between the organisation and the community that can be verified and monitored. The premise is that people will change their behaviour when it is in their interests to do so. The use of conservation agreements is familiar to communities in Umzimvubu region where they have been used successfully with land use management practices.

REFER TO:
Gardiner, M. (2020) Conservation agreements on communal lands in South Africa. Conservation South Africa Conservation Stewards Program:
https://bit.ly/3lhS1j0

The Conservation Stewardship Programme detailed on the CI website states that 'in many parts of the world, communities use their land, water and other natural resources in unsustainable ways simply because they have no economic alternative. Protecting biodiversity and ecosystem services in these places requires conservation tools that create development opportunities for local populations. When conservation offers concrete benefits to local communities, protecting the environment becomes a fair, viable choice'.

TOOL THREE

VILLAGE NAME:

Data Collectors Details: _____ Name/Number:_____

Date: _____ Source of Information/Interviewee: _____

Number of sub villages:		
Number of households:		
Average household size:		
Population Size (%):		
Population under 18 years (child):		
Population 18 to 35 years (youth):		
Population distribution by gender:	Males	Females
Employment Numbers (between 15 and 64)		
Employed:		
Not economically active:		
Unemployed:		
EDUCATION		
Name and number of primary schools:		
Name and number of high schools or secondary schools:		
HEALTH		
Name and number of local clinics:		
Frequency of mobile clinic visit to the village:		
Distance to nearest hospital from village:		
OTHER RESOURCES: PLEASE COMMENT ON THE PRESENCE AND NUMBER OF THE FOLLOWING FACILITIES:		
Community Hall	Yes	No
If no, what is the distance to the nearest Community Hall?		
Sports Field	Yes	No
If no, what is the distance to the nearest sports field?		
Convenience Stores	Yes	No
Names of any NGOs working in the village:		
Presence of public works infrastructure development in the village?	Yes	No
If yes, mention type and progress:		

3

VILLAGE LEVEL INFORMATION GATHERING

It is essential that you investigate and understand the way water is used and perceived in the village, and how it contributes to the health of the community and their livestock.

This questionnaire was compiled by Umzimvubu Catchment Partners and should take no more than 20-30 minutes to complete. Information provided is confidential and is used to help plan better outreach support.

page 2

WATER RESOURCES					
Number of Water Monitors in the village?					
Presence of a Water Board or Water Committee?	Yes		No		
Is there a Rural Water Operator present in the village?	Yes		No		
Do you have any water pipes installed in your yard or home?	Yes		No		
Total number of taps in the village:					
Total number of taps in each sub village:					
How many are working?	0-1	1-3	3-5	5-10	Other
Who repairs water infrastructure in this community?					
Does the support person/team come when needed?	Yes		No		
Does the community have maintenance funds for water infrastructure?	Yes		No		
SANITATION					
Number of households using pit latrines:					
Number of households with no toilet facilities:					
Number of households with other toilet facilities:					
AGRICULTURAL ACTIVITIES					
Number of households involved in agricultural activities:					
Presence of a Grazing Association in the village?	Yes		No		

Thank you for your participation.

TOOL FOUR

NAME OF INTERVIEWEE:

Village: _____ Interviewer/s: _____ Date: _____

Start Time:

End Time:

GENERAL:					
How many people live in your household?					
Number of Females?			**Number of Males?**		
Ages:					
Who is the head of your household?	**self**	**other**	**If other: FATHER / MOTHER / GRANDMOTHER/ GRANDFATHER / UNCLE / CHILD / OTHER**		
SECTION 1: WATER USE AND ACCESS					
1. What sources of water are available for your household/community? please circle					
Water Tap Borehole River/Stream from roof Captured Rainwater: unprotected Spring Water: Other					
2. Which of these do you use on a daily basis (your main water supply)? pls circle					
Water Tap Borehole River/Stream from roof Captured Rainwater: unprotected Spring Water: Other					
3. Who collects the water?	SELF / OTHER		If other: FATHER / MOTHER / GRANDMOTHER/ GRANDFATHER / UNCLE / CHILD / OTHER		
4. How frequently is water collected?	_____ times per day		_____ times per week		
5. Do you have water pipes installed in your yard/home?	YES		NO		
6. Who installs water taps in your area?					
7. If you don't have yard/home tap, how far is your daily water source?	within 200m	between 200 - 500m	500m to 1km	more than 1km	
8. In the case of water taps not working, how long has this been the case?	1 week	1 month	6 months	1 year	More than 1 year
9. How would you rate the amount of your preferred water supply?	Acceptable		Not Acceptable		
Please explain:					
10. How would you rate the quality of your preferred water supply?	Acceptable		Not Acceptable		
Please explain:					
11. How long does it take you to get to the water collection source?	less than 30 mins		30 mins – 1 hour		more than I hour
12. Any suggestions for improving your water situation?					

4

WATER FOCUSED HOUSEHOLD SURVEY

The aim of the questionnaire is to better understand the way water is used and perceived in your household, and how it contributes to health of the community and livestock. This questionnaire was compiled by UCP as part of the landscape stewardship work. The questionnaire should take no more than 20-30 minutes to complete. The information is confidential and is used to help plan better outreach support.

13. In your opinion, can women in the community have more of an influence on decision making around water use at a household level?					
YES If yes, what mechanisms could make this possible?		NO		MAYBE	
SECTION 2: HYGIENE & SANITATION					
2.1. What kind of toilet facility do members of your household usually use? Please tick Flush / Pour Flush Ventilated Improved Pit Toilet Pit Toilet Without Slab Bucket No Facilities / Open Veld / Bush Other					
2.2. Are you currently able to use this toilet facility?		YES		NO Why Not?	
2.3. Have there been instances where there was an illness outbreak, and the local water was the cause?		YES		NO	
2.4. How long ago (in years) did this happen?					
2.5. Do you know what diarrhoeal symptoms are? Can you explain?					
Diarrhoea is a condition when someone has at least 3 loose, liquid or watery bowel movements a day)					
2.6. Has anyone in your household had diarrhoeal symptoms in the past four weeks?		YES		NO	
2.8. When is it important to wash your hands?					
Before preparing or eating food	Before feeding a child	After changing a nappy or cleaning a child	After defecating or using the toilet	After returning home from working outdoors	Other
2.9. Do you experience any of the following challenges around your community?					
Water pollution from livestock using the same drinking water sources:		YES		NO	
Water pollution from disposal of animal carcasses into water sources:		YES		NO	
Water pollution from littering/dumping of waste into water sources:		YES			
Other - please specify:					

Thank you for your participation.

TOOL FIVE

OBSERVER INFORMATION:				
Spring Unique ID (Eg. Your name_Village_Spring Site No)				
Observation Team (Name & Contact Details)				
Village Informant (Name & Contact Number)				
Date Of Capture				
SITE INFORMATION AND SOURCE INFORMATION				
Traditional Area:				
Village:				
GPS Location Of Source:	Latitude:	Longitude:		
Nature of Spring:				
Protected Spring	Formerly Protected Seep	Unprotected Spring	Other	
Type of Spring:				
Seep From Sub Soil	Single/Multiple Eyes Emerging From Rock	Multiple Eyes In Close Proximity	Small Waterfall	Other Pls Specify
Spring Unique ID: (Office Use ONLY)				
SPRING FLOW INFORMATION				
Volume Of Container Used (l): _____ Time To Fill Container (sec): _____ Flow Rate (L/min) (office use only) _____				
OBSERVED QUALITY				
How would you rate the quality of the water from this spring (please substantiate answer in comments)?				
Not Acceptable	Always Acceptable	Sometimes Acceptable	Comments:	
H2S Sample Code				
H2S Result	Negative (clear-yellow)	Positive (grey-black)		
Is there visible potential contamination source present?		YES	NO	
Potential source of contamination:				
Pit Latrine		Dumping Site		
Graveyard		Livestock Kraal		
Litter		Other		
Observed contamination risk?				
High	Medium	Low		
Comments:				

5

HYDROCENSUS FORM

This questionnaire was compiled to gather data about the various spring sites in each community. Questions can be added or amended based on the needs of a given project. The data is captured through interactions with a local spring informant as well as a trained representative of the implementing organisation. This can be done digitally, using mobile applications or using paper-based capture methods. All data captured is then reviewed and added to a database of springs (**Tool #6**) that can be filtered to identify the best springs to protect based on the various project mandates of the implementing party. Information related to the site must be adjusted prior to starting. (Second section under Traditional Area below).

page 2

WATER POINT FUNCTIONALITY				
Does the community use this source for water supply?	YES			NO
How often does the community collect water from this source?	DAILY	WEEKLY	MONTHLY	OTHER
Is the spring easily accessible by all people?	YES		NO	
Please describe:				
Distance from spring to community (users):	<200m	>=200m & 500m	.=500m	
Estimated number of users:				
<20	20 - 50	51 - 100	101 - 200	>200
Average waiting time at the source, please pick closest estimate:				
0min	10 min	20 min	30 min	
How reliable is the source for community water supply?				
Not Reliable	Somewhat Reliable	Reliable		
Comments:				
What efforts have the community taken to protect the spring?				
THREATS				
Are there invasive alien plants around the spring?	YES	NO		
Is the spring open to livestock?	YES	NO		
Is water being abstracted from the spring?	YES	NO		
Additional comments about the spring ...				
Would you like to flag this spring?	YES	NO		
Photo of spring eye:	YES	NO		
Photo of spring background included:	YES	No		

TOOL SIX

OBSERVER INFORMATION:		
Deployment:	Hydrocensus	Hydrocensus
Enumerator:		
Site Number:	1	2
Spring Unique ID (Eg. Your name_Village_Spring Site No:		
Observation Team (Name & Contact Details):		
Village Informant (Name & Contact Number):		
Date Of Capture:		
SITE INFORMATION AND SOURCE INFORMATION		
Traditional Area:		
Village:		
GPS Location Of Source: Latitude:	Longitude:	
GPS Location Of Source: Method	**GPS**	**GPS**
Nature of Spring:	**Unprotected Spring**	
Type of Spring:	Single/Multiple Eyes Emerging From Rock	Multiple Eyes In Close Proximity
Spring Unique ID (Office Use ONLY)		
SPRING FLOW INFORMATION		
Volume Of Container Used (l):	11	1
Time To Fill Container (sec):	26,716	129,192
Flow Rate (L/min):	2,24	0,46
OBSERVED QUALITY		
How would you rate the quality of the water from this spring (please substantiate answer in comments)?		
	Always Acceptable	Not Acceptable
Comments:	The spring always flowing throughout the year, the water appears to be clear.	It's in a steep slope, it is not easily accessible. The flow of the spring is too slow.
H2S Sample Code:		
H2S Result:	Negative (clear-yellow)	Positive (grey-black)
Is there visible potential contamination source present?	YES	YES
Nature of contamination?	Litter around spring site.	Livestock Kraal
Distance to closest identified source of contamination? (If Any) Estimate in Meters.	1	1
Location of potential source of contamination relative to spring site:	Around Spring Site	Around Spring Site
Observed contamination risk:	Low	High

6

HYDROCENSUS OR SPRING SOURCE DATABASE

This is an extract from the Spring Source Database compiled using the hydrocensus form in Tool 5. Note that examples of comments have been left under site 1 and site 2 in this form to illustrate the type of information gathered.

page 2

WATER POINT FUNCTIONALITY		
Observed contamination risk (Comments):	The litter is not from substances that are toxic, most of it is below the spring.	There's cow dung in the spring, litter as well. The mud around the spring has a terrible smell.
Does the community use this source for water supply?	YES	NO
Does the community currently use this source for water supply?	YES	NO
How often does the community collect water from this source?	Daily	Monthly
Is the spring easily accessible by all people?	YES	NO
Please describe why...		The spring is very far from the community. The accessibility is very poor because of the rocks along the way.
Distance from spring to community (users):	<200m	>=500m
Estimated number of users:	<=20 & <50	<20
Average waiting time at the source, please pick closest estimate...	0 min	30 min
How reliable is the source for community water supply?	Reliable	Somewhat Reliable
How reliable is the source for community water supply? Comments ...	There is always water it doesn't dry up. Accessibility is good. The water is clean. The spring water flows in high volumes.	The spring is seasonal, the spring is not protected. Waiting time is too long.
What efforts have the community taken to protect this spring?	Some work had been done on the spring in the past, the structure has since fallen apart.	None
Person Responsible for maintenance (name & contact number)?	None Available	None

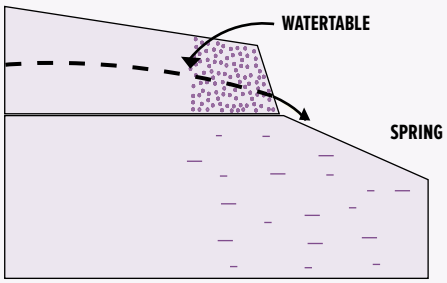
THREATS		
Are there invasive alien plants around the spring?	YES	YES
Is the spring open to livestock?	YES	YES
Is water being abstracted from the spring?	YES	YES
Additional comments about the spring ...	The spring is not protected The alien plants are too close to the source of the spring The is litter around .	The flow of the spring is very poor and the spring's mud is stinking with litter around. The spring is unprotected.
Would you like to flag this spring?	YES	NO
Photo of spring eye	https://api.mwater.co/v3/images/5d0acb187dcc4ab49f630316a13ae30a	https://api.mwater.co/v3/images/9d7b56d6452f45bdb65046e1c57e52f9
Photo of spring background included	https://api.mwater.co/v3/images/ad7bfa65006c41348d47db1553d3d5d4	https://api.mwater.co/v3/images/17602b2aa8a648cc86ee323370b4fead

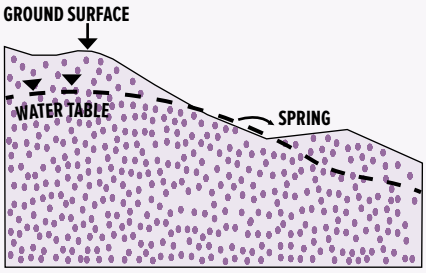
TOOL SEVEN

TYPES OF SPRINGS

7

TYPES OF SPRINGS





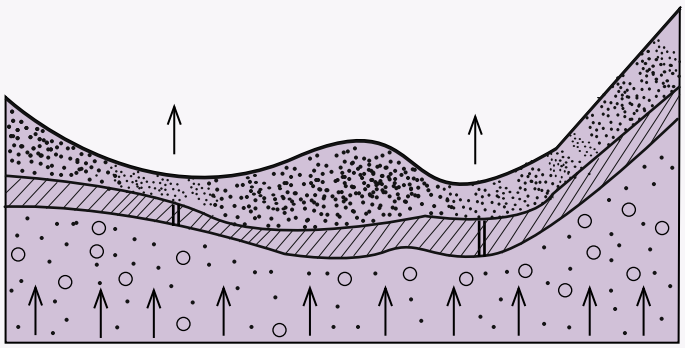
Geological cross section of a gravity spring or seep – topography controlled. *(from Pearson et al, Volume 2, 2003)*

Spring water is ground water that appears at the surface. In *Volume 2 of the WRC report* (Pearson et al, 2003), John Weaver, describes three reasons why ground water appears at the surface in the form of a spring or seep. Firstly, there are seepage springs where the land surface cuts below the water table and ground water thus seeps out at the surface. This is typically a gravity spring. Secondly, barrier springs occur where a barrier of rock with a lower permeability lies upgradient to a rock type with a higher permeability. The ground water flow becomes blocked by the less permeable rock, increasing the pressure and causing the ground water to overflow at the surface as a spring. Finally, artesian springs occur where a geological fault or discontinuity allows deep groundwater that is confined by low permeability rock to be forced to the surface as an artesian well.

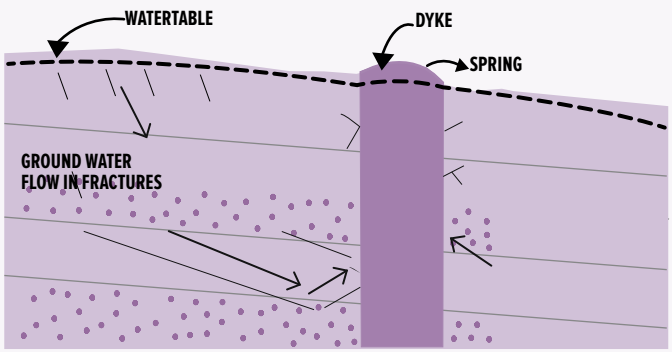
Gravity springs, illustrated left, emerge from the side of a slope and are due to the gravitational flow of groundwater. There are two hydraulic categories of springs: gravity springs and artesian springs. Gravity springs can be controlled by either geology or topography. Those controlled by geology are often found in the foothills of the Lesotho Drakensburg, the Eastern Cape and up the escarpment to Mpumalanga.

Flow and reliability of gravity springs are controlled firstly by the extent of permeable formation within the catchment. This controls the volume of water stored in the aquifer and is related to the reliability of the spring. If there is a significant storage volume and a relatively low rate of outflow, then the springs will be reliable. Conversely if the catchment storage volume is low, and the outflow rate is high then the springs will be less reliable. Secondly the rate of recharge of rainwater to the aquifer will impact on the available water.

Artesian Springs are due to the release of groundwater under pressure and generally flow vertically out of the ground. Artesian spring *(from Meuli and Wehrle, 2001)*



Geological cross section of a **Fault Controlled Cross-slope Spring**, with an impermeable dyke causing the barrier. (from *Pearson et al, Volume 2, 2003).*



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TOOL EIGHT

VELD SANITATION CONCEPTS & KEYWORDS FOR TRANSLATION

8 VELD SANITATION CONCEPTS & KEYWORDS FOR TRANSLATION

Select the ones that are relevant in your community.

KEYWORD	ENGLISH MEANING OXFORD DICTIONARY	TRANSLATION *Include Sentence If Helpful*	KEYWORD	ENGLISH MEANING OXFORD DICTIONARY	TRANSLATION *Include Sentence If Helpful*
Veld sanitation	Good practices, land use & water resolution.		Biodiversity	The variety of plant and animal life in the world or in a habitat.	
Conserve	We need to conserve our natural resources and our nature. i.e. to protect something from harm.		Sustainable	To maintain something.	
Wetlands	A place where the land is covered by water.		Alien plants	Plants that are not origionally from Southern Africa.	
Ecosystem	Plants and animals that live in an area together.		Organisms	An individual animal, plant or single celled life form.	
Fertilizers	Substance added to soil to increase its fertility.		Insecticides	A substance used in killing insects.	
Livestock	Domesticated animals raised in an agricultural setting to produce labour and commodities such as meat, eggs, milk, and wool.		Animals	Any living creature including man, lion,	
Biome	A large region of earth that has a certain climate and certain types of living things. Major Biomes include Forests, grasslands, and desserts.		Veld	Open, uncultivated country or grassland in Southern Africa. It is conventionally divided by altitude into highveld, middelveld, and lowveld	
Sanitation	Refers to public health conditions related to clean drinking water and adequate treatment and disposal of human excreta and sewage.		Contaminated / contamination	Having been made impure by exposure to or addition of a poisonous or polluted substance.	
Faeces	Waste matter eliminated from bowels.		Intensity	The strength or force of something.	
Infiltration	Movement of a liquid into something by filtration.		Pollution	The presence in or introduction into the environment of a substance which has harmful or poisonous effects.	
Separate water sources	Different places to collect water from		Erosion	The process of eroding or being eroded by wind, water, or other natural agents	
Climate change	A change in global or regional climate patterns, attributed largely to the increased levels of atmospheric carbon dioxide produced by the use of fossil fuels.		Atmosphere	The envelope of gases surrounding the earth	
Evaporation	The process of turning from liquid into vapour		Vapour	a substance diffused or suspended in the air, especially one normally liquid or solid – i.e. water	
Precipitation	Rain, snow, sleet, or hail that falls to or condenses on the ground.		Groundwater	Is water that exists underground beneath the land surface.	
Run off	Involves water or other liquids running off something by overflowing and possibly flooding an area.		Water cycle	The circulation of the earth's water, in which water evaporates from the sea into the atmosphere, where it condenses and falls as rain or snow,	
Germs	Microorganism, especially one which causes disease.		Dehydration	A harmful reduction in the amount of water in the body.	
Diarrhoea	A condition where someone has at least 3 loose, liquid or watery bowel movements a day.		Reduce	Make smaller or less in amount, degree, or size	
Water borne diseases	Are conditions caused by pathogenic micro-organisms that are transmitted in water. These diseases can be spread while bathing, washing.		Water related diseases	Are conditions caused by pathogenic micro-organisms that are transmitted in water. These diseases can be spread while bathing, washing, drinking water, or by eating food exposed to contaminated water.	
Reuse	Use again or more than once.		Recycle	Convert (waste) into reusable material.	
Recover	Return to a normal state of health, mind, or strength				

TOOL NINE

PRE- AND POST TRAINING QUESTIONS

9

VELD SANITATION PRE- AND POST TRAINING QUESTIONS

Questions can be answered verbally or written, individually or as a group.

1. What are germs?

_____

_____

_____

2. Do you agree with this statement:

It is very important to wash your hands many times during the day in work and at home?

☐ Agree
☐ Disagree

3. In the veld, it can be challenging to wash your hands with soap and water. How do you clean your hands when you are in the veld?

_____

_____

_____

4. Complete the sentence:

4.1 Before, _____, I wash my hands.

4.2 After, _____, I wash my hands.

5. Name 1 or 2 handwashing actions to improve the health of the community?

_____

_____

_____

_____

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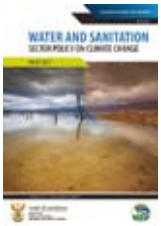

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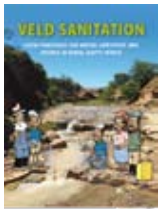

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FOOTNOTES

Footnote #1 (PAGE 7) - *https://bit.ly/3rJ8D4A.*

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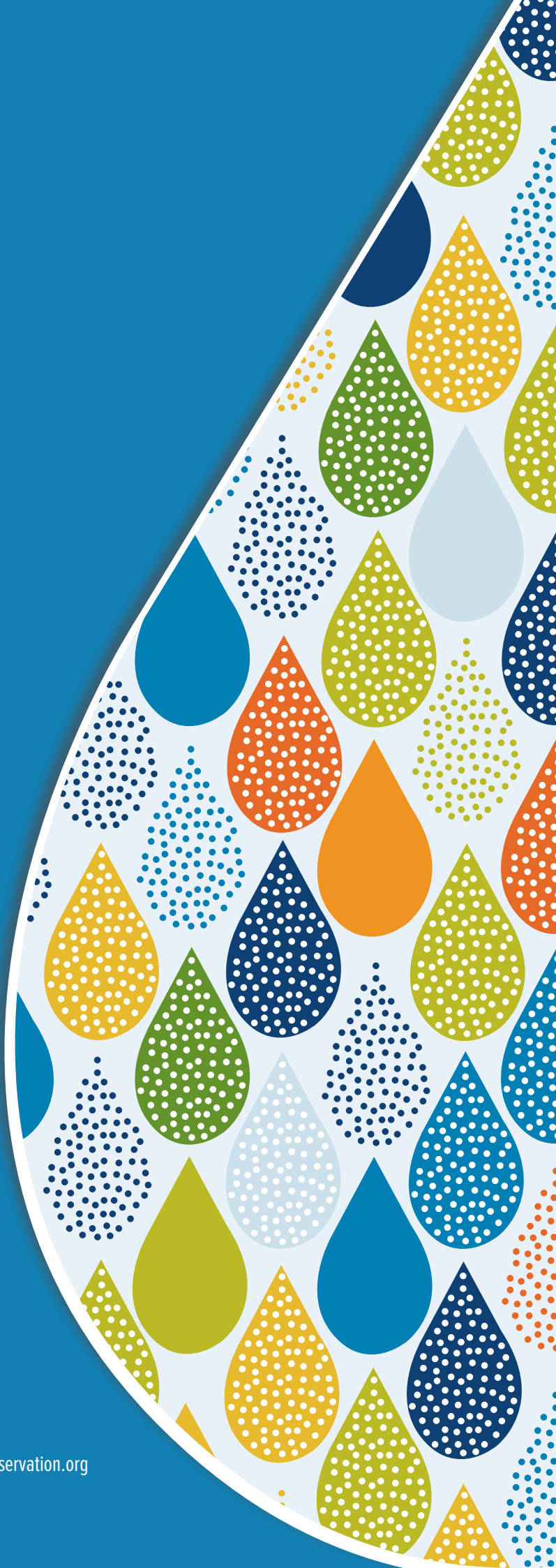

UMzimvubuCatchmentPartnershipProgramme

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