Capacity Building for Climate Change Adaptation and Disaster Risk Reduction in Rural Communities: Tsengiwe, Eastern Cape

Report to the
WATER RESEARCH COMMISSION

by

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EXECUTIVE SUMMARY

In South Africa the most common natural hazards are floods, storms, wild fires and drought. The Southern African region is regarded as one of the most vulnerable regions in Africa to climate change and variability, in part, due to its low adaptive capacity and inherent vulnerability (IPCC, 2007). If the changes in climate observed over the last century persist, the potential impacts on water resources are likely to become more diverse and severe (Kusangaya et al., 2013).

The extent and state of water infrastructure in South Africa varies widely across the country. Vast rural areas are still without access to an adequate, safe water supply or proper sanitation and there is an urgent need for service delivery to address this backlog. The existing infrastructure in municipalities is under strain and can often not cope with the increasing demand. To sufficiently manage this vital resource, it is imperative to formulate a participatory approach, good governance and communication between all stakeholders.

This report summarises the process of engaging the rural Eastern Cape community of Tsengiwe in planning for climate change adaptation (CCA) at a local level. Tsengiwe is located within the Sakhisizwe Local Municipality (LM), which is a Water Services Provider (WSP) within the Chris Hani District Municipality (CHDM) in the Eastern Cape. The CHDM has been declared a drought affected region. The need to tackle the issue of climate change through adaptation measures and a disaster risk reduction (DRR) programme in the area has been recognised.

In villages such as Tsengiwe, a lack of long-term disaster planning and poor coordination between water services and disaster management at the local level compounds the exposure of risk in communities. Grassroots or community involvement in climate change adaptation (CCA) planning and implementation will be critical, and needs to be supplemented by the effective functioning of relevant service delivery sectors.

The WRC project 1888/1/11 highlighted that DRR provides a useful and practical lens through which to view challenges that can affect water and sanitation services. According to this framework, potential threats to successful and sustainable service delivery are used as starting points for positive change or to initiate plans to mitigate the risks they pose. Tsengiwe was seen as a suitable case study for a follow up study because the team was able to draw on established connections. During Project 1888/1/11 the study team gained an understanding of the institutional hazards and contextual issues faced by Tsengiwe. This information placed the team in a position to facilitate Participatory Rural Appraisal (PAR) processes to assess community perception of risk and deepen the community's understanding of DRR through catalysing community-led processes for CCA.

The purpose of the study was to gain an in-depth understanding of the rural challenges in adapting to climate change, to understand the role of community based organisations (CBOs) and community-level coping strategies, and how to cohere and optimise these with local and district municipal resources and initiatives and sustainable water services. The study identified the need for the development of a common vision and purpose from village to DM level to improve assurance of water supply, particularly developing resilience at village and household level through efficient use of water and sustainable use of land. In order to achieve this it was necessary to map the community's water sources, reticulation, storage and the municipal service delivery process. Study outcomes include:

- Creating plans to undertake disaster risk assessment at a community level;
- Catalyse community led CCA and other DRR measures;
- Strengthen partnerships between the community and LM, District Municipality (DM) and provincial and national stakeholders, and local mentors;
- Monitor study progress and evaluate the impacts of community CCA initiatives; and
- Produce video documentation of the study.

The study was informed by theories around Participatory Action Research (PAR). The key phases of PAR generally involve a spiral of self-reflective cycles which are also captured in

the Review, Reflect, Revise process described by the previous WRC studies. The adaptive process of PAR was applied throughout the study. Specific facilitation techniques such as Participatory Mapping, Participatory Rural Appraisal (PRA), and Constructive Dialogue were implemented in three, one-week workshops.

The main results of the first workshop were:

- The identification of hazards experienced by the community;
- Community level hazard ranking; and
- Disaster risk assessment at local community level informed by community perceptions and specialist opinion.

The second workshop facilitated communication between Tsengiwe and the Sakhisizwe municipality, the DWA, DRDAR, Department of Environmental Affairs and other officials in order to gain their support with and input into the climate change adaptation processes initiated within and by the Tsengiwe community. The team further facilitated links between Tsengiwe and nearby school-greening projects, Mbewula and Three Crowns. This workshop was successful in catalysing and evaluating risk reduction measures that could be undertaken at the community level, culminating in community CCA Plans, each led by a Committee and a Committee Leader. The community progressed from expectations of receiving and moved towards aspirations and documented ideas on what they can do.

A third follow up workshop was organised to monitor the progress of the community CCA plans. During the third workshop, a system for M&E of municipal water services delivery and the CCA Plans was developed, and village youth were trained in basic research. The youth signed contracts for undertaking the M&E work.

Study results include:

- Community-level hazard ranking;
- Risk Assessment methodology and results;
- Contact with local mentors and government stakeholders;
- Study video;
- Five Community Plans for CCA each led by a Committee and Committee Leader;
- Study hand over to the University of Fort Hare and Rhodes University;
- Increased community understanding of risk and hazard and the importance of cooperative risk management; and
- Community-led Monitoring and Evaluation system.

A challenge with regards to the risk assessment was the conflation of hazard and risk on the part of the community. The risk reduction game Riskopoly provided an experiential basis from which to discuss risk. The game highlighted the role of games in increasing community understanding of slow onset disasters and how to prepare for multiple hazards simultaneously in order to reduce risks.

Although direct links, facilitated by the research team, provided the community with useful information and contacts, official mobility and unresponsiveness at the local and regional level poses a challenge for the CCA Committees.

There were several challenges in working with youth on the M&E, namely that they are more mobile than other members of the community and have a variety of competing interests. In total, ten community members signed M&E contracts but only five completed the work. The surveys were incomplete and highlighted that in many instances the committees had not followed through with plans. The research team emphasized that the M&E team would not get paid if they did not get the work done, requiring M&E members to make the choice to do the work or not get paid.

Recommendations for similar studies include:

- Inspire communities through site visits;
- Create links with local authorities and specialists;
- Multi-generational M&E;

- Sustained support and contact is needed in participatory M&E;
- PAR studies require more than three years of face-to-face contact after initial catalysing and project funding needs to factor this in;
- Formalise collaboration with external projects for on-going support;
- Negative attitudes of peers can be overwhelming even for positive deviants;
- Ensure participation of a wide range of community members;
- Games and participatory mapping are valuable tools for community engagement; and
- Advancing in one area of CCA in a determined fashion may be more beneficial than a too-broad focus.

It is hoped that the study will inform and influence the development of CCA at a rural community level while also providing insight into the challenges encountered and lessons learnt in order to assist similar future studies.

ACKNOWLEDGEMENTS

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Students and Recent Graduates Capacity Building

Table 1: Student and Recent Graduates Involved in Study

Forename(s)	Surname	Gender	Race (White, Indian, Coloured or Black)	Qualification	Institution	Country of Origin	ID or Passport number	Proof of Registration Submitted	Tasks
Jessica	Lee	F	W	B Soc Sci (student)	University of Cape Town	South Africa	8809220146084	Yes	Chief videographer
Vakanai	Shoko	M	B	BSc (Hons) (student)	University of Stellenbosch	Zimbabwe	BN049090	Yes	Weather data analysis and GIS mapping
Willem Stefan	Conradie	M	W	BSc (Hons) (student)	University of Cape Town	South African	8810045244088	Yes	Proofreading, revision and development of indices
Paula	Hay	F	W	MA (student)	University of Cape Town	South Africa	8705310501081	Yes	Social anthropology researcher, report writing, and video supervisor
Olivia	Davis	F	W	B Soc Sci (student)	University of Cape Town	South African	8809290108089	Yes	Field work, reporting and processing of information
Amy	McConaghy	F	C	BA (Hons) (recent graduate)	University of Cape Town	Britain/ South Africa	706833102	Yes	Graphics
Greg	Dor	M	W	BSc (Hons) (recent graduate)	University of Cape Town	South Africa	9006185289087	Yes	Data analysis, reporting and Risk Assessment
Sinawo	Jack	M	B	BSc (Hons) (recent graduate)	University of Fort Hare	South Africa	8910165800089	Yes	Hydrocensus
Bosenberg	Erin	F	W	MFA (student)	University of Witwatersrand	South Africa		Yes	Workshop 1 video production

Maponopono	Naledi	F	B	BSocSci (student)	University of Cape Town	South Africa	9210050541081	No	Translation of surveys and film script English into isiXhosa
Danielle	Sher	F	W	Television Production (Hons) (recent graduate)	University of Cape Town	South Africa	9011190033082	No	Project video production

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ACWR	-	African Centre for Water Research
ARC	-	Agricultural Research Council
BOM	-	Australian Government Bureau of Meteorology
°C	-	Degrees Celsius
C	-	Coping Capacity
CBM&E	-	Community-based Monitoring and Evaluation
CBO	-	Community Based Organisation
CCA	-	Climate Change Adaptation
CHDM	-	Chris Hani District Municipality
CIPRO	-	Companies and Intellectual Properties Office
CLTS	-	Community-Led Total Sanitation
CSIR	-	Council for Scientific and Industrial Research
DAFF	-	Department of Agriculture, Forestry & Fisheries
DANIDA	-	Danish International Development Agency
DBSA	-	Development Bank of Southern Africa
DEAEAT	-	Department of Economic Affairs, Provincial Department Environment and Tourism
DFID	-	Department for International Development
DM	-	District Municipality
DMC	-	Disaster Management Centre
DRDAR	-	Department of Rural Development and Agricultural Reform
DRM	-	Disaster Risk Management
DRR	-	Disaster Risk Reduction
DST	-	Department of Science and Technology
DWA	-	Department of Water Affairs
EC	-	Electrical Conductivity
FAO	-	Food and Agricultural Organisation
GIS	-	Geographic Information System
H	-	Hazard
HFA	-	Hyogo Framework for Action
HIV/AIDS	-	Human immunodeficiency virus infection / acquired immunodeficiency syndrome
HR	-	Human Resources
IDASA	-	Institute for Democracy in Africa
IDP	-	Integrated Development Plan
IFAD	-	International Fund for Agricultural Development
IWRM	-	Integrated Water Resource Management
Km	-	Kilometres
LM	-	Local Municipality
m	-	Metres
M&E	-	Monitoring and Evaluation
MAP	-	Mean Annual Precipitation
MoU	-	Memorandum of Understanding
NGO	-	Non-governmental Organization
NRF	-	National Research Foundation
NWA	-	National Water Act
NWPR	-	National Water Policy Review
NWRP	-	National Water Resource Plan
NWRS	-	National Water Resource Strategy
P	-	Probability
PAME	-	Participatory Assessment Monitoring and Evaluation
PAR	-	Participatory Action Research
pH	-	Potential of Hydrogen (acid/alkaline balance)

PM&E	-	Participatory Monitoring and Evaluation
PRA	-	Participatory Rural Appraisal
QMS	-	Quality Monitoring Standards
R	-	Risk
RDP	-	Reconstruction and Development Programme
S	-	Severity
SAICE	-	South African Institution of Civil Engineering
SANS	-	South African National Standards
SGB	-	School Governing Board
SIDA	-	Swedish International Development Cooperation Agency
StatsSA	-	Statistics South Africa
UFH	-	University of Fort Hare
UN/ISDR	-	United Nations International Strategy for Disaster Risk Reduction
UNDP	-	United Nations Development Programme
V	-	Vulnerability
WCDM	-	Water Conservation and Demand Management
WD-SA	-	Water Dialogues South Africa
WfGD	-	Water for Growth and Development
WMA	-	Water Management Authority
WRC	-	Water Research Commission
WRM	-	Water Resource Management
WSA	-	Water Services Authority
WSDP	-	Water Services Development Plan
WSP	-	Water Services Provider

1. INTRODUCTION

South Africa is a semi-arid country with an average rainfall of 500 mm per annum, comparatively lower than the world average of 860 mm (Annandale et al., 2011). This rainfall is unevenly distributed in that 65% of the country receives less than 500 mm of rain annually (which is considered the minimum for successful dry-land farming) while 20% receives less than 200 mm per annum.

The Southern African region is regarded as one of the most vulnerable regions in Africa to climate change or climate variability, in part, due to its low adaptive capacity and inherent vulnerability (IPCC, 2007). In South Africa the most common natural hazards are floods, storms, wild fires and drought. In the last 30 years, drought has affected 95% of South Africans (Annandale et al., 2011). Climate change is likely to cause an increase in the frequency and severity of extreme weather events. Damage due to these events has already been estimated to be at least one billion rand per year between 2000 and 2009 (Annandale et al., 2011). There are diverse views regarding the projected magnitude of climate change in Southern Africa and the possible impacts in terms of land and water resources but if the changes in climate observed over the last century persist, the potential impacts on water resources are likely to become more diverse and severe (Kusangaya et al., 2013).

Temperature records in Southern Africa highlight that over the last decades the region has experienced a warming trend (see Figure 16 in Shulze, 2011). Temperature changes may lead to changing rainfall patterns, the spatial and temporal distribution of runoff, soil moisture and groundwater reserves, as well as an increase in the frequency and occurrence of droughts and floods (Schulze, 2011; Kusangaya et al., 2013). The spatial and temporal availability of water resources can thus be altered with changes in temperature (Kusangaya et al., 2013). Arid and semi-arid regions like South Africa are likely to get drier due to climate change than more humid areas and are likely to experience the greatest global warming; of 0.2-0.5°C per decade (Christensen et al., 2007 in Kusangaya et al., 2013). Rainfall in South Africa is already characterized by high annual variability fluctuations. The projected impact of climate change will likely place increased stress on the water sector and management of this resource is imperative.

The extent and state of water infrastructure in South Africa varies widely across the country. Vast rural areas are still without access to an adequate, safe water supply or proper sanitation and there is an urgent need for service delivery to address this backlog. The existing infrastructure in municipalities is under strain and can often not cope with the increasing demand. To address this problem a number of national legislative and policy measures have been implemented stipulating that the resource be equitably, sustainably and efficiently managed (DWA, 2013a). The National Water Research Strategy 2 (NWRS 2) (DWA, 2012) also recognises the increased threats posed by climate change and advocates for the implementation of disaster risk reduction (DRR) and climate change adaption (CCA) strategies.

There is urgent need for a participatory approach, good governance and communication between all stakeholders to sufficiently manage this vital resource. At a provincial level, the All Towns Reconciliation Strategies Study for the Eastern Cape (DWA, 2011a) demonstrates that most of the current water supply problems and restrictions experienced in many towns and villages could be avoided by proper management of the existing schemes. It emphasises that this process needs to be accompanied by skills development and training on all levels within the municipal structure to ensure these local schemes are operated in a reliable and efficient manner.

This report summarises the process of engaging the rural Eastern Cape community of Tsengiwe in planning for CCA at a local level. Tsengiwe is located within the Sakhisizwe Local Municipality (LM), which is a Water Services Provider within the Chris Hani District Municipality (CHDM) in the Eastern Cape. The closest town to Tsengiwe is Cala, with the

towns of Eliott and Queenstown 30 km to the North East and 100 km to the South West away respectively (**Figure 1**).

At the District Municipal level, the CHDM Water Services Authority (WSA) is tasked with implementing water supply schemes. It has been declared a drought affected region and the need to tackle the issue of climate change through an adaption and DRR programme in the area has been recognised. Elsewhere in the Eastern Cape, there is as yet limited long-term disaster planning and coordination between water services and disaster management at the local municipal level. In villages such as Tsengiwe, this lack of planning compounds the exposure risk of communities. Grassroots or community involvement in climate change adaptation planning and implementation will be critical, and needs to be supplemented by the effective functioning of relevant service delivery sectors.

The purpose of the study was to gain an in-depth understanding of the rural challenges in adapting to climate change, to understand the role of community based organisations (CBOs) and community-level coping strategies, and how to cohere and optimise these with local and district municipal resources and initiatives and sustainable water services. Key aims of the study included:

- Create plans for disaster risk assessment at the community level (**Section 5.2**);
- Catalyse community led CCA and other DRR measures (**Section 5.3**);
- Strengthen partnerships between the community and LM, DM and provincial and national stakeholders, and local mentors (**Section 5.1**);
- Monitor study progress and evaluate the impacts of community CCA initiatives (**Section 5.5**); and
- Produce a video documentation of the study.

The study was informed by theories around Participatory Action Research (PAR). The key phases of PAR generally involve a spiral of self-reflective cycles (Kemmis & McTaggart, 2007) which are also captured in the Review, Reflect, Revise process described by Water Research Commission (WRC) 1888/1/11, 2011. These are listed as:

- Planning a change;
- Acting and observing the process and consequences of the change (Review);
- Reflecting on these processes and consequences (Reflect);
- Re-planning (Revise);
- Acting and observing again (Review); and
- Reflecting again (Reflect).

These are incorporated into the CCA Plans and Monitoring and Evaluation (M&E) programme described further in **Section 5.3** and **Section 5.5**, respectively. It is often the case that through the Review, Reflect, Revise process initial plans become obsolete in the light of learning from experience. Success is not dependant on whether participants have followed steps faithfully but whether there has been an evolution in a community's and research team's understanding and approach (Kemmis & McTaggart, 2007).

The adaptive process of PAR was applied throughout the study. Specific facilitation techniques such as Participatory Rural Appraisal (PRA), Constructive Dialogue and Participatory Mapping were implemented in three, one-week workshops. The workshops and their outcomes were analysed and a risk assessment was conducted for the area. The results are described in **Section 5**. The risk assessment was conducted using data from the Africon Chris Hani Disaster Risk Assessment (2009). The final Aurecon report only became available after the second workshop, after which the integration of major methodological changes were no longer possible. Due to client-consultant confidentiality the methodology for this risk assessment could not be made available earlier.

The study's overall outcomes, understandings and lessons learnt in planning for CCA at a community level are reflected and expounded upon in **Section 6**. It is hoped that the study

will inform the development of CCA at a rural community level while also providing insight into the challenges encountered and lessons learnt in order to assist similar future studies.

Table 2: Community Workshop Aims and Outcomes

Workshop and Dates	Aims	Outcomes	Report Section
Workshop 1 (8-12 July 2012)	• Introduce the study and gain support at community, Department of Water Affairs (DWA), Department of Rural Development and Agrarian Reform (DRDAR), Department of Agriculture and others at the Local Municipality (LM), District Municipality (DM) and provincial level for roll out of CCA initiatives • Gather information on trends in climate, population, land use, erosion, livestock farming, water availability and environment • Initiate discussion on CCA and DRR and identify hazards experienced by the community as well as vulnerabilities and coping capacities • Unpack the understandings and attitudes of the community in Tsengiwe towards climate change • Agree on Hazard prioritisation and explore CCA options • Get input from community and authorities for the risk assessment methodology • Strengthen community partnerships and support the community to take full responsibility and ownership of the study. • Capture workshop proceedings on video to serve as a resource in developing risk assessment guidelines	• Community-level hazard ranking • Risk Assessment methodology and results • Contact with local mentors and government stakeholders • Video feedback, notes and video material to be used in developing risk assessment guidelines	**Section 3.1**
Workshop 2 (20-24 May 2013)	• Report back to the residents on the exploratory workshop held in 2012, along with the outcomes of additional interim specialist studies by Umvoto • Receive feedback on the Workshop 1 video • Take the Community Steering Committee on a "farmer-to-farmer" exchange visit to see school-greening projects that could inspire and provide ideas for resilience projects • Prioritise hazards identified in workshop 1 • Catalyse evaluation of DRR measures and development of plans for CCA, each plan with own Committee Leader • Identify key goals and activities the community can undertake on their own in the short-medium term and agree on the manner in which the implementation of CCA Plans will be monitored and evaluated • Update the Sakhisizwe Municipality, DWA,DRDAR and other officials to the climate change adaptation processes being undertaken by the Tsengiwe Community • Facilitate communication between potential local mentors, successful development projects, and relevant authorities at LM and DM level and gain specialist input from representatives to the workshop and CCA Plans • Gather knowledge of the various government support mechanisms that may be available to the	• Five Community Plans for CCA each led by a Committee and Committee Leader • Contact with local mentors and government stakeholders • Plans to be taken further under the leadership of Fort Hare and Rhodes Universities • A better understanding of the environment and identification of questions and issues with regard to possible earth dam siting and catchment potential and other strategies towards resilience • Increased community understanding of risk and hazard and	**Section 3.2**

Workshop and Dates	Aims	Outcomes	Report Section
	community, and to seek advice and assistance from these institutions	importance of cooperative risk management	
Workshop 3 (5-9 August 2013)	• Evaluate the study progress, challenges, success and solutions as input to the M&E report • Receive feedback from each Committee on work and progress on each CCA Plan and revise each plan as needed • Create a spatial representation of the infrastructure and resources of Tsengiwe Village as they related to the CCA Plans • Facilitate links between the Tsengiwe community, DWA and DRDAR • Enhance the community's knowledge of government support mechanisms available to the community • Train youth in basic M&E to hold CCA Plan Committees accountable • Develop system for M&E municipal water services delivery • Final analysis of the impact/worth of the intervention on CCA and DRR in Tsengiwe • Formally hand over resource packs for each of the Tsengiwe CCA Plans	• M&E system in place • Community map for each CCA Plan • Updated CCA Plans • Contact with local mentors and government stakeholders • M&E system and youth M&E team	**Section 5**

In this study emphasis was placed on the water service infrastructure, water service delivery and disaster management sector. Without effective and reliable service delivery at LM and DM level the full impact of water shortages, food insecurity and health impacts are felt at village level and are exacerbated by climate change. This study identified the need for development of a common vision and purpose from village to DM level to improve assurance of water supply, particularly developing resilience at village and household level through efficient use of water and sustainable use of land. In order to achieve this it was necessary to map the community water sources, reticulation, storage and the municipal service delivery process.

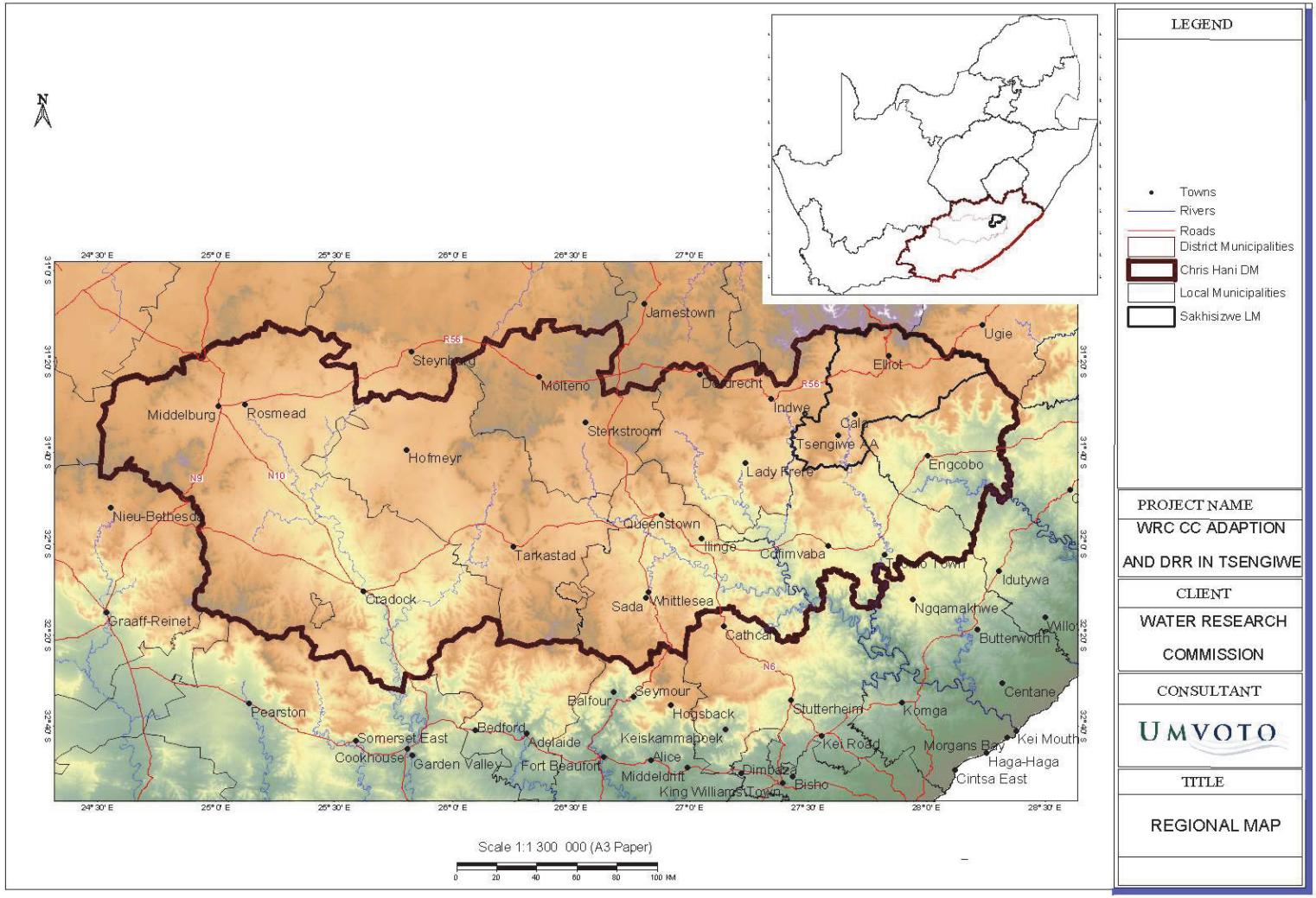

Figure 1: Tsengiwe Locality Map

2. STUDY HISTORY

This study was initiated as a follow up to WRC project No.1888/1/11 titled *A Risk-based Methodology to Assess Social Vulnerability in the Context of Water Infrastructure*. The focus of this previous study was the nexus between Water Resource Management (WRM) and DRR at local level. Project 1888/1/11 proposed a methodology for understanding vulnerability and resilience to water-related hazards and identified opportunities to mainstream DRR into water services aspects. The study developed indicators for community level DRR by adapting the Hyogo Framework of Action (HFA), an international Framework for DRR to which South Africa is a signatory, to the community level. The study identified Tsengiwe (Cala) as a suitable case study due to the presence of the Masiphile Study which was a community and church supported development centre.

Project 1888/1/11 highlighted that disaster risk management provides a useful and practical lens through which to view challenges that can affect water and sanitation services. According to this framework, potential threats to successful and sustainable service delivery are used as starting points for positive change or to initiate plans to mitigate the risks they pose. The study also highlighted that institutional dysfunction is a man-made hazard in the water services sector. The lack of relevant skills and continuity in personnel at all levels within municipalities is causing problems in the operation and maintenance of water supply schemes and water services, along with poor planning and no pre-emptive interventions of water services institutions. In Tsengiwe it was apparent that political motivation and self-interest often trumped service delivery. Further to this, the relationship between villagers and the LM was adversarial.

One of the outputs of Project 1888/1/11 was a conceptual approach to mainstreaming risk management in water services. The approach presented WSAs and Water Service Providers (WSPs) a way to integrate the psycho-socio-political and institutional dimensions of risk into all aspects of infrastructure development, and operations and maintenance for sustainable water and sanitation service delivery. The Conceptual Framework, while targeting municipalities, emphasized that the level to which receiving communities are engaged and empowered to participate actively, constructively and creatively in decision making and implementation are key determinants to the success and sustainability of any service delivery project. In addition, moving a group of people towards the interactive end of the spectrum is a process of relationship and capacity building between all parties, which takes time to develop.

In a country where the empowerment of all its citizens, especially the most vulnerable and marginalized is its ultimate vision, developing robust and mature tools for participation and communication is essential. It was in this vein that this follow up study proposed to focus on community level DRR and climate change adaptation. Tsengiwe was seen as a suitable case study for a follow up study because the research team was able to draw on established connections and the Masiphile Project had grown and now received funding from the Department of Science and Technology (DST) in cooperation with Rhodes University and the University of Fort Hare (UFH). Having gained an understanding of the institutional hazards and contextual issues during Project 1888/1/11 the research team was in a position to facilitate PRA processes to assess community perception of risk and deepen the community's understanding of DRR through catalysing community-led processes for CCA and M&E.

3. STUDY ACTIVITIES

The study process and the outcomes produced are documented in this report. **Table 3** below provides a summary of work conducted and deliverables submitted in the course of the study. The discussion section (**Section 6**) details the study process and products, and provides a summary on lessons learned in light of the approach adopted, social theory considerations and suggested best practices that can be taken forward.

Table 3: Work Conducted per Deliverable: Purpose and Method

Deliverable	Dates	Purpose	Methods and Outcomes	Report Section
Detailed Methodology	01/04/12-30/04/2012	• Confirm study approach	• Decisions on approach were detailed in the Methodology Report (Umvoto, 2012)	**Section 3**
Community Hazard Ranking	Planning 15/04/12-15/06/12 Materials Preparation 15/06/12-01/07/12 Workshop 08/07/12-15/07/12	• Initiate discussion on CCA and DRR • Gather information on hazards, risks, social and institutional issues, animal numbers etc. • Agree on risk prioritisation and explore CCA options	• Workshop in Tsengiwe/ Cala-meetings held with Tsengiwe community and LM and DM • Specialist risk assessment • PRA (community hazard ranking, problem/ solution tree)	**Section 3** **Section 5.2**
Design Risk Assessment Results and CCA Recommendations	15/06/12-30/09/2012	• Propose a methodology that will allow for recommendations to prioritise and improve design of interventions in rural communities	• The data gathered from the initial workshops was analysed and the risk assessment approach (Umvoto 2011) was refined • A risk assessment approach was recommended and prepared for Tsengiwe Village(s)	**Section 5.2**
Community Workshops	Workshops 08/07/12-15/07/12 20/05/13-4/05/13 05/08/13-09/08/13	• Expand communication with community • Disseminate risk assessment results and study progress • Facilitate communication with potential local mentors, successful development studies, and relevant authorities at LM and DM level • Evaluation of risk reduction measures and develop plans for CCA • Ensure good working relationships with community members • Agree on the manner in which the implementation of CCA Plans will be monitored and evaluated	• Community workshops and planning • Participatory mapping meetings with LM and DM officials • Facilitating face to face meetings with the LM and DM officials and Tsengiwe community members • Facilitating communication with local commercial agriculture and civil society to build basis for sustainable mentorship through field visits • Participatory mapping • Riskopoly game	**Section 3** **Section 5**
CCA Planning	15/08/12-30/01/2014	• Risk assessment and CCA planning with documented lessons learned generalised to rural communities in South Africa	• Relevant indicators for social vulnerability and coping capacity were identified • Identification of key goals	**Section 5.3**

Deliverable	Dates	Purpose	Methods and Outcomes	Report Section
		• Five Community CCA plans each led by a Committee and Committee Leader	and activities that the community can undertake on their own • Community CCA plans to be taken further under the leadership of UFH and Rhodes University	
M&E of progress and results of programme	Planning 20/05/13-4/05/13 Hand over 05/08/13-09/08/13 Results review 30/01/2014	• Evaluate the study progress, challenges, success and solutions as part input to M&E report. • Final analysis of the impact/worth of the intervention on CCA and DRR in Tsengiwe • Train youth in basic M&E to hold CCA plan committees accountable • Develop system for monitoring and evaluating municipal water services delivery	• Participatory M&E • Community follow up and M&E training workshop • Updates from community support group, team member visits • Recommendations for future risk assessment, interventions and roll out of DRR in rural areas	**Section 5.6**
Submit at least one proposal for additional funding	01/04/13-30/11/2013	• Acquire additional funding and attention for the study	• Two proposals were submitted – one to WRC, one to Development Bank of Southern Africa (DBSA)	**Appendix 3**
Video and written documentation of study	01/07/12-31/01/2014	• Use the video to support feedback at second community workshop • Provide training support material for community level CCA	• Capture elements of the study and create video on best practices and lessons learnt to illustrate how communities can adapt to climate change • Workshops, reference group meetings, landscape activities and M&E training filmed as material for the documentary.	**Project Video**

Three community workshops were held between July 2012 and August 2013. This is further detailed in **Table 3**, which describes the aims and outcomes of the study and the activities undertaken to achieve these aims. Specific activities are described in **Section 5**. The study team drew on participatory approaches to development such as PRA and Constructive and Confrontative Dialogue during three one-week workshops. PRA places an emphasis on empowering local people to assume an active role in analysing their own living conditions, problems, and potential solutions and opportunities for change. These changes can be achieved by collective action and an assumption of responsibilities by the local community. External parties act as catalysts, while study ownership rests with the community. Through Constructive and Confrontative Dialogue all stakeholders are encouraged to bring their concerns and questions to the fore so that the complexity and scope of community issues can be better understood. This is discussed further in **Section 6.**

3.1 WORKSHOP ONE: TOWARDS A RISK ASSESSMENT METHODOLOGY

The first workshop took place from 8 to 12 July 2012. The goals of this workshop included:

- Introduce the study and gain support in the community, with provincial DWA and DRM departments and LM/ DM officials for roll out of CCA initiatives;

- Gather information on trends for local climate, population, land use, erosion, livestock farming, water availability and environment;
- Identify hazards experienced by the community as well as vulnerabilities and coping capacities; and
- Unpack the understanding and attitudes of the community in Tsengiwe towards climate change and explore CCA options.

Two of the main aims of the study were to agree on a community hazard prioritisation and undertake a disaster risk assessment at a local community level. The risk assessment would be informed by community perception and experience as well as by specialist opinion and risk factor measures. The first workshop highlighted the community's conflation of hazard and risk. The difference between risk perception and risk assessment at community level was explored by combining specialist knowledge and a data dependent approach to hazard analysis and comparing that with the hazard identification and prioritization agreed upon by villagers in participatory workshops. A specialist informed risk assessment was undertaken and using facilitation techniques such as PRA and Constructive Dialogue, local perception of risk and the difference, if any, between local risk perception and specialist risk analysis was brought to the fore.

The results of the Risk Assessment for Tsengiwe Village are detailed in **Section 5.2**. The first workshop resulted in a community level hazard ranking, a climate change risk assessment and successful contact with local mentors and government stakeholders.

Figure 2: Workshop One – Facilitation

3.2 WORKSHOP TWO: CCA PLANNING, TRAINING AND MENTORSHIP

The second workshop took place from 20 to 24 May 2013 (see

The workshop was successful in terms of deepening the trust between the research team and the community and facilitating significant capacity building.

One of the goals of the second workshop was to report back to the community on the workshop held in 2012, particularly the outcomes of the specialist studies conducted by the research team. This was achieved in part through the Workshop 1 video, which served as a touchstone for reflection and discussion. The video also served to remind the community of the learning outcomes of the first workshop and provide them with an opportunity to view their own contribution to the studies progress. In addition, the research team facilitated communication between Tsengiwe and the Sakhisizwe municipality, the DWA, DRDAR, Department of Environmental Affairs and other officials in order to gain their support with and input to the climate change adaptation processes initiated within and by the Tsengiwe community. This involved meetings at the Sakhisizwe LM in Cala and organising a community forum with the Extension Officer for Tsengiwe. This provided the community with knowledge of the various government support mechanisms available at a local level.

The team further facilitated links between Tsengiwe and nearby school-greening projects, Mbewula and Three Crowns, in order to inspire Tsengiwe with new ideas and resources. The Committee leaders and members of the M&E team went on a day excursion to observe examples of crop growing, land husbandry techniques and eco-greening schemes. Both schools demonstrated approaches to reduce risk and set in place coping strategies which were inspirational and informative for participants. Feedback from those who participated in the excursion was delivered the following day to the rest of the community. This visit facilitated connections for the Committee Leaders and the School Greening Committee subsequently organised a second visit for school staff and students.

A final goal of the second workshop was to catalyse and evaluate risk reduction measures that could be undertaken at the community level. Through various PRA activities, the community developed five plans for CCA, each led by a Committee and Committee Leader. These are detailed in **Section 5.3**.

Although the team planned two community workshops, it was evident after the second workshop more contact time with the community would be valuable in order to ensure that the youth group received appropriate training for taking over the M&E work. This change is in line with PRA which allows for adaptation of study approach based on new information and community needs.

Village tour of water resources and infrastructure

Developing community climate change adaptation plans

Figure 3: Workshop Two

3.3 WORKSHOP THREE: MONITORING AND EVALUATION OF STUDY PROGRESS

A third follow up workshop was held from 5 to 9 August 2013 (see **Figure 4**) in order to monitor the progress of the community CCA plans. A key aim of the workshop was to receive feedback from each committee on work and progress in each CCA plan. The plans and M&E surveys were then revised accordingly. During the third workshop, a system for M&E of municipal water services delivery, the CCA plans and training youth in basic M&E to hold CCA plan committees accountable was undertaken. Another aim of the third workshop was to create a spatial representation of the infrastructure and resources of Tsengiwe Village as they relate to the CCA plans. This was achieved through a participatory mapping exercise conducted with the CCA plan committees. The mapping exercise, discussed in further detail in **Section 5.1.4**, built community engagement and knowledge sharing, particularly between elders and youth. It also initiated a discussion on social issues and needs. On the basis of this information the research team provided useful materials on land and water management (**Section 5.1.5**).

Hydrocensus Training

Participatory mapping and interaction with government officials

Monitoring and Evaluation Training

Figure 4: Workshop Three

4. LEGAL POLICY AND GEOGRAPHIC CONTEXT

4.1 NATIONAL WATER CONTEXT

The water balance (reconciliation between supply and demand) paints a grave picture for many water management areas being in water deficit in 2000 already, and more projected to be in deficit by 2025. The water requirements for year 2000 and the total available yield per water management area are given in tables for the year 2000 and projected to 2025 (see Figure 2-1 in WRC 1888/1/11).This information is based on both surface water and groundwater resources, and takes into account the Groundwater Reserve (DWAF, 2004). Groundwater may play a pivotal role in rural water supplies in the country, but the widespread exploitation and use of the resource has been limited historically, hampered by the widely held view that “few major groundwater aquifers exist that can be utilised on a large scale”, a view also noted in the NWRS (DWAF, 2004). This view is now slowly chancing but resistance remains at local government and community level, which diminishes their access to a sustainable water supply.

The NWRS 2 (DWA, 2012) recognises that groundwater is a significant and under-utilised resource in many parts of the country although local yields are usually quite low. The most recent estimate of sustainable potential yield of groundwater resources at high assurance is 7 500 million cubic meters per annum with potentially about 3 500 million cubic meters available for further development. This resource is however widely distributed and often far from centres of demand (DWA, 2012).

Water scarcity is looming for a number of social, historical and political reasons (Herold, 2009). The potential wide ranging impacts of climate change on water resources (availability, accessibility and demand) make a compelling case for the need to strengthen integrated water resources management institutions since decisions for water resources planning and management (including aspects of climate change impacts) are made within such structures. The supply of potable water and basic sanitation services to all inhabitants is high on the agenda of national, provincial and local government (Annandale et al., 2011; DWA, 2012).

The NWRS (DWAF, 2004) gives an overall indication of the country’s resources demonstrating that by 2025 the situation is likely to deteriorate unless interventions are successful. The updated 2012 NWRS 2 (DWA, 2012) highlights the impressive progress made in providing millions of South Africans with access to a safe water supply as the backlog was reduced from 41 % in 1994 to 5% in 2012. From 1994-2009 approximately 9 million people gained access to water that previously did not. Still, there are many South Africans who suffer from water insecurity and lack of access to reliable water supplies for domestic and productive purposes.

Many municipalities, water user associations and farmers do not meter water use and are unable to assess water losses. This is exacerbated by a lack of infrastructure asset management, operation and maintenance, resulting in demand exceeding supply in many areas. The NWRS (DWA, 2012) recognizes that one of the primary gaps in water resource management is the lack of effective institutionalization of resources in water sector business management. This has resulted in water related sectors and industries not giving water the priority it deserves.

Water is not the only ingredient for development. Other factors (skills, energy, institutional capacity, leadership, capital inter alia) must be in place for development to occur. But, water is essential development. Without it, development cannot happen or will cease. As such, scarcity of potable water is a scale independent indicator for social vulnerability and the impact will cascade from national to household scale.

4.1.1 Political & Legislative Management

The Water Act 54 of 1956 contained methods to determine and obtain entitlements to public and private water within the borders of South Africa. In addition, the Environment

Conservation Act 73 of 1989 facilitated the Government's quest towards effective protection of the physical environment (Annandale et al., 2011). This Act set the foundation for the National Water Act (NWA) 36 of 1998, which recognizes that water in South Africa is a scarce and unevenly distributed national resource which belongs to all its inhabitants. This act therefore does away with the distinction between public and private water and ensures that the National Government is responsible for the nation's water resources and use. The organization should be conducted in a sustainable manner by means of, among other things, integrated water catchment management and where appropriate the delegation of management functions to a regional catchment level so as to enable all to participate. The NWA further legislates the way in which water resources should be protected, used, developed and managed.

Water Services Act 36 Promulgated in 1998 is the legislative framework for the provision of water supply and sanitation services consistent with water resources management. The Act sets out the role of DWA in event of non-performance by provinces or local governments and establishes water services institutions. The Act establishes that the district (or authorized local) municipality represents the WSA.

Along with the National Environmental Management Act 107 promulgated in 1998, the Disaster Management Act 57 of 2002 can also be used as a vehicle for preventing or reducing risks from natural disasters. The Disaster Management Act 57 promulgated in 2002 specifically calls for emergency preparedness, rapid and effective responses to disasters and post-disaster recovery, and establishment of national, provincial and municipal disaster management centres all over the country.

There are various tools, strategies, management plans and project specific initiatives in place to address shortfalls in water service provision by all responsible parties, for example the municipal Integrated Development Plans (IDP) and Water Services Development Plans (WSDP), the NWA, NWRS, the Blue and Green Drop Certification Processes, the Water for Growth and Development (WfGD) initiative, reconciliation studies and more recently an initiative to upgrade the operations and maintenance protocols of all small scale supply schemes, including groundwater supply wellfields. The water resource reconciliation strategies developed for the metropolitan areas, and those currently underway for all other towns, villages or groups of villages in the country, will contribute to the upgrading of municipal IDPs.

The Municipal Structures Act (1998), Section 84, also emphasizes that the responsibility for providing water services rests with DMs and LMs. The Minister of Provincial and Local Government Affairs can authorize a local municipality to perform these functions. In order to ensure the practical manifestation of government for the people by the people, the local government sphere of South Africa development has been reconstructed and legislated within Local Government Municipality Structures (Act 117 of 1998) and Systems (Act 32 of 2000). Van Rooyen and Versfeld (2009) describe the role of water in the DWA National Water Resources Planning (NWRP) document: *Strategic Planning for Water Resources in South Africa: A Situation Analysis*, as important for:

- Providing domestic and social needs
- Supporting the development that will bring about economic growth,
- Maintaining the environment (with domestic and social objectives), and
- Improving overall quality of life.

Both Herold (2009) and Turton (2008) have referred to the current 'water crisis' facing South African water resources, noting that action to overcome it is somewhat slow or non-effective. Van Rooyen and Versfeld (2009) identify "immediate actions" that are necessary to "stave off imminent water shortages" and suggest that the "concerted implementation of water conservation and demand management (WCDM) measures" are of a priority, along with the need to ensure that long term water supply interventions are implemented to meet the demands of major metropolitan areas and other fast growing development centres in South

Africa. The priority may be more demanding and require more social discipline than society has been able to muster to date.

The re-use of water is also identified as an “immediate and practical supply intervention”. However re-use calculations assume that wastewater treatment plants are reliably and ably managed and maintained. A number of concurrent studies by DWA to establish reconciliation and supply strategies for urban supply centres throughout the country, suggest that most municipalities lack the skills and financial capacity to undertake the necessary Operations and Maintenance of their towns’ water supply and sanitation infrastructure (Wilson and Pereira 2009). This view is supported by Herold (2009), who states that in the past 15 years the “municipal sector has lost the majority of its experienced engineers and technicians”. According to the South African Institute of Civil Engineering (SAICE) president, Neil Macleod, “out of 284 municipalities, it has been reported that there are 83 operating without a single engineer.” (van der Merwe, 2007). It was reported by SAICE (in van der Merwe, 2007) that 56% of treatment plants lacked sufficient maintenance staff to maintain the mechanical and electrical equipment. Herold (2009) argues that this loss of technical and managerial capacity is also “starting to unravel the bigger institutions” responsible for water services; a situation that is not likely to be remedied in the near future given the shortage of technical, scientific and engineering skills in South Africa.

There is growing consensus that the attrition of skills at national and municipal level contributes to the risk of water contamination and reduces assurance of water supply. Other factors to be considered are decaying infrastructure and lack of monitoring and information management systems to support early warning and timely remediation measures as well as social and political factors.

The NWRS (DWA, 2013b) recognises the stipulation of equity, sustainability and efficiency, by the NWA, as key guiding principles for water resource management. However, it goes on to point out that the one principle that has not received the desired attention is equity, which results in the perpetuation of inequitable water allocation. The NWRS 2 (DWA, 2012) is built on the understanding that water is a basic human need while also recognising the critical role water plays in ensuring equitable and socio-economic development.

Ageing infrastructure affects both local authorities and the DWA resulting in significant impacts on people, the environment and the economy (Herold, 2009). This situation is compounded by a funding system that supports grants and loans for the construction of new water supply and sanitation infrastructure but ignores dominant need of most municipalities for financial support for the maintenance and repair of existing infrastructure. More generally, and with regards to livelihoods and food security, shortage of water and/or poor condition of irrigation canals can impact optimal utilisation of land, whether for domestic, commercial or subsistence livelihood purposes.

In addition to poor operations and maintenance of infrastructure, growing gaps are evident in both consistent supply and water quality-monitoring networks. The capacity to run associated information systems is also declining, with the result that potentially harmful trends are not being identified and the DWA is unable to enforce regulations and water allocations. It is likely that there are other as yet undetected problems due to inadequate monitoring and lack of capacity to interpret the information and take appropriate remedial action. The impact of this social malfunction is felt most keenly at local level. These factors highlight the grave and critical need for community resilience and the ability to intervene in worsening scenarios.

4.1.2 Climate Change & Disaster Management

The DWA’s (2012) NWRS 2 recognises threat posed by climate change and proposes responses that comprise a suite of approaches, measures and actions. These responses range from research to planning and implementation. Mitigation and reducing impacts through effective adaption to the expected changes are also seen as essential. The report also notes that climate change will have the most severe impact on poor and marginalised communities who are already vulnerable to water insecurity.

The NWRS (DWA, 2013b) outlines seven key objectives for its climate change strategy for the water sector:

- Reduce the vulnerability and enhance the resilience of communities, people, enterprises and ecosystems, to water-related impacts of climate change, particularly for those groups most at risk;
- Improve and enhance water resources management processes to build the required resilience and adaptive capacity;
- Integrate climate change considerations into short-, medium- and long-term water planning processes for water resources and water services;
- Implement the best catchment and water management practices to maximise the degree of water security and resource protection under changing climatic conditions;
- Enhance the human, legal, regulatory, institutional, governance and financial resources and capacity to assist with the effects of climate change on water;
- Undertake focused monitoring and research to ensure the efficacy of water adaptation approaches over the long term; and
- Ensure inter-linked climate and hydrological modelling tools that represent the complex interrelated natural systems.

In response to climate change and in order to achieve the above objectives; strategic actions are proposed by the DWA (2013b) that focus in particular on three major themes. The first of these is *water governance* which recognises the importance of communication and interaction in building resilience and reducing vulnerability through institutions, research, financing and constant engagement between all parties. The second looks at *infrastructure development, operation and maintenance*; focusing on water supply (using a no-regrets/low regrets approach), as well as protection, monitoring and response strategies that will require increasing attention in the face of climate change. The third theme focuses on *water management* and the associated actions that deal with the allocation, conservation, quality and protection of resources. Simultaneously the strategy seeks to improve understanding and upgrading of climate change scenarios, modelling and vulnerability assessments with a view to improving disaster management.

NWRS 2 (DWA, 2012) accounts for the importance of a water-related disaster management approach and strategy in the context of the larger South African developmental water management framework. In terms of the NWA, disaster management includes the management of floods and droughts, the prevention of pollution and degradation of water resources and the promotion of safety. Failure of water supply has also been identified as a critical risk area for water security. It is recognised that water-related natural hazards and disasters are, to a very large extent, attributable to extreme climatic events associated with climate change and variability. These disasters threaten health, livelihoods and the lives of people with the poor and vulnerable being hardest hit. The key objectives for the management of these disasters outlined in the NWRS include:

- Reduction of the water-related disaster risk by responding appropriately to drought and flood hazards, prevention of pollution and degradation of water resources and promotion of dam safety;
- Enhancement of disaster resilience through ensuring the preparation and implementation of the water sector disaster management plan within the National Disaster Management Framework to ensure coordinated actions by all role-players within government and outside;
- Facilitation of inclusion of water-related disaster management planning and allocation of associated resources (human resources skills and budgets) in strategies and business plans of all water management institutions; and
- Extended focus and improved management on regional and local levels.

The need for a participatory approach, good governance and communication between all stakeholders is advocated for by the DWA and is strongly emphasized in its strategies. The

next sections look at structures and their associated actions that influence Tsengiwe on a provincial, municipal and local level.

4.2 PROVINCIAL WATER CONTEXT

The natural water resources of the Eastern Cape are dominated by surface resources. These resources are not evenly distributed across the province with runoff being much greater towards the coastal regions, mainly due to the higher rainfall distribution in coastal areas. The development of several large dams and numerous smaller farm dam's mean that surface water resources are extensively covered in the province.

Although it is estimated that substantial quantities of groundwater could be abstracted, actual groundwater usage is relatively small over most of the area. This is generally due to the relatively well-watered nature of the area and the wide occurrence of perennial surface streams, especially in the eastern part of the Province.

The past decade has seen a major emphasis on addressing the backlogs in water supply infrastructure in informal and rural areas, with a number of rural water supply schemes having been commissioned DWA's (2011a). The All Towns Reconciliation Strategies Study for the Eastern Cape established that the most common negative impacts on water supply and service delivery are associated with a lack of technical skills and proper management of water infrastructure and resources at the local municipal level.

The All Towns Reconciliation Strategies Study for the Eastern Cape (DWA, 2011a) demonstrates that most of the current water supply problems and restrictions experienced in many towns and villages could be avoided by proper management of the existing schemes. It proposes that this should include:

- Implementing water conservation and water demand management measures to reduce losses and waste;
- Proper operation and maintenance of existing supply infrastructure, including ensuring the required budgets and skilled manpower to operate effectively;
- Asset management, to prolong the life of the infrastructure; and
- Refurbishment of existing infrastructure to reduce losses and waste.

In response to the aforementioned challenges the All Towns Reconciliation Strategies Study for the Eastern Cape (DWA, 2011a) recommends and promotes the use and development of groundwater resources. The DWA considers this a more reliable and feasible option. Local groundwater development is recommended as it is considerably more cost effective, especially in rural areas, than the construction of huge dams with widespread distribution networks to reach widespread, sparsely populated villages. It is emphasised that this process needs to be accompanied by skills development and training on all levels within the municipal structure to ensure these local schemes are operated in a reliable and efficient manner.

4.2.1 Chris Hani District Municipality Context

Water Services

The CHDM is a land locked district located in the north eastern sector of the Eastern Cape. The majority of towns in the CHDM are supplied with water from surface water resources while communities in the district generally rely on unprotected springs, streams and boreholes for their water supply. The DWA (2011b) notes that the 2007 StatsSA Community Survey and Municipal reports confirm that high percentages of households lack access to basic services.

CHDM is split up into eight LMs; all are WSPs. CHDM is the WSA for all LMs within the district in terms of powers and functions as contained in the Municipal Structures Act, 117 of 1998. It is therefore responsible for the provision of water and sanitation services for all

people under its jurisdiction and is responsible with addressing the water services backlog. In larger towns water supply is treated and subject to operational and compliance monitoring whereas supply and quality are seldom monitored in small and remote rural communities. Thus there is a need for smaller local municipalities to act as WSPs.

A measure for checking and certifying the compliance of municipalities with regards to water supply and quality regulations is illustrated by the results of the recently developed Blue Drop (Drinking Water Quality Assessment and Compliance) and Green Drop (Effluent Water Quality Assessment and Compliance) systems.

Blue Drop Certification

The Blue Drop Certification is an incentive-based programme, which commenced in 2008 as a mechanism for improving South African drinking water-quality management. The 2012 Blue Drop assessments were conducted for all municipalities in the country, overseen by a specialized unit, which monitors municipal drinking water quality management performance under the South African water sector regulator, the DWA.

CHDM, a WSA in the Eastern Cape impressed with its drive to improve drinking water quality management. The blue drop score in CHDM showed an overall improvement from 53.1% to 73.5% demonstrating the officials' commitment in this regard. This is a laudable performance under challenging circumstances. However there remain areas with excessive microbiological contamination in areas such as Cala and Eliott. Compliance percentages in these two areas were well below 50% and it is expected that these communities are at risk from water borne contamination. The municipality is required to update the DWA's regional office and compose an action plan for urgent improvement of treatment efficiency levels in these areas.

Overall the Blue Drop inspectors noted: "The WSPs (LMs) responded very well to the deficiencies identified during the Blue Drop Assessment and come well prepared for the Confirmation Interviews. The WSPs were strongly supported by the CHDM. The District Director personally led the interviews and made sure that each of his WSPs was represented in large numbers. This illustrates the commitment of the District towards the Blue Drop Certification Programme." (CHDM, 2012)

Although there has been a marked improvement of the water monitoring systems by the municipality there remain under performing areas, the worst of which are the Rural Supply areas. The CHDM (2012) outlines specific areas that require additional interventions:

- Drinking Water Quality testing and compliance in rural areas;
- Water Safety Plans in some areas (i.e. rural areas);
- Implementation of the comprehensive testing programme that will fully comply with South African National Standards (SANS) 241; and
- Capacity building and reducing reliance on service providers for support and testing.

Green Drop Certification

The Green Drop Certification process was introduced as an incentive-driven initiative to address gaps and raise the performance levels of municipal wastewater services. The First Order Assessment process is an action research methodology aimed at problem solving and is in line with the DWA enactment of the enforcement protocol. A risk based regulatory approach provides early warning signs of water treatment plants that contain a certain measure of risk and then directs the type of intervention required to manage and mitigate the identified risk. Assessments were initially done within political and provincial borders, instead of water catchment boundaries, as it was acknowledged that cooperation between DWA and provincial local government will be necessary to fully address the situation adequately.

A lack of operational information in the CHDM indicated ineffective management of the wastewater systems in general; this severely compromised the Green Drop performance of

CHDM and WSP (LMs): Officials indicated a budget for operations and maintenance but could not produce any evidence of expenditure. This prevented the assessors of having complete confidence in the efficacy levels of asset management.

The Green Drop assessments that were conducted in the CHDM revealed that management of wastewater ranges from acceptable to entirely unacceptable. The management of the Queenstown wastewater system proved promising while the rest of the systems remained far below standard. These poor performances mean that the Department is required to request the WSA to provide an explanation together with a turn-around plan. A number of the stations received an undesirable maximum risk rating thus the district is classed as within the critical risk category. This situation will not be rectified without a concerted planning and implementation effort from municipal decision makers and management.

In general the Green Drop Inspectors noted that "the Regulator is not satisfied with the overall performance of wastewater services management in Chris Hani DM. The WSA has to submit a Corrective Action Plan to DWA within 30 days of release of the Green Drop Report" (CHDM, 2012).

Waste water treatment is an example of a slow-onset disaster – an incremental but long-term and cumulative environmental change that may only receive attention when it reaches crisis level.

Disaster Management

The CHDM has been declared a drought affected district and has been allocated drought relief funding by the DWA. As part of a district wide adaption strategy the CHDM has adopted the role of developing and spearheading a programme on climate change preparedness. The CHDMs 2012-2017 IDP has highlighted climate change as a priority for all departments. Therefore a climate change summit was convened which produced the following resolutions:

- That a District Wide CCA strategy be developed;
- That the District Wide Environment and Climate Change Forum be resuscitated and be inconclusive of all stakeholders; and
- That the Three Crowns sustainability commons project (which is now a provincial flagship project) be replicated to rural villages. This project will deal with water conservation projects, food security projects, waste management projects and any projects that seek to reduce the impact of climate change.

The CHDM has a recognised Disaster Management Centre (DMC) which was officially opened in 2005. It functions with a limited workforce and minimal resources and, particularly with regards communication which is critical when dealing with disasters which requires issuing of early warnings, receiving calls and dispatching response vehicles and compiling Incident Reports. According to the 2012 – 2017 IDP (CHMD, 2012) these factors pose challenges that will need to be addressed in the 2013/2014 financial year.

There are six satellite DMC's throughout the district, including one in the Sakhisizwe LM and each centre is operated by three officials (CHDM, 2007). These satellite centres lack proper infrastructure and the district is taking steps to address the resultant backlogs and hold-ups. As prescribed in the Disaster Management Act 57 of 2002 and the Disaster Management Framework of 2005 the officials in the centres are responsible for the education of the communities on disaster management and risk reduction practices. The IDP (CHDM, 2012) has advocated that a scientific risk assessment will be conducted within the next financial year that will act as the basis for the development of a Disaster Management Plan, in response to the climate change challenges.

Community level CCA planning can mitigate the lack of long-term disaster planning at the municipal or district level. The community of Tsengiwe was selected as a case study due the grass roots initiatives underway which reduce the community's risk of disaster. These initiatives are underpinned by on-going studies developed by the UFH as well as government

support through the Department of Social Development. The following section describes the Tsengiwe study area and its geographical and water services context.

4.3 STUDY AREA

4.3.1 Overview

Tsengiwe is divided into two sections: Upper Tsengiwe (also called Umhlonyane), Lower Tsengiwe (with three sub-sections: Entilini, Eskolweni and Estrong Yard) (see **Figure 5**).

The Cala town and village cluster (which includes Tsengiwe), has a total population of 68 000 people (DWA, 2011b). The population of Tsengiwe Village is approximately 2 000 (Sakhisizwe IDP, 2009) and has an unemployment rate of approximately 80%. An overview of the demographics of Sakhisizwe LM and Cala are summarised in **Table 4**.

The data is derived from the 2011 census and Sakhisizwe IDP (2009) (a more comprehensive overview can be found in WRC 1888/1/11).

Table 4: Overview of Demographics for Sakhisizwe LM and town of Cala

Factor	Sakhisizwe LM	Cala
Illiteracy	90%	90%
Unemployment	39%	NA
Economically active population (age 15-64)	58%	NA
Dependence on social grants	20%	NA
Completed secondary school (age 15+)	14%	10%
Some secondary education (age 15+)	35%	34%
Grade 12 and higher (age 15+)	21%	13%
Tertiary education (age 15+)	6%	2.5%
HIV/ AIDS[1]	NA	50%
Percentage of people with HIV/ AIDS who are parents[2]	NA	60%

An overview of Tsengiwe village conditions is summarised in **Section 4.3**. The table summarises:

- The basic health and social services provided by the clinic and two CBOs;
- The poor level of infrastructure and water services to the two junior secondary schools in Tsengiwe;
- Reasons for and challenges associated with a decline in agricultural land condition and extent; and
- Challenges associated with the community's support of two different local leadership bodies.

For a more comprehensive overview of the social, political and land use issues in Tsengiwe see WRC 1888/1/11. Pictures of community life are displayed in **Figure 6**.

[1] Mlisa, 2009
[2] Mlisa, 2009

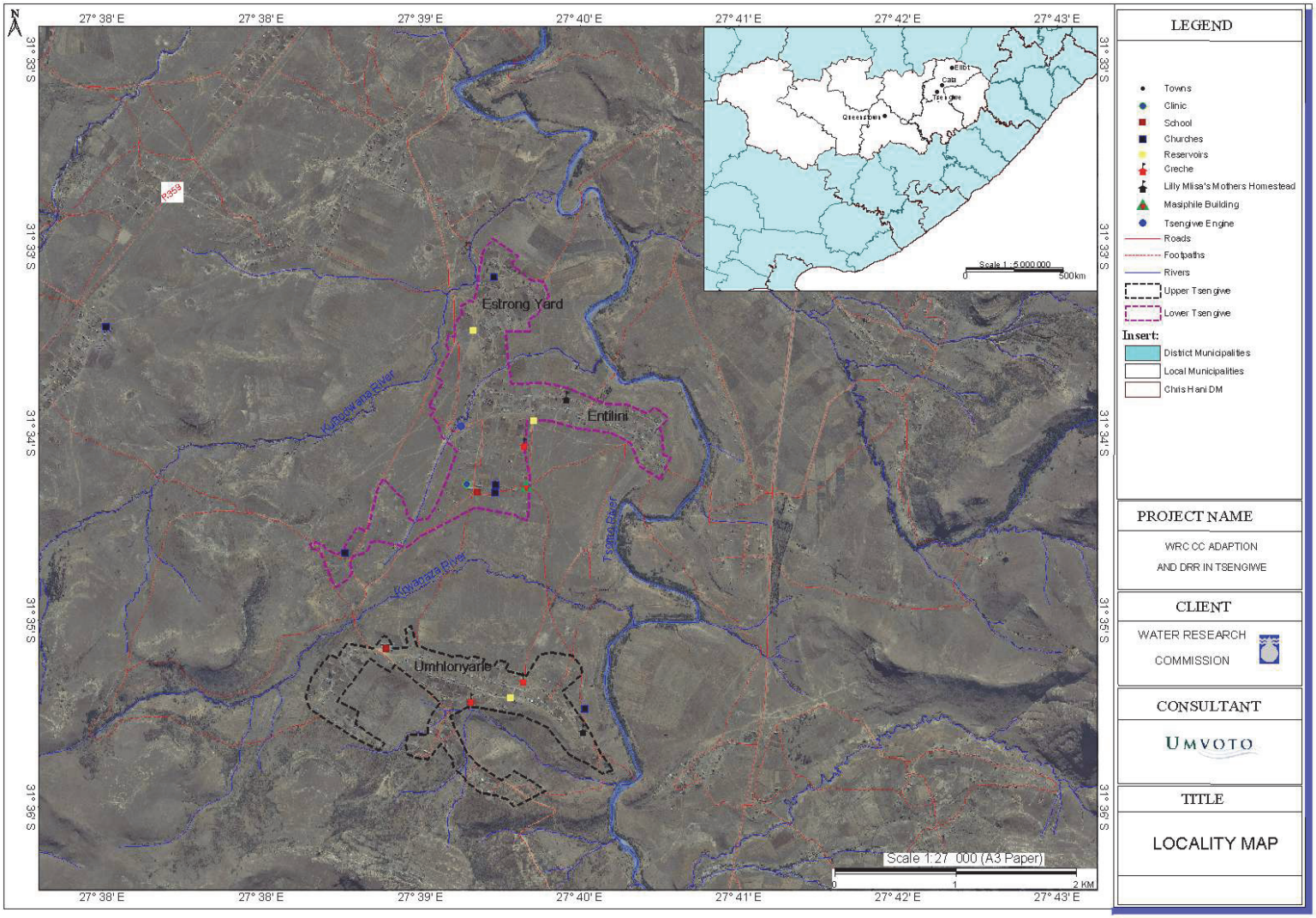

Figure 5: Tsengiwe Village Map

Figure 6: Collage of community life in the Tsengiwe village

Figure 7: Land Use and Management in Tsengiwe

4.3.2 Water Supply and Services

Tsengiwe is located in the S50D quaternary catchment and the village falls under the WSA of the CHDM. Tsengiwe occurs 20 km upstream of the Ncora dam on the Tsomo River which flows south and occurs east of the village. The Sakshisizwe LM Water Services Department is overseen by the WSA as the water services provider to manage Sakhisizwe water and sanitation, operation and maintenance, treatment and disposal of effluent.

There is no reticulated water supply to individual households in the Tsengiwe Villages, as well as no water-borne sewerage. The majority of residential structures and toilets are self-built and most homesteads have pit latrines. These latrines are not ventilated. Hand washing is recognised as an important issue but fetching and carrying of water and the distance to village taps is a serious constraint with regards good sanitary habits.

Spring supplying water to Lower Tsengiwe

Public borehole

Upper Tsengiwe Reservoir

Concrete reservoir in Lower Tsengiwe

Figure 8: Water supply for Tsengiwe village

Springs

Water is provided to Tsengiwe via three springs located in Upper Tsengiwe. Two of the springs were only connected to infrastructure for pumping and supply in November 2010. A small dam was constructed around each spring and inlet and outlet pipes connected. As of May 2011, the two newly connected springs dried up due to less than previous seasonal rainfall. A fourth capped low yielding spring is present which has been added to the main reticulation supplying the town's reservoir. The main spring is the primary source of water for Upper Tsengiwe – supplying the entire upper village with domestic water. This spring has one reservoir and community taps located at every 200-500 metres, and illegal connections between the taps and houses. This spring is located about two-thirds of the way up the catchment. Water in the catchment is generated from rainfall on the large upland areas above the catchment. From there surface runoff is east towards the Tsomo River i.e. away from the village. The community would like to dam much of this runoff to be used for irrigation purposes. Some of the upper catchment runoff is channelled in order to supplement the main spring supply. Some residents have bought and laid pipes to channel water from mountain dams and springs for private use. Blockages are common in pipes in Upper Tsengiwe and the spring and borehole water supply is not treated or purified.

Boreholes

In Upper Tsengiwe there is one non-functional borehole and reservoir that used to be equipped with a wind pump. The borehole was never capped and is now filled with rocks and refuse. Rehabilitation by re-drilling the borehole would be required to make this borehole functional and repairs are needed to the reservoir. A borehole with a hand pump occurs close to the Tsengiwe Junior Secondary School, but this borehole is no longer functional due to blockage, lowering of the water level or malfunctioning of the equipment.

In Lower Tsengiwe there is a functional borehole and reservoir with a diesel pump as well as a non-functional borehole and non-functional reservoir which was once pumped using a windmill. Both non-functional borehole and reservoir need to be replaced, rehabilitated or repaired.

A number of boreholes have been privately drilled all across the Tsengiwe village in order to supplement water supply. Many of these private boreholes have never been equipped with pumping equipment and those that have, have since broken down. The old dam in Upper Tsengiwe has not been functional for approximately 50 years (Chris Ncoko – pers. comm.) but was once used to irrigate vegetable gardens. A failed dam also exists in the secondary upstream catchment (on the Ncoko farm project). There is also a non-functional borehole which was once pumped using a windmill.

A centrally located pump is used to extract water from the Tsomo River. This water is supplied to a cooperative irrigation scheme estimated to cover 5 hectares. This study is funded by the National Development Agency and is led by the Village Headman and approximately 15 male and female farmers from the village. The water is stored in a well-designed and constructed dam. There is one stock watering dam that services both Upper and Lower Tsengiwe and more such dams are necessary for the amount of livestock in Tsengiwe.

Water for the village use is stored in a tank which supplies all of Tsengiwe. This tank is filled by the municipality when supply from the village springs ceases (springs dry up) or water from Tsomo river not available for pumping. The municipality has two trucks to supply water from the treatment works to this tank and a tank in the neighbouring village of Manzana. During periods of low water supply the municipality is meant to deliver water to the village. However, the municipality does not have enough trucks to match water demand and often no deliveries occur, unless paid for by a particular household. The water delivery trucks can deliver 15,000 L and 13,000 L, respectively. At least three or four trucks are needed to meet water demand for the village. Water does not always reach the higher lying areas of the village due to turning off of water supply pumps. The water supply pumps are not manned 24 hours a day, nor water levels in the water tanks monitored sufficiently. Longer periods of pumping or improved infrastructure are required to meet domestic water demand.

Infrastructure

There are a total of 25 taps in Upper and Lower Tsengiwe, which is not enough to fulfil the demand or the requirement that taps be located within 200m of a house. Information from work undertaken by WRC 1888/1/11, 2011 suggests that the water infrastructure situation is better in the lower part of the village than in the upper part. In Lower Tsengiwe there are approximately 18 taps (4 for 40 households). In the Tsengiwe Engine area there are approximately four taps for 160 households and there are three taps in Upper Tsengiwe (household number unknown).

Few households have rain water harvesting tanks (5 000-20 000 litre capacity), largely due to the cost. The majority of households have, however, acknowledged and recognized the value of rainwater harvesting and having a storage tank and the demand for supply of tanks is high.

There is one water pump engine in Tsengiwe, which pumps water from the river and links to four taps. Reportedly less water is flowing for shorter periods in the Tsomo River (pers. comm. Village Headman, December 2010). An assessment of longer-term rain and runoff records is needed to establish whether this is linked to larger scale changes in climate or to land use patterns in the headwaters area, or both.

Service Provision

In the Blue Drop Report 2010, for the CHDM, Sakhisizwe (Elliot) received a score of 26%. The Cala area failed to provide the necessary information for an assessment.

The water supply for Tsengiwe is inadequate and the distance to water supply (taps) is large. This is best demonstrated by the fact that each of the two secondary schools have only one tap each, by the number of privately drilled boreholes (though most are not used and maintained) and that all villages aspire to ownership of water tanks for roof rainwater harvesting. There is insufficient water supply for irrigation purposes; water is mostly used for domestic supply. It is suspected that some of this limited village water is used in food gardening – but water supply is insufficient and that such use would only exacerbate supply failures. Water supply failures are reported as ‘regular’. Service provision in Cala, and particularly Tsengiwe reflects the need for integration between disaster management and water services at the rural community level and improved two-way communication between communities and the WSA. Currently the village has 600 houses, each with a 50 x 50 m plot of land. Water services planning will need to account for the estimated expansion of the village by a further 240 houses.

The LM WSP is aware of the need to train and employ pump plant operators, so that if shifts are shared, the water will be constantly pumped and lapses in water availability be reduced or eliminated. No further action to rectify water supply problems has been undertaken since field work was conducted in September 2010. Operators go to the municipality to complain about water services delivery but several operators have said it will take collective community action to receive a positive response and action. The Sakhisizwe LM has limited capacity in terms of keeping up with existing projects let alone initiating new infrastructure projects. The mobility of personnel remains a factor in sustained improvement of services. **Figure 9** depicts water services and infrastructure in Tsengiwe.

Toilets

Spring

Boreholes

Municipal water delivery

Figure 9: Water Infrastructure and Services in Tsengiwe

5. STUDY RESULTS

This section details the results of the study. The research team formed a constructive bond with the community and the facilitation process was completed through three workshops and field trips. Throughout the study, the team endeavoured to build capacity within the Tsengiwe community to understand climate change or variability related risks faced and to develop risk reduction. This was achieved through the facilitation of mentorship relationships between the community and various specialists and government agencies. In addition, the community's understanding of risk was achieved through tools such as participatory mapping and a risk reduction game as well as community participation in hydrocensus work. This is detailed in this section.

A video of the first workshop was used as part of training in workshop two and to support feedback on workshop processes. In addition a video has been produced as a resource for community planning for DRR and CCA. The research team provided basic soil and water conservation training as well as resource packages for development committees. Another result of the study was the development of proposals by the team to secure additional funding. The risk assessment methodology and results, community CCA Plans; and M&E programme arising from this study are detailed in **Section 5.2**, **Section 5.3**, and **Section 5.5** respectively.

5.1 MENTORSHIP AND TRAINING

The study has focused on facilitating participation among community members but also emphasized the importance of dialogue between local and external specialists, traditional leadership and local government, as well as national and provincial agencies and community members so as to build the capacity of community members to engage with a variety of stakeholders who could aid in achieving their goals. This was achieved through field trips, facilitating communication with local mentorship and training. Effort was invested, for example in engaging municipal sectors to establish supportive links between Tsengiwe CCA Plan Committees and relevant municipal stakeholders (**Appendix 3B**). Government officials were invited to meetings and the research team organised a workshop with the DWA and DRDAR.

5.1.1 Field Trips

A field visit was arranged for members of the Tsengiwe Community to two school 'greening projects' that lie within a one-hour radius of Tsengiwe Village. In total 15 community members accompanied the research team in visiting these sites. The first site, Three Crowns, is a local flagship project for greening and green energy. The project commenced in 2006 and has been well funded. The second project, Mbewula is far more remote but has a similar footprint of projects. These projects were used in training and school pupils were encouraged to invent and construct. Projects developed at the 'school greening' projects are summarised in **Table 5** below.

Table 5: Mbewula and Three Crowns Greening Projects

Project	Details
Energy	• Solar cooker • Wind generator • Solar panels • Biogas digester (also for waste management) • Solar water heaters (tubes in array and a "solar snake" – a very effective long pipe in the sun)
Water	• Rainwater tanks and channelling of roof water
Waste	• Recycling of hand basin water to toilet cistern • Biogas digester to deal with toilet waste (other compostable material can also be added)
Gardening	• Greenhouse • Vermiculture • Hydroponics • Algal pond (waste water from biogas digester) • Aquaculture (non-operational) • Irrigation using recycled waste water • Permaculture beds

The Mbewula and Three Crowns visits facilitated mentorship between community members and neighbouring communities and were inspirational and educational for Tsengiwe residents. It was clear that the success of these two greening projects was due to highly energetic and dynamic principals. Feedback from participants who attended the excursion was delivered to the rest of the community in the form of a presentation and question and answer session. A graphic collage of photos of the school greening visits is shown in **Figure 10.**

Figure 10: Mbewula and Three Crowns greening project collage

5.1.2 Facilitating Communication with Local Mentorship

The CCA Plans identify leaders and committees which serve as a framework for mentoring. The same community leaders were brought to the LM to meet and establish connections with LM and DM councillors and municipal officers (see attendance registers **Appendix 2A**). Key elements of the CCA Plans are mapped onto the list of mentors (**Appendix 3B**).

The objective in facilitating meetings with members of the LM and DM was to gain the support of the authorities for CCA and DRR activities such as the CCA Plans and engaging with the community by providing guidance and technical input.

During the first workshop, a meeting was held with the LM and DM authorities at the LM in Cala. The information on potential risks gained from meetings with the authorities were included into the village meetings and compared to community risk perception. This was the first step in gaining the support of the provincial DWA and DRM departments and LM/ DM officials in the study, with the aim of rolling out CCA initiatives at the WSA level. The CHDM and Sakhisizwe LM were further invited to community meetings in Tsengiwe as were some provincial and regional authorities including the DWA and Department of Economic Affairs, Provincial Department of Environment and Tourism (DEAT) (See **Appendix 2A**). Important links were established at the workshop with DEAT and DWA.

During the second workshop, a meeting was held at the Cala Municipal offices and was well attended by a cross section of influential civil officials at LM and DM level, including: Agricultural Extension Officers, representatives from the DWA (Cradock and East London), DRM, DEAT, Communications and Public Health (see **Appendix 2B**). DWA officials were further taken on an inspection of abandoned and disused boreholes, viewed the catchment area and the site proposed by villagers for an earth irrigation dam within Tsengiwe. It was important to involve the DWA at this stage as they would be required to undertake a feasibility study, approve water use and implement the proposed development.

During the third workshop, the research team facilitated a meeting between the community and the Tsengiwe Village Extension Officer Mr. Malgas from DRDAR to provide the village with information on land care, fencing, cultivation and stocking. The community had the opportunity to ask questions and have them answered directly. In addition, a meeting was held in Cala with two Tsengiwe CCA Plan leaders and key members of the Sakhisizwe Municipality from DRDAR (Mr. Malgas, Extension Officer; Mr. December, Planning Officer; Mr. May, Controlling Officer) and DWA (Mr. Masoka, Institutional and Support Officer). A representative from the DWA (Mr. Masoka) also visited Tsengiwe to discuss DWA processes regarding bulk supply, operations and maintenance, water works, feasibility studies, training, rain water tanks, land tenureship and licencing. This face to face contact established connections and interest on the part of the relevant authorities and clarified many of the community's questions and concerns.

5.1.3 Risk Reduction Game – Riskopoly

Riskopoly – a game based on the risks posed by meteorological hazards – was developed by Umvoto Africa (Pty) Ltd and played as a facilitation tool during the second workshop. This is depicted in **Figure 11**. The purpose of the game was to highlight experientially the need to prepare for several different unpredictable hydro-meteorological hazards. The game requires players to strategize investments and spending with the aim of reducing risk and improving coping capacity. In the context of PAR, games can be especially valuable as they can be played many times and different aspects and new insights gained each time. Games serve to expand the range of possibilities with which people can act by creating an alternative world of imagination, based on real life but freeing players up to consider new possibilities that may have been dormant within everyday awareness (Levine and Levine, 2011).

Players were divided into four teams of four to six players. Each team elected a team leader to do the buying and selling of products. Players clearly understood the rules and after the second round when the implications of not having a particular item that provided hazard protection was felt, the excitement grew. It was apparent, for example, that a water storage tank is an essential item and three out of four groups purchased one in the second round. The other items became

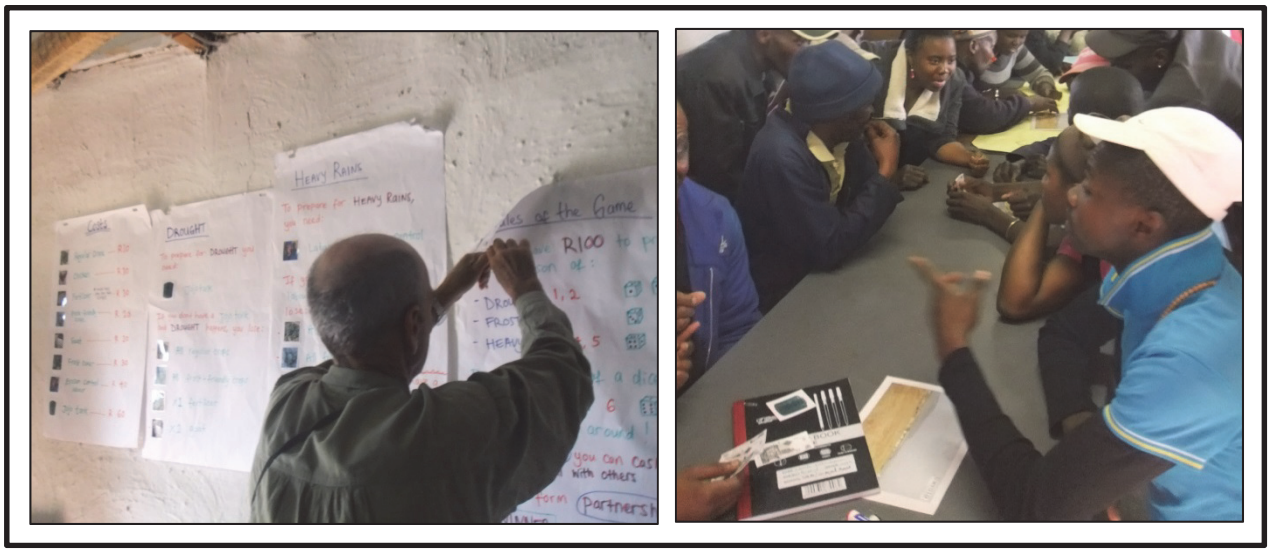

Figure 11: Riskopoly Game

relevant as the game progressed and different hazards occurred. Players were also able to earn money by having a water tank and by the end of the game it was understood to be an important investment as the returns extended beyond drought scenarios. With the loss of certain protective measures as penalties, which some teams had invested in, the competitive spirit grew. It also became harder after each round to regain losses, particularly without the correct products to protect against hazards such as drought, flood or frost. Adaptation in the event of a hazard was also important and informed the inclusion of a buying and selling round which enabled players to re-evaluate their decisions.

The feedback from the game indicated that players had gained insight into key elements of risk reduction. Feedback included:

- Have back up – hazardous events will occur;
- Prioritise what you want to buy and invest in;
- Work together; and
- Spend wisely and on important items.

It was interesting that teams in the Tsengiwe pilot game did not partner up with each other. This option illustrates the importance of cooperation and the potential benefits of pooling resources. However the competitive spirit of the game served to heighten excitement and this cooperation did not occur. Throughout the workshop the game and insights gained by players and the study team continued to serve as a touchstone for real life examples. Playing together as a community can also serve to restore a sense of solidarity and joy and perhaps the most important conclusion, voiced by game players, was that cooperation and working together was essential in mitigating risk.

5.1.4 Participatory Mapping

In Tsengiwe, the research team conducted a participatory mapping exercise using a scale map and image. This map was a Geographic Information System (GIS) image of the community created by the team, showing topography, the borders of the village, houses, and major roads. In this participatory mapping exercise, local knowledge is drawn directly onto a remote sense image (IFAD, 2009). The position of features was determined in relation to landmarks such as rivers and houses. This method is useful for groups who cannot read a topographic map. This map is shown in. The participatory mapping exercise and community workshops brought together community members of different generations and facilitated communication and discussions of possible CCA initiatives.

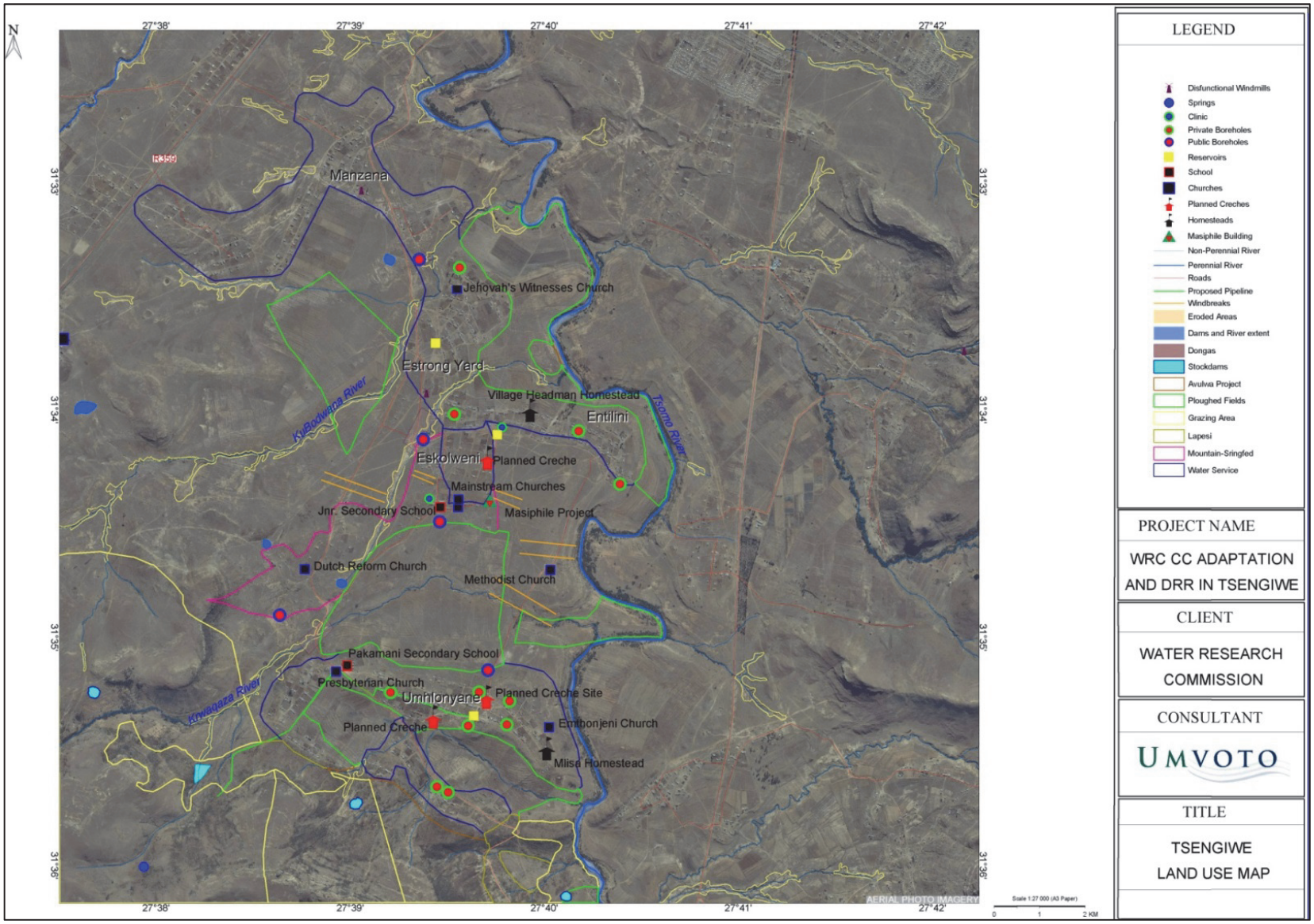

Figure 12: GIS map of Tsengiwe used for the participatory mapping exercise

In Tsengiwe, the focus of mapping was on land use and water resources that the community felt were important in progressing in their CCA Plans. These aspects include communal land, water sources and infrastructure and major agricultural projects. The community also mapped environmentally vulnerable areas such as such as dongas, areas overgrown by alien vegetation, flood zones and areas of major soil erosion. Knowledgeable members of the community were also able to share their ideas and local and historical knowledge.

The map provided a focus for discussions and raised the awareness of less knowledgeable community members about water resources and infrastructure, as well as assets and issues within the community. The process of mapping highlighted interesting social dynamics present in the community. For example, in order to put up fencing, the boundaries of the village would need to be confirmed in a political meeting between leaders of Tsengiwe and the neighbouring village. In another example, lands were identified by some villagers as communal and by others as private. The terminology and use of agreements around this land was worked out in the mapping process. Politics around donkeys and animal grazing were also brought to the fore.

The research team used the exercise to generate a GIS map and resource base that can be used by the community to plan interventions and coping strategies towards DRR and CCA. The map was returned to the Masiphile resource centre for community use. The purpose of the map is for internal community consumption and to illustrate local knowledge to consultants and outsiders. It will be especially useful for the community when they need to communicate important information to decision makers using cartographic protocols. It was also possible for them to update it as their plans are implemented.

5.1.5 Soil and Water Conservation Training

During the third and final workshop, a concluding talk on land care and soil and water conservation was delivered to the Tsengiwe Community, presenting best practise examples from other rural villages in South Africa. It was emphasized that the village needs to set in place a schedule for the clearing of alien vegetation, the regeneration of slopes and swales to prevent water runoff and erosion, and the planting of trees and/or agricultural crops within swales to stabilise the soil and provide for food security (see **Appendix 3A**).

In terms of lapesi removal, discussions with the community highlighted the potential to remove, but use the lapesi by either burning it or pack it into immediate areas of erosion (a suggestion from the community). It must be placed in the immediate vicinity of removal so that the seeds do not spread through movement. This also assists with erosion control.

In terms of preventing water runoff at the household level, discussions with the village highlighted the need for households to take responsibility for diverting water runoff. Each household can create channels and gullies to control and divert storm water onto cultivated areas or vegetable gardens.

It was also emphasized in the presentation that trees for shade and as windbreakers should be planted and that water tanks were a key mechanism for achieving water security.

Several resources related to soil and water conservation were given to each CCA Plan Committee. The slides from the presentation and resources are summarised in **Appendix 3A**. In addition, the Water Supply and Reticulation Committee discussed methods of recycling grey water during community meetings.

5.1.6 Development Committees Resource Package

For the third workshop, the team prepared a resource package for each Development Committee. Resources were organised into an expanding file folder with resource relevant for each CCA Plan. The text box below summarises the resources in each folder.

Committee Resource Pack

- Information on School Greening
- Looking after the Soil – D. Versfeld
- Land Care Books – D. Versfeld
- Flow charts for contacts within DWA and DRDAR
- Stationary (pens and notebooks for committee members)
- A copy of each CCA Plan
- UN ISDR Booklets developed with the Umvoto team:
    - Water and risk in Africa
    - Role of poverty alleviation in DRR
    - Land use
    - Risk and reward
    - Environmental protection and DRR
- Green Communities Booklets
    - Tree propagation
    - Soil management
    - Hard landscaping
    - Waste management
    - Water management
    - Plant propagation

The research team initiated dialogue with the DWA and DRDAR. This information is captured in the CCA Plan flow charts (**Appendix 5**) which were provided to the Committees in the relevant resource package. Maps of Tsengiwe were also left for the communities use. The information and resources specific to each CCA plan are summarised in **Table 6**.

Table 6: The resources specific to each CCA Plan are summarised in the table below

CCA Plan	Resources
Water Supply and Reticulation	• Hydro-census
Land Degradation and Soil Erosion	• Links between DRDAR and an Extension Officer about appropriate trees to use for wind breaks • Looking after the Soil Booklets (D. Versfeld) o Brush packing o Micro-catchments • Tsengiwe Map
Agriculture and Crop Cultivation	• Land Use Care Booklets (D. Versfeld) o Swales o Contours o Brushpacking
Animal Grazing Management	• Looking after the Soil (D. Versfeld) o Brush packing o Micro-catchments
School Greening	• Information on school greening from Three Crowns and Mbewula

5.1.7 Hydrocensus

During the second and third workshop, a hydrocensus was conducted. The purpose of the hydrocensus was to gather information on water supply sources and water delivery areas in the village. Conducting a hydrocensus was an important exercise in order to quantify the vulnerability of the village to water-related hazards (i.e. drought, flood etc.). Community participation in the hydrocensus allowed specialists to capture local knowledge of water resources, practices around water use and issues related to water scarcity. Hydrocensus work involved:

- Locating and recording positions and condition of boreholes in an around the village;
- Measuring and recording capacity and functionality of reservoirs; and
- Mapping the link between different water sources (springs and boreholes) and areas of supply in the village.

The hydrocensus is presented in **Appendix 1** and also informed **Section 4.3** (water supply and services overview) in this report.

5.2 RISK ASSESSMENT

The Cala area has a temperate inland climate with an average annual rainfall of 495 mm. Rainfall is highly seasonal with only 110 mm in the winter months of April-September, making Tsengiwe Village particularly vulnerable to seasonal drought. Summers in the area are warm, while winters are cool to cold. Climate change in the Tsengiwe-Cala area has been experienced as a noticeable shift from summer dominated rainfall to more autumnal rains over recent years; which is often associated with episodic downpours. The shift of the wet growing season into a colder temperature regime in Tsengiwe has placed demands on summer crop selection and created an agricultural drought condition. Floods have limited impact since the village is well above flood lines but erosion and soil loss are obvious consequences of heavy rainstorms. Contamination of water is reported but this is not a chronic risk and villagers considered floods and polluted water a lesser priority than drought.

Drought is further exacerbated by poor water infrastructure and lack of municipal services. Institutional dysfunction is considered the biggest hazard faced by the Tsengiwe community. Ineffective governance by local and regional government and traditional leaders and limited service delivery in general contribute to and compound the problems experienced by the community. A key issue identified by the LM is the dispersed settlement pattern of developed centres surrounded by scattered, under-developed rural villages, which makes providing access to basic infrastructure and services more costly, resulting in fragmented development. Since 2004, there has been a population increase of 100 households but the infrastructure has not expanded to meet population demands. Further housing development is planned without concomitant plans to increase the water supply.

Climate change models suggest that while gross rainfall may increase for the Cala-Tsengiwe area (as for the whole of the Eastern Cape); this is likely to be more sporadic and variable in occurrence. Farmers feel that they are already receiving less rainfall and this perception, along with other aspects of climate change such as temperature variability are explored in this study. The issue of land and soil degradation has had an obvious impact on the ability of the landscape to absorb and use rainfall (see Farmer Support Group, 1996), whether or not rainfall has increased or decreased. Tsengiwe has lost much of its environmental resilience in terms of buffering landscapes and communities from climate change. Resilience is not limited to the environment, but this can be strengthened through economic diversity and social cohesion as well changing the way water is used. Forms of livelihood and the way natural resources are made available and used are critical factors in increasing resilience.

In terms of DRR, there are few specific government resources at the LM level. There is no explicit reference to DRR in the Sakhisizwe municipality IDP (2013). The IDP mentions putting in place measures that reduce the vulnerability of disaster prone communities and provide appropriate preparedness and mitigation strategies. The DRM department at the LM level focuses on quick onset disasters such as fires, strong winds and flash floods. These are hazards listed in the Aurecon (2009) report and will be the focus on at both DM and LM level, in future. There is little initiative towards planning for slow onset disaster such as drought and there is almost no interaction between the DRM and departments such as DWA and DRDAR.

The village of Tsengiwe was selected as the pilot area for developing and testing the risk assessment methodology. This methodology was informed by a review of literature on current global and local understanding of climate change, for specialist quantitative and participatory qualitative rural appraisal. The multi-phase risk appraisal approach allowed the research team to determine the differences between risk perception (using the information and insights derived

from a community-based risk assessment) and specialist risk 'reality' (quantitative or semi-quantitative specialist informed risk assessment based on climate) of hydro-climatological hazards in the Tsengiwe region.

This methodology can be used to distinguish between climate related hazards and environmental degradation driven risks and to understand the risks posed by climate change in rural areas. Through understanding the actual hazards, vulnerability and coping capacity it is possible to identify opportunities to develop CCA plans at village level, prioritise interventions and assess timelines for implementation. It is important that the methodology be usable, relevant and considered practical by both village leaders and various development specialists and scientists.

The methodology aims to highlight the influence of scale at which a risk assessment is undertaken, the consequent influence of data input and approach to the risk assessment, and to illustrate how these inform risk perception (rightly or wrongly). Buy-in to risk reduction activities requires that, so far as possible, risk perception and risk assessment are aligned and agreed upon (during and/or after due process) between government levels (traditional and local) and the rural population. Where these cannot be aligned, opportunities to support/catalyse householders to focus on family or local CBO-led risk reduction can be identified on the basis of risk assessment results.

This assessment therefore aims to illustrate the need for communities to be supported to undertake their own risk assessment and using these, to engage proactively with government structures, non-governmental organizations (NGOs) and others, in planning and undertaking community led risk reduction activities. It also aims to illustrate the importance of communities querying their own perception of risk and vulnerability and the contribution that informed hazard vulnerability and coping capacity analysis makes to design of appropriate risk reduction CCA programs.

5.2.1 Methodology

Elements of Risk Assessment

For the specialist-informed and community-based risk assessments, the risk of each household or village to each specific hazard can be determined (qualitatively, semi-qualitatively or quantitavely) by using the classic risk equation, where:

$$\textbf{Risk (R)} = \frac{\textbf{Hazard (H) x Vulnerability (V)}}{\textbf{Coping Capacity (C)}}$$

R is the risk of a hazard occurring; H is the probability of a particular event; V is the vulnerability of the receiving environment and people; and C is the coping capacity of the receiving community. While the likelihood or impact of the event often cannot be controlled, whether the event causes a disaster can be controlled by increasing the coping capacity and reducing the vulnerability of a particular community. Vulnerabilities and coping capacities will change depending on the hazard in question. The UN/ISDR risk equation should be calculated for each hazard event and associated impact vulnerability.

Risk refers to the combined susceptibility (i.e. degree of coping capacity) and vulnerability of the community to potential damage caused by a particular hazard, and is therefore rooted in conditions of physical, social, economic and environmental vulnerability that need to be assessed and managed on a continuing basis. For example, risk to a low-moderate severity/probability hazard might be very high, due to an extremely vulnerable community/environment with little internal or external coping capacities (such as the devastation caused by the 2010 Haiti magnitude-7 earthquake), and vice versa (e.g. an 8 magnitude earthquake causing relatively little damage in Valparaiso, Chile). These processes of risk assessment are intended to lead to the application of risk reduction measures, which may include environmental management and the protection of critical facilities, both of which have been highly relevant to this study.

A ***hazard*** in the most general sense is defined as 'a potentially damaging physical event, phenomenon or human activity, which may cause loss of life or injury, property damage, social and economic disruption or environmental degradation' (UN/ISDR, 2004). There is a distinction between "natural hazards", of hydrometeorological, geological or biological origin, and "technological hazards", associated with "technological or industrial accidents, infrastructure failure or certain human activities which may cause loss of life or injury, property damage, social and economic disruption or environmental degradation" (UN/ISDR, 2004). Environmental degradation, in this context, means "processes induced by human behaviour and activities (sometimes combined with natural hazards) that damage the natural resource base or adversely alter natural processes and ecosystems" (UN/ISDR, 2004).

The UNDP (2004) recognizes ***vulnerability*** as "…a human condition resulting from physical, social, economic and environmental factors which determine the likelihood and scale of damage from the impact of a given hazard." Elaborating on this, vulnerability can be seen as the degree to which people, property, natural resources, systems, and prevailing institutional, economic, environmental, and social activities and conditions are susceptible to harm, degradation, or destruction from a specified hazard within a specified future time period. Both these definitions of vulnerability recognize 4 critical influences:

- social dimension – the vulnerability of different social groups based on their age, gender, socio-economic status, and the strength or weakness of social networks;
- economic dimension – income, vulnerability of economic sectors and critical infrastructure;
- environmental dimension – fragility of environmental resources such as groundwater and land; and
- institutional dimension – the effectiveness of structures and institutions).

Coping capacity defines the resilience (both internal and external) a community, area or object has to a disaster or specific hazard. It is the manner in which people and organisations use existing resources to achieve various beneficial ends during unusual or adverse conditions. It is the extent to which an area of community will be affected by a hazard event and how long it will take to recover. Coping capacities are socially determined characteristics that determine the ability of people to respond to and cope with the impacts of a disaster. Coping capacities include:

- human capital – the skills, health and education of individuals;
- social capital – relationships, the stability of networks and structures of social interaction;
- physical capital – infrastructure and equipment;
- natural capital – goods provided by the earth such as water, soil, wildlife; and
- economic and financial capital – quality of the built environment such as roads and wastewater treatment works as well as the financial capital available to a community.

Units of Assessment

The first step in the risk assessment methodology is vital. It requires the identification of the spatial elements, or units, within which risk to specific hazards can be identified. The evaluation of risk is ideally conducted at both village and household level, using specialist and community-led approaches. There can be a different outcome if risk of various hazards is evaluated at individual household level (with the sum of households comprising the village) or at a village level as a whole. Thus the methodology recommends households and village clusters at the larger scale as the two key units of risk assessment. If evaluated at village level, vulnerability and coping capacity factors should include evaluation and impact of governance at traditional, local and district level. These differences will also have an impact on the relevance and efficacy of DRM activities rolled out by Provincial and National Government.

Scoring Hazards

Hazard scores for each household and village as a whole can be calculated by determining the

severity and probability of each specific hazard. Severity and Probability are both given a score out of 5, using the equation:

Hazard (H) = (Probability (P) + Severity (S)) / 2

The final hazard score is then calculated out of 5. This portion of the risk assessment should be specialist-informed, with the probability and severity rankings are based on collected scientific data.

Scoring Vulnerability

The specialist vulnerability assessment should be conducted for each household and village as a whole. The data can be used to assess five vulnerability components, namely family type, health, food security, access to water services and land security (see **Appendix 4D**). Each of these components should be scored out of 5, with each component then added together and divided by 5 to get a normalized final vulnerability score out of 5.

Scoring Coping Capacity

The specialist informed coping capacity assessment for each household should be determined by scoring three components out of five points, namely financial resources, education and skills, and belonging/ beliefs and traditional knowledge. Each of these component scores can then be added together and divided by 3, in order to get a normalized final coping capacity score out of 5.

The coping capacity for each village is calculated differently as it is linked to the larger ward, LM and DM structures. It thus requires calculations based on the implementation of various stages of the HFA Priorities for Action (UN/ISDR, 2005). The HFA priority areas strive to reduce the impact of disasters through gender sensitive disaster preparedness and risk reduction i.e. by increasing the coping capacity (see **Appendix 4E**). Each HFA priority area can be given a score out of 5, depending on whether there is very limited to no implementation (1), limited implementation (2), partially implemented (3), mainly implemented (4) and fully implemented (5) (**Appendix 4E**). The final village coping capacity is then calculated using the equation:

C = (HFA1 + HFA2 + HFA3 + HFA4 + HFA5) / 5

5.2.2 Assessment Procedure

At the first workshop the research team chose not to approach the community with an empty worksheet (as would have been the case in 'classic' PRA) but came with as much basic knowledge as possible. The community was then asked to work with this knowledge in correcting, improving and adding to it. In preparation for the initial workshops the team assembled a history of development effort and projects within the area, including a summary of what has been tried, what has failed and what has succeeded. These aspects were discussed with the community during the workshop.

The team started the process by providing the 'known' knowledge in the format of a large-scale map of the area. This showed occupied areas, roads and other infrastructure, fields and land use within those fields (with historic evidence if available), fences, dams and springs, rivers, eroded areas, invasive alien plant extent, etc. This was populated with the detail as appropriate to the identification of risks and resilience. The community was then facilitated to add the 'unknown' knowledge, with the 'data' corroborated though community consensus. Additional knowledge included rainfall figures showing averages, trends and seasonality, census data, water services and water quality information, groundwater maps, etc.

It was a challenge to introduce concepts of slow-onset risks, like climate change, and the necessity for CCA into the lives of communities that are ruled by day-to-day problems. However, many of the related issues were already identified as problems by the Tsengiwe community – even if clear causal links to climate change had not yet been established. The concept of planting trees for the next generation was successfully adopted by forestry farmers – and this example offered lessons to be learnt and transferred to climate change where actions will only benefit the next generation. The team relied on parallel studies being undertaken by the UFH to

provide historic information on land use and productivity and work with the community to project this forward, then imposed the present or likely impact of climate change.

Following the principle of community-led, specialist informed risk assessment, specialist input was added to the information gained from the workshops so that risk assessment was not dominated by perception. Out of a big pool of hazards, specialists defined a shortlist of four hazards (boundary constraints) (**Appendix 4D**). The community added to this by sharing their perception of the shortlisted hazards and by proposing additional hazards in the initial workshops (**Appendix 4C**). Out of the shortlist and hazards proposed by the community, three were selected and discussed in detail during the workshops.

In order to test the validity of the community-based perception of hazard, certain criteria were established using actual hydro-meteorological data obtained from weather stations (South African Weather Services, 2012 and DWA, 2012). Prior to discussing such an approach, it should be noted that data availability strongly influenced the different hazards that could be meaningfully considered and the possible measures used in evaluation. This remains a problem inherent in undertaking such analysis in the South African context, especially in under-developed rural areas. The results of the structured, semi-quantitative methodology on a 1 to 5 rating score are compared with the Tsengiwe community analysis and the resulting score input to the risk equation.

5.2.3 Assessment

Units of Assessment

The first step in the risk assessment methodology is the identification of the spatial elements, or units, within which risk to specific hazards can be identified. In this risk assessment the evaluation of risk is at Tsengiwe village level and uses both a specialist informed and community led approach to hazard analysis. The hazards identification was done by the community and the analysis by climatologists for hazards for which data was available.

Unfortunately household data that was collected in a separate study funded by the National Research Foundation (NRF) were not appropriate for use, as outlined in Deliverable 3 “Methodology for Risk Assessment” of this study. The vulnerabilities and coping capacity used in the 2009 study undertaken by Africon (now Aurecon) for the CHDM are used in the risk assessment instead. It is assumed that the average sum of vulnerability and coping capacities of the LM is the same for the village of Tsengiwe and that Tsengiwe is socially reasonably representative of other villages in the LM although geographic factors could result in different village specific hazard prioritisation ranking. A more detailed analysis of vulnerability and coping capacity is beyond the scope of this study but warrants attention to establish sensitivity to scale and factors used as proxy e.g. local landscape and land use factors.

The disaster risk assessment undertaken by Africon (2009) used local municipalities as the unit of assessment, which influenced the hazard types identified for the assessment as well as the vulnerability and coping capacity, and hence risk assessment. This scale of risk assessment informs the perception of risk at DM and LM level, and will also inform prioritization and roll-out of risk reduction activities by local government. If the perception of risk and evaluation of risk at village level is different, it will probably be difficult to motivate community self-help and contribution to disaster risk reduction or climate change adaptation activities. Building a culture of self-help and contribution is essential to building community resilience if the risk reduction activities are to be driven from the top down. Not to do so could well build dependence rather than a deep resilience able to gain momentum from grassroots level.

Identification of Hazards, Vulnerabilities and Coping Capacities

Hazards, vulnerabilities and coping capacities related to climate change were identified in a village community workshop conducted in Tsengiwe in June 2012 (**Table 7**). Subsequently a meeting was convened with the water services sector in the LM and DM as well as the DWA, and DEAT. The Traditional Authority was invited but did not attend. The workshop was, however, well attended by community members who had been present at the community

workshop (see **Appendix 2** for attendance lists). The community output was presented to these parties and further discussed by all attendees.

Table 7: Climate change hazards, and associated vulnerabilities and coping capacities for Tsengiwe

Hazards	Vulnerabilities	Coping Capacities
• Droughts • Flooding • Snow and frost • Extreme weather events (hail, lightning etc.) • Fire	• Social breakdown • Institutional/governance failure • Land degradation	• Improved food security • Development projects • Alternative and additional water supplies (dams, rainwater harvesting, groundwater, water reuse etc.) • Sustainable agricultural practices

The Africon (2009) report identified only snow and strong winds/tornadoes as hazards within Ward 4 of Sasikhisizwe LM (Tsengiwe falls within this Ward). As can be seen from **Table 7** a number of other hazards were identified for Tsengiwe, demonstrating the importance of scale assessment and wider consultation during the study (see **Appendix 4C**).

Hazard Scoring

The community-based participatory hazard identification was simplified, with the community identifying the specific hazards they felt vulnerable to, and ranked them using an increasing hazard score of 1 to 5. Results from the 12 July 2012 Sakhisizwe workshop show the community rating drought (hazard score of 5) and flooding (hazard score of 4) as their greatest hazard in the area, followed by extreme weather events (hail and strong winds, hazard score of 3), frost and snow (hazard score of 2) and fire (hazard score of 1).

The report conducted a structured semi-quantitative analysis using a 1-5 rating score choosing to focus on the drought, extreme heat and frost hazard. Drought and frost are seen as primary hazards as they are most likely to impact on food security. Tsengiwe is positioned sufficiently high above the Tsomo River that significant flooding is not likely a large risk. Flooding is seen not as a meteorological hazard *per se* but rather as a consequence of incorrect land use and management.

The three of the hazards identified where analysed and the results are ranked according to results of a structured quasi-quantitative methodology on a 1 to 5 rating score (Deliverable 3) This score is input into the hazard equation:

$$H = \frac{S + P}{2}$$

Where; P = Probability and S= Severity

The selection of criteria is illustrated in the flowchart

Figure 13 and outlined in **Table 8** (for a detailed description. The final hazard scores (out of 5) used in the risk equation are as follows:

- Drought = 4;
- Extreme Heat = 1.67-2.33 (minimum and maximum dependent on month);
- Frost = 2-3.7 (minimum and maximum dependent on month).

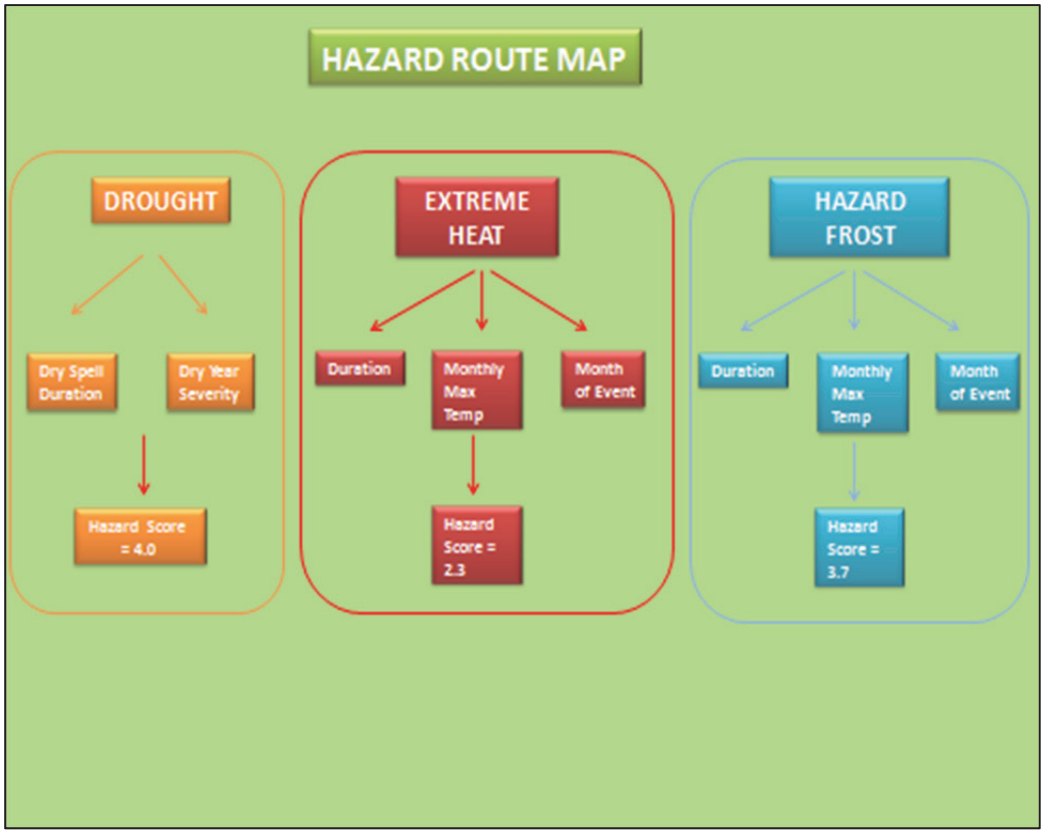

Figure 13: Hazard Flow Chart showing Final Scores

Table 8: Table of the Hazards to be Evaluated and Quantified

Hazard	Probability	Severity Components	Comment	Score
Drought	The probability is implied in the definition of the severity components	Dry Spell Duration	90th percentile annual maximum dry spell during the summer rainfall months between October and March	5.0
		Dry Year Severity	Ratio of 10th percentile of annual precipitation to Mean Annual Precipitation (MAP)	3.0
Extreme Heat	The probability is implied in the definition of the severity components	Duration	90th percentile of the no. of consecutive days when temperature > 32˚C	1.67-2.33
		Monthly max temperature	90th percentile of max temperature in a given month	
		Month of occurrence	The manifestation of a heat event in relation to the season	
Frost	Frequency of occurrence	Duration	An increase in the duration of the number of days of frost increases the hazard, as crops become increasingly exposed and susceptible to damage. (BOM 2007). Human health may be put at risk by continued periods of sub-0 temperatures.	2-3.7
		Months of occurrence	The seasonality of frost risk	
			The number of days of potential frost occurrences in any given month.	
Floods, Hail, Wind, Fire	Not analysed			

Vulnerability Scoring

Financial and time constraints precluded vulnerability and coping capacity being assessed at a household level, thus values derived from Africon's (2009) assessment were used. The CHDM disaster risk assessment (Africon, 2009) used a generalised, broader scope vulnerability assessment instead of household or village specific vulnerabilities, focusing on regional analysis of:

- Societal vulnerability: Identifying neighbourhoods where individual resources are minimal. Limited resources availability in a community suggests that the community might be vulnerable, or susceptible, to any hazard event;
- Environmental vulnerability: Identifying locations where there is potential for secondary environmental impacts from natural hazards and targeting vulnerable locations for risk reduction activities;
- Economic vulnerability: Identifying the economic vulnerabilities to hazard impacts; and
- Critical facilities: Determining the vulnerability of key individual facilities or resources within the area.

These regional vulnerability components can be scored either as 1 (not vulnerable), 2 (vulnerable) and 3 (extremely vulnerable), and then added together to get a final vulnerability

score ranging from 4 to 12. This score (9 out of 12 for both hazards) was then converted to a score out of 5. The result was a vulnerability score of 3.75 that was used in the calculation of the risks of all three hazards.

Coping Capacity Scoring

The CHDM disaster risk assessment (Africon, 2009) calculated a "manageability" factor, which is similar to the HFA Priority Areas. It scored the following components on the degree to which a community can intervene and manage the negative consequences of a hazard as either 1 (poor), 2 (modest) or 3 (good):

- Awareness;
- Legislative framework;
- Early warning systems;
- Government response;
- Government resources;
- Existing risk reduction measures;
- Public participation measures; and
- Municipal management capabilities.

These components can be summed, resulting in a final manageability score ranging from 6 to 24. The average vulnerability and coping capacity score was calculated from the various factors used by Africon (2009). The coping capacity Africon (2009) score for snow (14 / 24) and tornadoes (10 / 24) is used in the risk calculation to calculate risk for drought, extreme heat and frost. Further analysis of the wind patterns can be undertaken to confirm this assumption. The average of these scores was used and converted to a score of 2.5 out of 5 for coping capacity in the area.

Risk Scoring

The values derived for the different hazards were input into the risk equation:

$$\textbf{Risk (R)} = \frac{\textbf{Hazard (H) x Vulnerability (V)}}{\textbf{Coping Capacity (C)}}$$

Table 9: Summary risk analysis for Tsengiwe

Hazard Type	Hazard Score		Vulnerability Score	Coping Capacity Score	Risk Score	
Drought	4		3.75	2.5	6	
Extreme Heat	1.67	2.33	3.75	2.5	2.5	3.5
Frost	2	3.7	3.75	2.5	3	5.6

The summary risk analysis (**Table 9)** illustrates the impact of changes in hazard and coping capacity scores. The table calculates the risk for the minimum and maximum of the hazard score in any one month for frost and extreme heat. This illustrates that direct intervention to minimise a hazard occurring can reduce the risk score all else being equal. Similarly if one were to reduce vulnerability the risk would also be minimised. The indirect proportionality of coping capacity to risk however means that in order to reduce risk the coping capacity would need to increase. Thus in order to reduce risk, all else being equal, investment is required in increasing the coping capacity of households and LMs to overcome the impact of associated hazards as well as to reduce the vulnerability of these households to hazards.

5.2.4 Comment and Analysis

The comparison between the community ranking and the data informed ranking is listed in **Table 10**. The hazard analysis illustrates that drought is correctly perceived as the most significant hazard but suggests also that extreme heat is an emerging hazard which may increasingly impact human health as well as food security. This suggests that water storage is an important risk reduction initiative.

Table 10: Summary of Factors Perceived and "Quantified" as a Hazard

Hazard	Community Ranking (1-6)	Data Informed (1-5)
Droughts	******	4 (Lack of rain) 1.67-2.33 (Extreme Heat)
Floods	*****	
Hail	****	
Wind	***	
Frost	**	2 in summer 3.7-4.0 in winter
Fire	*	

The components of the extreme heat hazard scoring used in this report need further analysis as the present score is largely reflecting the month in which the event occurs and which counter intuitively suggests that the hazard of extreme heat is most likely be of negative impact in winter. This is based on the premise that untoward high temperatures have a higher negative impact when people are expecting cool temperatures and vice versa. This ranking by month appears to skew the score to an increased risk in winter.

The contradictory element is best illustrated in **Figure 14** where the frost and extreme heat variations in score are shown per month. During summer months (October to February/March) the hazard scores for both follow similar trends and are close in actual score. As expected the greatest difference between the 2 hazards is in the winter months. It was not expected however that the highest score for frost and for extreme heat both occur in the winter months. From an agricultural perspective it is known that warm/cold periods in winter/summer can be devastating to crops. This result warrants further research and consideration.

The analysis of frost presents a complex monthly pattern which if it persists in early spring or early autumn could impact food, cash crops as well as survival of animal young. It is correctly perceived by the community as a significant hazard but possibly underestimated in this generic semi-quantitative analysis in relation to specific agricultural or pastoral activities. As for extreme heat the risk to specific activities needs to be assessed; and the differences illustrate where experiential knowledge of villagers is very valuable.

Floods are perceived by the community as a significant hazard but data analysis suggests that it is not a meteorological hazard and that the experience of "flooding" is rather as a consequence of incorrect land use and management as well as land degradation. In this instance mitigation measures related to conventional measure of floods would not be effective if the actual "cause" of the impact of what is perceived as floods were not addressed and corrected. This illustrates how perception and or difference in the usage of the term "floods" especially in the climate change debate could lead to poorly conceived mitigation measures.

The results support relevance of scale appropriate hazard analysis needed to catalyse community led CCA measures. The CHDM highlights Snow and Strong Winds as priority hazards for Ward 4 of the Sakhisizwe LM in which Tsengiwe is situated. It is likely that these are both significant hazards at the ward scale but it is not likely that the community would be motivated to help themselves or contribute to initiatives by the DRM of the LM or DM if the hazard of drought and consequently water and food insecurity were not addressed. Further it is unlikely the community would invest in improved roof/other structures and planting of trees as wind breaks to crops reducing impact of strong winds if the impact of local scale run off floods on individual households and village roads is not addressed first / as well.

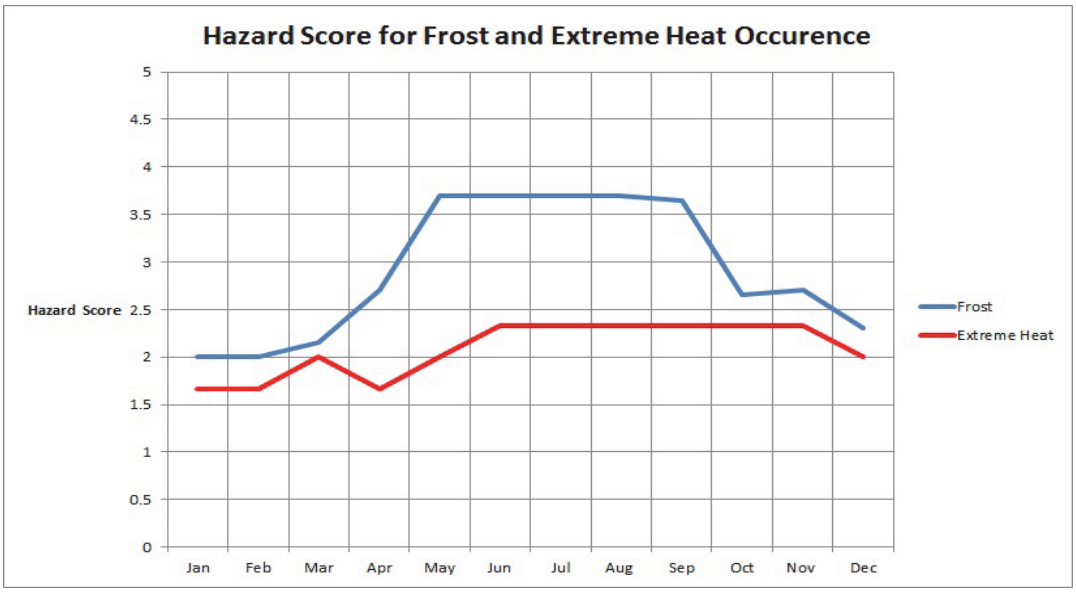

Figure 14: Graph to illustrate that frost is the more significant hazard. The highest score for Extreme Heat is lower than the lowest score for Frost.

5.2.5 Conclusions

There was mention that there is less water flowing for shorter periods of time in the Tsomo River (pers. comm.; Village Headman, December 2010). However, assessment of longer-term rain and runoff records to assess whether this is linked to larger scale changes in climate or to land use patterns in the headwaters, or both, would be needed. Drought was perceived by the Tsengiwe community to have become progressively worse as a result of climate change. However, land degradation, ineffective governance by local and regional leaders, and limited service delivery also contribute to exacerbate drought and the problems experienced by the community. This should be emphasized; climate change can be used as a scapegoat for more pertinent institutional and socio-cultural issues related to land and water management. This is detailed further in Umvoto Risk Assessment Guidelines in **Appendix 4D**.

The community ranked Flooding as second in the Hazard rating. Site inspection however suggested that the perception of floods as a risk arises from the vulnerabilities created by land degradation at community scale and land use practice on a household scale. Given the increased variability and likely intensity of rainfall events it is possible that localised sheet flooding could increase while the village continues to remain invulnerable to regional scale floods (being situated well above the flood plain of the Tsomo River). Analysis of flood risk could be used to question this perception and illustrate or assist to identify contributions of vulnerability factors that cause the local flooding. Insight into, combined with demonstration of how to reduce the vulnerability factors changes the perception of a risk to insight into what causes vulnerability and demonstration of improving coping capacity.

5.3 COMMUNITY CCA PLANS

During the first workshop, potential development projects were also identified as possible components to be implemented for a CCA Plan. These are summarised in **Table 11** and were further explored with the community during the second and third workshops.

Table 11: Potential Development Projects for CCA Plans

Potential Project	Details
Groundwater development	Opportunities and technologies to use groundwater that is relatively close to the surface, and available to Tsengiwe village and many villages across the region, need to be explored. This is strictly in line with DWA's approach to optimise the use of local resources rather than to rely on bulk infrastructure schemes.
Surface water development	Opportunity to construct a small dam within the catchment for stock watering
Catchment rehabilitation	Opportunities for a catchment rehabilitation programme to secure and improve the grasslands through repairs to the old existing contour network, rehabilitation of dongas, removal of alien vegetation, construction of micro-catchments and swales, and brush packing – all integrated with stock management.
Agricultural development	Recognition that dry land cropping and stock farming are the only extensive agricultural practices feasible, although some supplementary irrigation may be possible. Project work would include the selection of new crops with a short growing season under the climatically changed conditions experienced by community.

Community hazard rankings (see **Appendix 4C**) were the springboard for discussions around actions that could be carried out by local municipality and community members, and those actions that were necessary but would need the support of "outsiders"; be this planning, direct government intervention, or funding. These led into the CCA plans and are discussed further in this section. The CCA plans focus on five key issues, perceived by the community to be interconnected but distinct enough to warrant their own plans. These included:

- Water supply and reticulation;
- Land degradation and soil erosion;
- Agriculture and crop reticulation;
- Animal grazing management; and
- School greening.

Although there remained a strong element of dependency on funding and intervention support, there were many actions recognized that could be undertaken from within. Each CCA plan is summarised in the sections below and captured in the progress table in **Appendix 6M**. **Appendix 6** also contains the original CCA Plans and a list of each CCA Plan committee.

Although limited, there are resources available for communities at the local and district municipal level. In order to assist Tsengiwe with navigating municipality structures and resources, the research team developed a step by step guide for community groups and individuals. The guide comes in the form of a flow chart related to each CCA Plan (see **Appendix 5**). Contacts are provided for each of the five main CCA Plans and identify key steps towards achieving CCA Plan goals and relevant contact persons at the municipal level. Among the contacts given for all of the above mentioned plans are:

- Mr May, the Control Officer from the DRDAR;
- Mr Malgas, the local Extension Officer;
- Mr Masoka from the DWA;
- Umvoto Africa;
- Companies and Intellectual Properties Office (CIPRO); and
- Community leaders.

5.3.1 Water Supply and Reticulation

Stock watering dams are a priority to encourage high-mountain grazing of extensive communal lands beyond the village boundaries and form an important part of the Water Supply and Reticulation Plan. In terms of rainwater tanks, Tsengiwe is well situated for rainwater harvesting tanks (moderate slopes, high runoff, and suitable land for irrigation). One site identified is at the

Upper Tsengiwe Secondary School – where the slope is suitable and school buildings will provide ample runoff. The Committee noted their lack of financial resources but their willingness to provide labour in support of setting up and looking after rainwater tanks. Processes and procedures for acquiring rain water tanks through the DWA, as well as qualifying criteria (e.g. applicant must be unemployed and must have a fenced plot) are detailed in the flow charts in **Appendix 5B** and table on CCA Plans Progress in **Appendix 6M**.

Key goals for securing domestic water supply, and providing for livelihood resilience both in coping with the variability in the current climate (marked by droughts with shortened, shifting and more episodic rainfall seasons) and in dealing with climate change include:

- Replace or rehabilitate non-functional boreholes and reservoirs;
- Installation of rainwater tanks for all eligible households;
- Maintenance of existing water infrastructure: Replace or rehabilitate pipelines, non-functional boreholes and reservoirs, provide for village level irrigation with the favoured option being a dam in the catchment area above the village;
- The development of additional stock watering dams and fencing of grazing areas, in association with the CCA Plan for animal grazing management; and
- Instil a culture of household recycling of grey water.

Measures that can be taken to supplement water supply are encouraged by the water supply flow chart – these pertain to additional dams, operational boreholes and household rainwater tanks. The funding and administrative processes for these are outlined and contact details for the relevant authorities at DWA and DRDAR are provided. Contacts are also listed to enquire about training on water quality and starting a plumbing mentorship programme. **Table 12** summarises the CCA Plan for Water Supply at Reticulation.

Table 12: CCA Plan for Water Supply and Reticulation

CCA Plan for Water Supply and Reticulation	
Audit of households needing rain water tanks	Committee to get approval from Headman for household rain water tank applications
	Committee to discuss at next community meeting the use of grey water for gardens, Jojo tanks and requirements for Jojo tanks
Boreholes	Committee to make applications to DWA/ Institutional Development and Support for the main village supply dam and for the stock dams
Village stock dams	Committee to review use of map/ mapping process. Committee to put application in with DWA for feasibility study on Tsengiwe Village Irrigation Dam

5.3.2 Land Degradation and Soil Erosion

Managing the land to optimise the use of rainfall, and maximise infiltration for crop and grass production, and the recharge of groundwater is essential. Most important is the process of developing plans and gaining assistance at municipal and government level in land care and environmental management. Other key goals with regards to land degradation and soil erosion include:

- Acknowledge the problem of over grazing and the role of donkeys;
- Advocating at the municipal level for the improvement of roads, dongas, swales and contours;
- Planting hedges as wind breaks;
- Household erosion control and water channelling;
- Gaining assistance and training for dealing with invasive alien species;
- Identifying effective species for pioneer grass cover; and
- Gaining assistance at municipal and government level.

Plans for land degradation and soil erosion include addressing road erosion, dongas and gabion intervention, and controlling alien invasive plant species. The contact details for the Extension Officer and the DRDAR Controller are listed for dealing with these issues (**Appendix 5D**). **Table 13** summarises the CCA Plan for land degradation and soil erosion.

Table 13: CCA Plan for Land Degradation and Soil Erosion

CCA Plan for Land Degradation and Soil Erosion	
Roads and Erosion	Committee to discuss household erosion control at the next community meeting
	Committee to discuss stone removal from erosion control areas at the next community meeting
	Committee to make contact with Mr. Malgas, Mr. May, Mr. Luzomba, Mr. Tomsana, and Mr. Arosi regarding the Xhalanga Land Care Project
	Committee to review this information on appropriate plants for managing gullies
	Committee to review information on training available at the municipal level for a village representative on erosion control
	Committee to review use of map/ mapping process of erosion on roads
	Committee to notify headman about the need to repair major roads and dongas; approach Councillor with a list/ description of major roads and dongas; Committee to follow up that Councillor Jam Jam has taken the concern to the LM Department of Public Works; Committee to follow up with Public Works and get in touch with Mr. Malgas – by 31 August 2013
Dongas & Roads	Committee to identify ways to prevent small dongas from becoming major dongas
Hedges and windbreaks	Committee to review use of map/mapping process of locations where a windbreak would be effective in agriculture and crop areas
	Committee to discuss trees for windbreaks with Mr. Malgas, Extension Officer
	Committee to acquire trees for wind breaks (approach mayor and Department of Environmental Affairs by 31 August 2013)
Swales and contours	Committee to review Umvoto training on putting in contours and maintaining and repairing existing contours
	Committee to appeal to headman or councillor to pressure the municipality/Department of Public Works to maintain and repair existing contours
Brush packing, lapesi and black wattle	Committee to follow up with brush packing and training people to cut lapesi and packing of lapesi into dongas
	Committee to review training guides provided by Umvoto on brush packing
	Committee to review where micro-catchments would be effective based on Umvoto training talks
	Committee to make progress in brush packing, use of lapesi to pack eroded areas, eradicating lapesi and creating micro-catchments to control soil erosion on slopes and hillsides
Micro-Catchments	Committee to review training talk on where micro-catchments would be effective
	Committee to review training on micro-catchment management
Grasses	Committee to identify effective grass covers for donga repair

5.3.3 Agriculture and Crop Cultivation

A large area of arable land is no longer in use in Tsengiwe due to land degradation and a lack of fencing, despite the fact that some of these fields are at the banks of the perennial Tsomo River. Since 2005, families with land on the banks of the river have repeatedly asked for help with irrigation and fencing of the fields from the provincial Department of Agriculture and from the Faculty of Agriculture at the UFH, without success. Crop production and marketing could

immediately be piloted on this land should it be fenced. There are families willing to lease their lands for sub-division into plots which could be used for development purposes.

Key goals at village level to improve agriculture and crop cultivation are to:

- Establish a co-operative;
- Establish a Community Resource Centre to centralise agricultural and livestock production with the specific goal of moving beyond subsistence and into cash farming through the development of irrigated and dry land agriculture methodology; and
- At household level, the CCA Plan aims to establish rainwater harvesting, household composting and household vegetable gardens.

There are various means to address agriculture and crop cultivation flow chart (**Appendix 5F**). The steps on how to set up cooperation, irrigate agriculture, rear poultry, maintain a sheep shearing shed, compost and grow a food garden are listed. Steps include applying for a water license, fencing or funding and contact with the Controller at DRDAR. **Table 14** summarises the CCA Plan for agriculture and crop cultivation.

Table 14: CCA Plan for Agriculture and Crop Cultivation

CCA Plan for Agriculture and Crop Cultivation	
Set up Co-op	Committee leader to approach an Extension officer and/ or DRDAR for funding for co-operative farming
	Committee to write a business plan for co-operative farming
	Committee to get funding approved for sheep shearing co-op
	Committee to get funding approved for piggery/ poultry co-op
	Committee to register sheep shearing co-op with CIPRO
Donkey and Cattle Management	Committee to discuss the donkey management system at the next community meeting and determine how maximum number of donkeys per household
Irrigated Agriculture	Committee and Headman to review priority areas for dam water
	Committee to review use of map/ mapping process of areas irrigated under current project
Dry Land Agriculture	Committee to review use of map/ mapping process of fields outside of household gardens without irrigation
Sheep Shearing	Committee to repair sheep shearing shed
Composting at Household Level	Committee to discuss household composting at the next community meeting
Household Food Gardens	Committee to make seeds, seedlings and fruit trees available to households
	Committee to discuss crops suitable for different seasons, particularly frost, at the next committee meeting

5.3.4 Animal Grazing Management

Communal control of stock numbers, especially as the village grows, will be essential if over-grazing is to be circumvented. Key goals for better animal grazing management include:

- Development of grazing camps for stock management;
- Designation of communal ploughing areas for communal agro-projects;
- Identifying and fencing off areas for the livestock;
- Fencing off ploughing fields for crops;
- Fencing of grazing camps; and
- Fencing off and securing individual households.

In terms of planning animal grazing camps, the steps for conducting a stock census, identifying suitable locations of camps, measuring the amount of fencing required and meeting with the planning manager at the DRDAR as well as neighbouring village headmen are outlined.

Stock watering dams and fencing are the responsibility of the Eastern Cape Department of Agriculture. The layout of grazing camps and provision of fencing would also fall under the Department of Agriculture. The processes and procedures for applications as well as contact persons are detailed in the flow charts in **Appendix 5H**. **Table 15** summarises the CCA plan for animal grazing management.

Table 15: CCA Plan for Animal Grazing Management

CCA Plan for Animal Grazing Management	
Plan for camps	Committee to review use of map/ mapping process of the location and extent of communal grazing land; which land is to be used for grazing or ploughing only; homes that are on communal grazing or ploughing land
	Committee to review use of map/ mapping process of where stock water dams are to be located in each camp
Fencing	Committee to get counting wheel and organise meeting with Headman and/ or sub-headman and neighbouring village and measure how much fencing would be needed to secure communal grazing fields
	Committee to estimate the cost of the required fencing for communal grazing fields
	Committee to measure how much fencing would be needed to secure communal ploughing fields
	Committee to fence grazing and ploughing areas
Umvoto Resources	Committee to review the information on community greening and soil and water conservation resources

5.3.5 School Greening

The poor level of infrastructure and water services situation in Tsengiwe is reflected in the two junior secondary schools in the village, as described in **Section 4.3**. The community noted their concern that children only learn about agriculture in theory but have little practical experience at school. In this light, the key goals for community and school greening include:

- The development of a comprehensive greening plan along similar lines to the Three Crown Project;
- To further present a strategy towards improving the functioning and use of existing infrastructure for both Pakamani and Tsengiwe Junior Secondary Schools; and
- Training for relevant school staff.

The flow chart on School Greening (**Appendix 5J**) refers community members to a document called 'Looking after the Soil' and provides contact details for the leaders of the Three Crowns and Mbewula projects. The CCA Plan for School Greening in detailed in **Table 16**.

Table 16: CCA Plan for School Greening

CCA Plan for School Greening	
Comprehensive Greening Plan for Pakamani and Tsengiwe Junior Secondary Schools	Committee to work with principals and School Governing Board (SGB) of Pakamani and Tsengiwe Junior Secondary Schools to write a plan for school greening
	Committee to make progress in: • Getting rain water tanks working • Rainwater harvesting and gardening • Getting toilets • Hydroponics • Algal pond • Biogas dispenser • Contouring, swales and use of surface runoff • Initiating discussion with Department of Public Health and Department of Education • Building greenhouses

CCA Plan for School Greening	
	• Snake pipes for hot water • Made contact with Mbeula and Three Crowns (invite to Tsengiwe and source materials for resource centre) • Bottle project with children (recycling) • Planting trees or hedges at school • Vegetable gardens • Make compost • Solar energy • Vermiculture
	Committee to develop a funding plan for the purification of water, cleaning and maintenance
	Committee to review Umvoto materials on school greening
	Committee to initiate training for the school gardener
	Committee to make contact with Three Crowns, Mbewula, Department of Education and Department of Health regarding School Greening
	Committee to identify Mbewula and Three Crowns funding sources and develop funding plan for School Greening of Tsengiwe and Pakamani Schools

5.4 MONITORING AND EVALUATION PROGRAMME

A key aim of the study was to monitor project progress and evaluate impacts and so far as possible the sustainability of the CCA programme to be implemented by Tsengiwe Village. In line with Participatory M&E, the Tsengiwe community set the objectives and activities themselves. This section describes the design of the M&E programme and training of youth in basic research and the concepts of M&E. In addition, community members were trained to monitor municipal water services delivery. This was seen as important for moving from the 'blame/ complain' relationship with the LM to holding officials accountable to service delivery using reliable data –such data being also available for communication to DM officials and the press.

5.4.1 Theoretical Background

M&E is used for a variety of purposes in different sectors. The most common functions of M&E are to evaluate the impact of a given programme and the changes that have come about as a result of programme initiatives (Estrella and Gaventa, 1998). The emphasis is on the comparison between programme objectives and actual achievement. Assessing programme impacts can determine if:

- Study interventions are achieving identified objectives;
- Programme objectives remain relevant over time; and
- Best action strategies have been pursued.

M&E can further create a learning process to strengthen community organizational and institutional learning as well as an opportunity for communities to review, reflect on and revise their own process and participation. It is anticipated that this is a component of empowering communities to engage in critical conversation with the LM.

M&E has stemmed from a trend in management circles towards accountability and results as well as a growing demand in the development sector from donors and stakeholders for accountability and demonstrable success. Coupled with this, there is an increasing focus in development discourse on community participation and thus an increasing recognition that monitoring and evaluation should also be participatory (Estrella and Gaventa, 1998). What is novel in this study is the village being accountable for their own self-help.

Community-based Monitoring and Evaluation (CBM&E), or Participatory Monitoring and Evaluation (PM&E) initially evolved in response to the failure of top-down and external approaches to assessment to build relationships between stakeholders and community members. Non-participatory M&E was largely focused on measurement, oriented to the needs of programme funders rather than the beneficiaries or participants in a programme. Furthermore, the emphasis on objectivity and distance between evaluator and participants facilitated judgments as opposed to empowerment. Rubin (1995) highlights that traditional approaches emphasizing value-free objectivity are usually not conducted by those actually impacted by the findings of the evaluation and tend to ignore qualitative information which helps provide a more nuanced understanding of study outcomes, processes and changes. In PM&E the broad goal is to involve the local population, particularly those likely to benefit and gain from the programme or with direct programme involvement. CBM&E and PM&E have been part of the policy domain of large donor agencies and international development organisations such as the Food and Agricultural Organisation (FAO), Danish International Development Agency (DANIDA), and the Swedish International Development Authority (SIDA) since the 1990s (Estrella and Gaventa, 1998).

Davis-Case (1990) describes Participatory Assessment Monitoring and Evaluation (PAME) which is based on the information needs of community members. Through PAME, insiders can set objectives and activities and monitor and evaluate whether these have been achieved and continue to be relevant. The role of outsiders is mainly to encourage and help insiders identify their needs, set objectives, monitor and evaluate the activities. Feuerstein (1986: xi) argues that participatory evaluation builds on what people already know and do, using and developing people's current abilities and skills to monitor and evaluate their own progress. During the first and second workshops in Tsengiwe (8 to 12 July 2012), the community was involved through participatory processes in the definition of problems, areas of progress, priorities for action and activities, and the indicators of progress in activities. The research team developed a set of surveys based on these indicators. During the third workshop (5 to 9 August), the Development Committees met to discuss and compare what they had been doing. This was facilitated by Umvoto and the M&E Group. Changes in circumstances and goals were captured and the CCA Plans and M&E surveys were updated. The surveys were further amended by the M&E Group, particularly the type and phrasing of questions. PM&E is an experiential learning cycle for the study team and the M&E Group. It serves to emphasize that participants learn from experience and can evaluate their own needs and priorities as they change (Estrella and Gaventa 1998).

PM&E is increasingly being regarded as a way to hold both project beneficiaries and stakeholders accountable. In Tsengiwe, this was taken a step further as the M&E programme also became a tool to empower people, especially the youth, to hold their community leaders and development committees accountable. PM&E also allows for reciprocal evaluations to take place, so that donors themselves are subject to some form of accountability. In this context, accountability becomes a two way exchange relationship between those who provide resources and those who use those resources. This can potentially allow beneficiary groups to present and articulate their needs. In Tsengiwe, the usefulness of the resources and contacts provided by Umvoto were monitored in terms of the relevance of the information and the subsequent activities that have arisen in the community as a result of this intervention and the information provided. The resources and training provided by Umvoto are detailed in **Section 5.1** and **Appendix 3**.

The research team sought to assess study and community efforts from the viewpoint of both insiders and outsiders in order to achieve a holistic perspective (see Campilan 1997: 69), balancing subjective and objective perspectives. As outsiders, the research team acted as facilitators and supervised the M&E process.

5.4.2 Focus of Monitoring and Evaluation

Ongoing Monitoring and Evaluation by the Research Team

The M&E programme was conducted on an ongoing basis. There were several parts of the study that the research team monitored and evaluated progress in. These included:

- How local perception of risk aligned with a specialist informed risk assessment (with an emphasis on hazard analysis and how hazard identification can be conflated with risk perception)
- Validity of the research team's insights and effectiveness of response to challenging issues faced by the community and success in building coping capacity through the introduction of local mentors and supporting communication with government services (water, agriculture, disaster management)
- Development of community-led CCA plans
- Progress in the activities for CCA and DRR laid out in the CCA Plans

During the second and third workshop, the research team was able to monitor progress in areas of concern identified during the first workshop. These are summarized in the **Table 17**.

Table 17: Ongoing Monitoring of Progress

Issue identified	Progress in Second and Third Workshops
No follow up on plans and workshops	• The research team presented the Workshop One video to very positive response. They felt heard and the positive contribution they made was 'visibly' and publicly acknowledged and greatly encouraged continued participation • The participation of the same (and additional) government officials from various departments in the first and third workshop was positive indication that there is support for the study and the community • The combination of the risk, hazard, vulnerability and coping capacity information in the video combined with presentations at the workshop, and playing of the Riskopoly game in the second workshop reinforced insights and enthusiasm without 'lecturing' • The village steering committee met on three occasions since the second community workshop to organize activities and the way forward • During the third workshop selected youth were trained in monitoring and evaluation the implementation of the CCA Plans. During this workshop the Research team and M&E Youth Group reviewed progress made by the Development Committees • The study has attracted the attention of the DBSA
Community does not work together and communicate about issues	• The Riskopoly game highlighted the importance of doing risk management and the consequences of not doing so. The process of playing the game and feedback from the participants highlighted the necessity of cooperative team work • During the preparation of the CCA Plans frequent reference was made to establishing cooperative ventures • During the field trip discussion following the Three Crowns and Mbewula village visits, emphasis was placed on developing activities for the benefit of the village as a whole • The outings to Three Crowns and Mbewula Projects were a good illustration to the group on what could be achieved if they "pulled together". Although the School Governing Bodies seemed resistant to uniting to uplift the schools, the School Greening Committee subsequently organised a trip to Three Crowns for a group of teachers, students and the Principals of the two Junior Secondary Schools in Tsengiwe. The group was very inspired by the visit • The Animal Grazing Management group emphasized that the village needs to form a policy on the number of livestock allowed per household. The animal census was a pro-active step forward in working together

Community Monitoring of CCA Plans Progress

The community level M&E programme was initiated during the second workshop with training taking place during the third workshop. The M&E programme was primarily established to monitor progress in the CCA Plans and the usefulness of resources provided by Umvoto. The key goals of M&E of the CCA Plans were to:

- Measure positive or negative change;
- Identify lessons learned and best practises; and
- Identify barriers to success.

The research team served as trainers for the M&E Group. This process is summarized in the following sections. The decision to work with the community in M&E stemmed from the following objectives:

- Involving end users in data gathering and analysis;
- Reinforcing community cooperation and involvement;
- Providing timely information for decision making;
- Obtaining information needed but also capturing qualitative information;
- Matching the skills and aptitudes of participants;
- Passing on skills to the youth;
- Encouraging the youth to see M&E as a way to constructively prod their community leaders into action and as an opportunity to offer active support, not simply as information for outsiders;
- Complementing the study approach of insider-outsider dialogue; and
- Resource requirements and time.

Water Services Monitoring and Evaluation

Feuerstein (1986) describes how surveys can be developed and carried out with community involvement in order to fit local needs and contexts. In community surveys, local members should be involved in deciding what information to obtain, how and when to obtain it and for what purpose. This approach was used in the development of the water services M&E survey.

As outlined in **Section 5.1.7**, as part of the specialist input on this study, the research team undertook a hydrocensus according to Quality Monitoring Standards (QMS). This was also used as an opportunity to mentor and train young leaders in the community in hydrocensus data collection. The data that they collected included the position of all boreholes, the functionality and repairs needed on all boreholes, and the position of reservoirs and springs. In addition any functional boreholes were sampled for pH and EC and a broad analysis of the distribution network of water from the reservoirs to different sections of Tsengiwe was conducted. The two youth who were selected to participate in the hydrocensus were involved throughout the process. It was important to involve the youth in this process as they were able to understand the water infrastructure of their village as well as the water needs. Furthermore, they learned why data is collected and how (e.g. photograph, GPS). Out of the hydrocensus a water services monitoring sheet was developed, see **Appendix 6K**.

5.5 M&E SYSTEM

5.5.1 Selection of M&E Youth Group

Approaches to participatory and community-based M&E stress the importance of involving relatively marginalised groups such as women, the youth and disabled members of communities (Campos and Coupal 1996: 22). The youth and women were chosen to lead the M&E programme because of the vulnerabilities identified through fieldwork, namely that the youth are unmotivated and lack skills and opportunities for advancement and that women comprise a large segment of the population and play a vital role in the management of water resources at the household level. The M&E programme particularly stimulated the youth to get involved in development processes because the women participants raised the issue that they were very busy with household duties. It was important for the youth to be part of a process of

challenging committee leaders to follow through with plans as they represent the future of the village.

The M&E Group comprised community members, both female and male that had attended the 20 to 24 May workshop and were chosen from the 22 community members that expressed an interest in being involved in monitoring and evaluation. Only one woman above the age of 25 volunteered to be part of the M&E Group. Many of the women that attended the workshop were volunteers with Masiphile but by the end of the second workshop, youth and elderly community leaders were the main participants. All of the thirteen youth (and one woman) that volunteered underwent training during the third workshop and received a certificate for the training. Basic research principles and ethics were explained and they were required to practise conducting surveys and interviews in role playing in front of the whole group.

Six youth and one older woman out of the thirteen were selected on the basis of their ability to conduct a survey in a final test exercise (see **Appendix 6N**). Each member of the M&E Group signed a contract and agreed to deliver one M&E survey to the Committee to which they were assigned. The group was contracted to be paid a fixed sum per survey if, and only if the surveys were completed neatly and accurately. The information generated in the M&E was valuable to the community as part of their process of fulfilling their CCA Plans, but it was also valuable to Umvoto in terms of developing a methodology for community level CCA. The value of this information for Umvoto led to the decision to pay the M&E Group. This also served to formalise the process for the youth as a job, for which they would only get paid when the work was complete.

The youth agreed on one member to act as their supervisor. This leader was left with a M&E package and set of instructions for conducting the surveys and arranging for them to be posted to Umvoto on the agreed upon deadline. This leader was responsible for organising a survey revision session with the M&E Group; organising a meeting with each Committee so that it can be surveyed; and assisting each youth surveyor with their assigned survey. The youth were not assigned to survey a Committee that they belonged to so as to ensure a cross-check and degree of objectivity.

5.5.2 Development of Surveys

The surveys were developed by adapting the CCA Plans into a questionnaire format (see **Appendix 6**). During the first round of M&E, which was facilitated by the research team, Committee activities between the second and third workshop June to August 2013 were evaluated. The youth were able to question whether the objectives set out in the CCA Plans were too ambitious or if Committees needed support to move towards action. They also assisted with adaptation of surveys. The youth were required to go through each CCA Plan survey as part of their training. This process led to the surveys being revised as the youth had suggestions in terms of how questions should be phrased. The first and second version of each survey can be viewed in **Appendix 6**.

5.5.3 Water Services Fact Sheet

Two members of the M&E Group were trained to undertake this monitoring over a six week period, monitoring effectiveness, dates and the non-delivery of services. The community was involved in the design of the monitoring sheet in terms of the timeframes and scope of the services to be monitored. The initial design of the sheet by Umvoto assumed that there was a regularity to service delivery. Input was necessary to adjust the survey to suit the casual 'needs-based' service delivery. This way non-delivery based on times of need could be captured. The monitoring sheet and results are captured in **Appendix 6K**.

5.6 MONITORING AND EVALUATION RESULTS

Data was collected using surveys and additional qualitative information was captured in the surveys during the third workshop. This facilitated critical reflection on constraints and opportunities for action beyond the initial CCA planning. The M&E Group was required to survey each committee again and mail the surveys to the research team to be analysed against the

priories laid out in the CCA Plans. Each Committee was expected to have been surveyed between 15th September and 1st October, giving them between five and six weeks from the end of the third workshop to follow through with most short term CCA Plans activities.

According to the M&E contract signed with Umvoto, the surveys were meant to be received on 15 October, 2013. The research team only received the surveys on 31st January 2014. The survey results indicated both progress and challenges in Tsengiwe. The survey results are captured in **Appendix 6M** and **6K**. **Table 18** summarises the progress made in each of the CCA Plans as per the M&E surveys received in January 2014 well as major challenges identified by the committees.

Table 18: CCA Plans Progress and Challenges

CCA Plan	Progress	Challenges
Water Supply and Reticulation	• Discussions at community meetings on what households can do • A list of households to get Jojo tanks compiled and permission obtained from Headman and submitted to DWA – awaiting formal acknowledgment • Delivery of water tanks expected to start in April 2014	• Dependence on Pat Makohliso (also Committee Leader of Land Degradation and Soil Erosion and other village initiatives)
	• Approached DWA on support for supply and stock dams	• Claim that DWA not available for communication • Resignation of water supply members and take over by other committee members
Land Degradation and Soil Erosion	• Brushpacking by Lapesi project	• Having a project is seen as progress – critical reflection on what projects do and how to move forward is needed
	• Some discussion at community meetings on what households can do	• Public Works claims to have no resources • Committee has not followed up with other departments for assistance • Villagers remove stones for erosion control repeatedly –no discussion of this in community meetings
	• Follow up contact with relevant officials at LM and DM	• Little mention of pro-active interaction with Xhalanga Land Care Project in terms of erosion repair • Lack of response from municipality regarding applications • Replacement of contact officials
	• Direct contact with Xhalanga Land Care Project • Application made for windbreak trees	• Lack of interest from Headman • Lack of response from municipality regarding applications
Agriculture and Crop Cultivation	• Business plans developed for co-operative farming	• No follow through with short term plans requiring community labour (e.g. repairs on sheep shearing shed)
	• Xhalanga Land Care Project – Tsengiwe is third on the list for fencing	• No follow through with committee fencing research as there is a dependence on Xhalanga Land Care Project • Little discussion on what households can do at community meetings
		• No updated contact with Social Development Department since the previous workshop

CCA Plan	Progress	Challenges
Animal Grazing Management	• Location of stock water dams agreed • Measurement of communal ploughing areas	• Have not determined official borders of village
		• Avoidance of donkey issue on part of community
	• Despite resignation of committee, other committee members have signed on to do the work	
School Greening	• Committee worked with Pakamani and Tsengiwe Secondary School to write a plan for school greening • Discussed funding options with Department of Education • Bottle collection project with children to build greenhouses • Composting and training for school gardener	• No clear greening plan in place despite meetings • No planning for repairing and/ or maintaining existing water infrastructure • No specific follow up after visit to Three Crowns in July

The Water Services Monitoring Factsheet was returned but not complete. Although this section of the M&E was assigned to two people, one person did more work than the other. The youth assigned needed more support but did not communicate this to the research team until the end of January. The results of this survey highlight the poor state of water infrastructure as well as the irregularity of the service delivery. A municipal water service truck delivered water to tanks in some weeks but not others and in three out of the six weeks contact with the municipality was required. Community reservoir tanks were empty after the first week and the Upper Tsengiwe Green Tank from the spring was constantly empty. Taps in Lower Tsengiwe were also found to be irregular with some found not to be pumping in each of the weeks surveyed (the survey on taps in Upper Tsengiwe was not completed). The Tsengiwe Engine pump was in operation for the first two days, thereafter it ran out of diesel and did not pump at all.

The surveys revealed several major challenges that the community faces. A recurring challenge is time management and the transition from hope, plan to implementation. This could be due scarce skills and over extended community but the results do suggest an attitude of ‘waiting’ for external input and intervention. This could be a way of coping with a feeling that there is only so much one can do, or reflect a measured passivity.

The community is still dependent on one or two community leaders to carry the CCA Plans. These leaders are considered elders in the community and often lack the time and energy to follow through with each plan. The surveys were meant to elucidate opportunities for overcoming challenges but the respondents revealed a singular challenge with the phrase ‘we are still waiting’. The community has made progress and are following up with large projects such as the Xhalanga Land Care project (a Department of Agriculture project running in Sakhisizwe LM) but have not engaged village youth and labour (or youth and labour have been unwilling to contribute time) to make basic repairs to the sheep shearing shed. The community has come far in overcoming the dependence on the Headman in order to make contact with local and district municipal officials.

Two challenges which the community identified during the first workshop were that there is no follow up on plans and workshops and that the community does not work together and communicate about issues. The surveys revealed that discussing so-called ‘political’ issues such as the number of donkeys per household and the removal of stones for erosion control is still a challenge and the committees dealing with these issues did not identify ways of overcoming this challenge.

Two committees resigned and it was impressive to note that members of other committees stepped into fulfil their roles. However, this also contributes to an over-dependence on one or two over-stretched individuals.

Based on the community's progress to date and the persistence of certain challenges, it is possible to unpack the risk of project failure that the community faces.

Table 19: Risk of Study Failure

Hazard	Vulnerability	Coping Capacities
No funding	• Dependence on Pat Makohliso (also Committee Leader of Land Degradation and Soil Erosion and other village initiatives) • Dependence on government projects • Avoidance of discussion on issues that are considered too 'political' or have the potential for conflict despite consensus within committees that discussion is vital	• Committee leaders and positive deviants • Existing projects underway • CCA Plans are the start of a road map • Contacts at LM, DM, Provincial Department of Agriculture, DWA and others and possibility for direct liaison with officials from these departments regarding government related interventions
Ineffective LM, DM and provincial contacts regarding applications	• Institutional dysfunction • Mobile officials • Lack of institutional knowledge	• Contacts with Mbewula and Three Crowns • Links to other DMs aside from CHDM as well as national and provincial initiatives
Lack of follow up, Nepotism, Corruption	• Passivity/ waiting • Village leadership and resources over-extended • Negative community/ peer pressure	• Ongoing support from Rhodes University and UFH through DST funded project

6. REFLECTIONS ON STUDY APPROACH

The purpose of this study was to gain an in-depth understanding of the rural challenges in adapting to climate change; to understand the role of CBOs and community-level coping strategies; and how to cohere and optimise these with local and district municipal resources and initiatives to improve and assure sustainable water services.

The study was developed on the basis of previous contact with the community and their participation during three workshops. The first workshop focused on community level hazard ranking and the development of a risk assessment methodology. Identifying risks and understanding risk in the community led to a second workshop in which these issues emerged as opportunities for DRR in the form of CCA Plans, initiated and developed by community participants. In the third workshop, a community-led programme for M&E progress in the implementation of CCA Plans was established.

Community-based development and the methods it employs is continuously concerned with a back-and-forth exchange between specialist knowledge and local knowledge. It is necessary to recognize the role of both forms of knowledge in addressing the climate related challenges that rural communities face. Both scientists and local people bring a particular form of knowledge and insight to the table, and it is at the nexus of these two that sustainable progress can be made.

Development is a process that increases choices by providing new options, diversification and ways of thinking about issues differently which enhances a community's ability to anticipate change (Christenson et al., 1989). The community is both the means and the end of community development. It is through the action that communities take for themselves that resilience to hazards can be instituted. As catalysts, the role of the research team was to establish a collaborative relationship with participants and facilitate their engagement with local mentors as well as local and regional government officials who could further support their initiative through access to information and funding. The research team maintained the stance that they could not fulfil development requirements, only assist with planning and networking. Indeed, a catalysing agent and facilitator's key task is to guide a group to use its knowledge, skills and potential to achieve its goals. This is further described in the Video.

This report describes the development theories the research team utilized and resulting activities. This report also outlines community development planning in South Africa and gives an overview of the study approach, namely PAR and the facilitation tools used such as PRA. The report concludes with a consideration of study challenges, lessons learned in the study process, recommendations for future studies, and how the study contributes to development and PAR approaches.

6.1 Community development planning in South Africa

The post-WWII era saw the rise of development initiatives – programmes designed to intervene in the underdeveloped third world. The notion of development was founded on the theory of modernization, of building a society up to a European ideal. Development programmes therefore sought to strengthen communities in the areas of economy, science and technology. Despite their apparently noble intentions, these projects were often exploitative in nature. In the 1980s the IMF and World Bank began to create structural adjustment plans which stipulated actions that would have to be taken in a country hoping to receive aid. During this time development programmes came under scrutiny (Gardner and Lewis 1996). Development practices were criticised for their top-down approaches, unequal relationships of power and the imposition of homogenous structures and programmes on diverse communities. These top-down interventions neglected local realities and were unable to access the value of indigenous knowledge. Facing redundancy, development policy responded by changing its discourse towards an emphasis on participation, indigenous (local) knowledge, and the joint production of knowledge among development practitioners and the community.

Development programmes in South Africa also took a top-down approach. In the 1990s real efforts were made to reverse this situation, but the attitude of expectation in implementation and delivery by government projects often still prevails. This is embodied in the National Planning Commission's current National Development Plan (2011). In Chapter 6 of this document, the creator of jobs and 'saviour' of rural communities is presented as the expansion of irrigation agriculture but there is no mention of soil or water resource constraints.

The government of South Africa has approved a policy of promoting the meaningful involvement of civil society in the water services sector. This policy is formulated in the Strategic Framework for Water Services, approved by Cabinet and published in September 2003. Other national government departments, notably the Department of Provincial and Local Government (DPLG), and organised local government (SALGA), have also committed themselves to achieving this goal (Chris Hani Case Study 2009).

Realistic and sustained intervention requires communities to fully grasp their situation, to take stock of their resources, and to drive their own development. Tsengiwe is not an atypical South African community and methods developed here can be translated to a wider rural community. Expectations need to be tempered with realism. It is unlikely that rural dwellers/ small scale farmers will ever be 'rich' and this should not be the development goal. The first objective is to set realistic standards of well-being – a reasonable and dignified lifestyle for all, with education opportunities for the young. Secondly it is necessary to recognise the critical nature of sustainability and, with that, the concept of resilience in a changing world where pressures of lifestyle and growing population are at odds with the largely negative impact of climate change.

Community based development programmes are concerned with drawing indigenous knowledge into development practice. Community-based development aspires to create self-reliant communities that would ultimately be able to sustain better living conditions without the presence of development workers (IDASA, 2007). These initiatives attempt to create a space where both 'specialist', western scientific, knowledge as well as local, indigenous knowledge are counselled in order to ensure the well-being of a community. As community-based development came into prominence, a number of methods through which representation and participation of the community could be ensured were identified, such as Translation and Interaction, Constructive and Confrontative Dialogue and Participatory Rural Appraisal (PRA).

6.2 Theoretical Approach

Participatory Action Research

PAR is an approach originally coined by social and organizational psychologist Kurt Lewin in the 1940s (Kemmis and McTaggart, 2007). Since then it has developed an extensive history in many fields of social practice (Kemmis and McTaggart, 2007). Three particular attributes are often used to distinguish participatory research from conventional research, namely: shared ownership of research projects, community-based analysis of social problems, and an orientation toward community action (Kemmis and McTaggart, 2007). PAR seeks to understand the world by trying to change it, collaboratively and reflectively. Participating communities are considered co-researchers and questions and issues are addressed on the basis of their significance for participating communities (Reason and Bradbury, 2008). PAR practitioners make a concerted effort to integrate three basic aspects of their work: participation (life in society and democracy), action (engagement with experience and history), and research (soundness in thought and the growth of knowledge) (Chevalier and Buckles, 2013). The key phases of PAR involve a spiral of self-reflective cycles involving (Kemmis and McTaggart, 2007):

- Planning a change;
- Acting and observing the process and consequences of the change;
- Reflecting on these processes and consequences;
- Re-planning;
- Acting and observing again; and
- Reflecting again.

Translation and Interaction

In community-based development, local people are envisioned as partners, not recipients, in the development process. Rather than creating a knowledge hierarchy, the recognition of equal value attempts to move away from polarisation and politics that might bedevil action. Ogden and Innes (2009) explore the value of a translation and interaction between the knowledge of specialists and that of community members as each are invested in an area, whether for different or overlapping reasons. In order to fully understand the issues surrounding forestry in South Yukon, Canada, the authors describe a series of workshops that sought information from multiple sources in the community. Those that had been working in the area, and were considered specialists in their terrain, were called upon to discuss technical issues and to identify possible scientific research questions. As a complement to technical scientific knowledge, community members identified a number of social and political issues prevalent in the area. Both these forms of knowledge are essential to a comprehensive understanding of challenges and possibilities. Baas and Ramasamy (2008: 6) also speak to the value of translation when they set it out to be one of the major tasks for a research partner working in development. The notion of translation is central to the approach taken in Tsengiwe, as local and specialist knowledge can only work together to find solutions if each is made accessible to the other including insight into contextual matters that inform the 'knowledge'.

Constructive and Confrontative Dialogue

In the face of a top-down approach to development, community based thinking has made its way into South Africa's development scene. The Water Dialogues South Africa (WD-SA – www.waterdialogues.org) was an initiative started in 2005. A working group was formed around public service and the effective delivery of services in the South African context. The method of constructive and confrontative dialogue, as employed by WD-SA, is particularly useful when thinking about the value and aim of community based development initiatives. The term 'confrontative dialogue' was coined by the WD-SA and refers to a process of interaction that allows for completely open discussion where participating members are invited to speak freely without fear of reprimand. This concept also allows for a comprehensive understanding of the full range of concerns and opinions that exist around climate change and water supply issues.

Over a period of four years WD-SA undertook research in eight areas around South Africa in order to show the necessity of a paradigm shift and how this shift might add to the well-being of communities in rural areas. In 2008 Durban played host to a workshop that sought to bring NGO and development workers from around Africa together in order to expose them to the idea of Community-Led Total Sanitation (CLTS) (Bongaarts Workshop Report 2008). CLTS is a concept that originated in India and is associated with Kamal Kar, a specialist in participatory development. CLTS aims to facilitate behavioural change in a community, rather than simply inserting apparent solutions into an area without taking into careful consideration its complex social context.

Positive Deviance

Throughout the study, emphasis was placed on positive deviance, which aims to draw out local ways of knowing that may address risk factors in a community in a more comprehensive and sustainable manner. Sternin's (1996) case study of malnutrition in Vietnam serves as an excellent illustration of the techniques of Positive Deviance. In 1991 John Sternin and his family arrived in Vietnam with the intention of investigating and addressing malnutrition (www.positivedeviance.org). According to Sternin, 65% of children under the age of five in Vietnam suffered from malnutrition in 1990. The task was therefore set to identify families whose children's nutritional information deviated from these statistics. Questionnaires to capture the basic information of families were distributed and it was found that a number of very poor households had well-nourished children. These families were approached and their deviant behaviour (behaviour that differs from the norm) were observed and documented. These families enriched their children's' diets by catching shrimp and adding greens from potato tops. Children were also encouraged to eat smaller meals at a more regular basis during the day. These "positive deviance" practices were then disseminated to the community through

volunteers who showed carers how to adjust and add to other children's diets in order to curb malnutrition.

The process of Positive Deviance therefore starts with the recognition of a specific risk. Development practitioners who employ the method of Positive Deviance will identify members of the community that are less affected by risk factors due to their positive practices. These positive practices are then isolated and disseminated to the rest of the community. The method is particularly effective as solutions to risk are neither foreign nor imposed on the community. Positive practices are drawn from everyday local ways of life and are therefore sustainable and independent of development workers. In Tsengiwe, the question of positive deviance emerged as a discussion on who copes best with drought and who copes well in a drought – what are their characteristics and why. The discussion also led to identification of people and villages who were notably better off or who were struggling financially and why.

6.3 PRA Techniques

PRA is the term used to embody the concept and set of tools for working with rural communities in assessing their lives, environment and livelihood, and seeking development responses to the situation. James Mascharenas ran a number of training programmes on PRA in South Africa in the mid-1990s, and its use became common in NGO driven development projects during that era.

The main goal of PRA is to develop participatory techniques to engage communities in development processes and behaviour change. According to Chambers (1994, pp.953), one of the most influential thinkers in developing PRA, PRA signals a new mode of learning which came into being as a result of development discourse's paradigm shifts. This is a move away from extractive methods towards uncovering local understandings of development (in this case risk) and local possibilities for alleviating the effects of climate specific risk. Bhandari (2012) refers to PRA as a short-cut for collecting data. PRA is used (FAO, 2003):

- To ascertain needs;
- To establish priorities for development activities;
- During the implementation phase of projects;
- Within the scope of M&E of projects; and
- For focusing formal surveys on essential aspects, and identifying conflicting group interests.

PRA techniques are characteristically qualitative. These techniques include semi-structured interviews, participatory analysis of secondary source stories, portraits and case studies, community workshops, seasonal calendars and participatory mapping (Chambers 1994, pp 959-961; Bhandari, 2012). PRA techniques are therefore geared towards participation and drawing the community into multiple levels of development practice. Communities must be involved in the formulation of their CCA plans, activities, projects and programmes.

One of the main goals of PRA techniques is to gain the necessary information to design and implement a project (FAO, 2003, ch.6). **Table 20** below summarises some of the information needs of communities and areas in which PAR can be applied (FAO, 2003, ch.10).

Table 20: Community Information Needs and PAR

Community Information	PAR Application
Social structures, cultural identities and beliefs	• Institutional and policy analysis
Livelihood strategies	• Village and district-level planning
Vulnerabilities	• Role of women and children in development programmes • Primary education • Health and nutrition
Economic structures	• Poverty alleviation
Physical environments and resources	• Agriculture • Natural resource management

In Tsengiwe, PRA techniques included participatory mapping, game playing (Riskopoly), timelines, problem-solving / objective trees, matrix ranking, seasonal calendars, 3-pile sorting and the use of buzz groups. Base maps were prepared for the community, showing the village settlement boundaries, rivers and dongas, water features (boreholes and dams) and other salient features. Various hazards, vulnerabilities and coping capacities related to climate change were identified through these processes and their causes and effects.

The premise of PRA is that communities know and understand their position and situation better than anyone else. An important principle of PRA is to share the results of analysis between the PRA team and the community members via visualisation, public presentations and discussions (Chambers, 1994). In Tsengiwe, the results of PRA processes were disseminated via video and feedback from the research team during the second and third workshops.

Participatory Mapping

> *Maps are more than pieces of paper. They are stories, conversations, lives and songs lived out in a place and are inseparable from the political and cultural contexts in which they are used* (Waren, 2004 in IFAD, 2009).

Participatory mapping is one of the most widely used participatory development methods that have been developed and adapted since development efforts have moved away from top-down approaches.

Broadly, participatory mapping is the creation of maps by local communities, often with facilitation by specialists or supporting organizations such as consultancies, governmental and non-governmental organisations (IFAD, 2009). Participatory maps can provide a visual representation of what a community perceives as significant features, including physical features, resources and local borders and boundaries. They can depict highly detailed information such as village layout, infrastructure such as roads, transport, and individual houses, as well as natural resources and boundaries. Along with geographic information participatory maps can illustrate important social, cultural and historical information related to demographics and land use, for example. Participatory mapping has the potential to build common sense on land-related issues and raise awareness about these issues in a community (IFAD 2009). Participatory mapping projects enable community information to be incorporated into government information. In particular, counter-mapping is a map making process whereby communities use a formal map but mark their own conceptions of land and resources. These maps are an alternative to government and industry maps and in many cases are used to bolster local claims to land and resources (Peluso 1995). Ultimately they can be advocacy tools as they represent communities' aspirations. Having a strong vision is the first step to being involved in planning and this can be facilitated by mapping.

The participatory mapping process can have several benefits for a community, including:

- Building community engagement and knowledge sharing, particularly between elders and the youth;
- Re-invigorating local knowledge;
- Initiating a discussion on social issues and a recognition of assets;
- Providing skills for community members to represent spatial knowledge; and
- Establishing a community consensus in terms of what information to display and how.

Once a community has an idea of its own physical and social limitations and possibilities it may be in a stronger position to work constructively with municipal authorities and external agents. Participatory maps, as a product, are useful for communities in several ways, including:

- As a medium to help plan the management of communal lands;
- Making the community's knowledge about lands and resources knowledgeable to outsiders;
- As a record of positive and negative changes in the landscape;
- Visual identification of success or failure of interventions over time; and

- Encouraging Review-Reflect-Revise.

Maps are useful for communicating a community's vision. In addition, the mapping process also served to mediate the community's visions with a scientific knowledge of land use and water resources. For example, the community identified communal grazing areas and stock dams in each of these areas. However, the research team was able to highlight which stock dams would actually be feasible. In that sense maps are an excellent way to engage specialists with community visions and develop realistic ways of making ideals manageable. Maps can also be a way for communities to work through disputes around land before they go beyond the spatial dimensions and become entangled with issues that are disconnected from the original disagreement (IFAD, 2009). The mapping process was especially useful for the research team to consolidate information on the water services situation in Tsengiwe and gain a community perspective on opportunities and threats to water security. In addition, the involvement of youth, women, and the elderly and community leaders in the mapping process broadened this perspective.

Riskopoly

Levine and Levine (2011) argue that it is precisely because humans have the capacity to imagine their world in multiple ways that they feel hopeless when we are blocked from doing so. One of the roles of the catalyst or change agent is to restore people's sense of their own resources and capacity to respond to the world in which they find themselves. Change agents should first strive to understand the world in which people live and then see possibilities of responding to that reality. It was in light of this understanding and a drive to move away from linear patterns of thinking that the research team used Riskopoly to stimulate imagination, insight as well as introduce the energy of fun and possibility.

Riskopoly was used as a facilitation tool during the second workshop to highlight the need to prepare simultaneously for several different unpredictable hydro-meteorological hazards. The game required players to strategize investments and spending and developed the community's insights into the difference between a risk and a hazard and the value of risk reduction. In the context of PAR, games are valuable tools for applying insights as they will have a different outcome each time they are played.

Games facilitate entrance into an alternative world of imagination. The imaginary world of play, however, always happens within the world in which people live their daily lives. Levine and Levine (2011) argue that as games happen within the world of the players they have the capacity to affect them in reality. Rather than just mirroring reality, games imply that something new can arise, wherein their power lies. Games can thus help players discover something new within a known context.

7. SUMMARY CONCLUSIONS, LESSONS LEARNED AND RECOMMENDATIONS

Community development is a process where people are united with those of governmental authorities to improve the economic, social and cultural conditions of communities and communities are integrated into the life of the nation enabling them to contribute fully to national progress (United Nations 1963, pp. 4).

The study was designed in line with a PAR approach. PAR was captured in the review, reflect, revise process described by research outcomes in WRC 1888/1/11 (2011) and was incorporated into the CCA plans and M&E programme described in **Section 5.3** and **Section 5.5**, respectively. It is often the case that through the review, reflect, revise process initial plans become obsolete in the light of learning from experience. What is important is that there has been an evolution in a community's understanding and practices (Kemmis and McTaggart, 2007). During the 'action' phase of PAR, the research team established relationships and a common agenda with all stakeholders. This led to a reflection on the research approach (see **Section 6**) and then to collaborative processes of planning for CCA. Subsequently there was further reflection on the research questions, approach, working relationships and resources required to fulfil the community's objectives (Kindon et al., 2007). The outcomes of the study will continue to develop in years to come, but this section provides a summary of:

- Challenges and study team responses;
- Contributions to theory arising from the study team; experience and insight
- Lessons learned; and
- Recommendations for future studies of this nature

7.1 CHALLENGES AND TEAM RESPONSES

7.1.1 Action Research vs. Development Planning

One of the challenges with the PAR approach was that the line between action research and development planning can become blurred. This often resulted in heightened community expectations and subsequent disappointment, particularly if there were not enough skills in the community to carry the work forward. The research team managed these challenges in part through the use of participatory techniques which served to build the capacity of the community to participate and resulted in concrete resources for the community such as useful documents, the participatory map and the CCA Plans, government contacts, and local mentors.

The research team involved officials from the DWA and DRDAR in workshops and engaged the community with these officials directly, as opposed to going through village leadership. This interaction assisted the community to realise what resources were available and what they could achieve. For example, a primary community goal was to acquire fencing. The agricultural extension officer from DRDAR was able to outline possibilities for funding through land care projects, as well as emphasize the steps that the community would have to take on its own, in order to access funding.

This led to a revision of the CCA plans in order to reflect the community's insights into government development processes at the local and district level. The community learned that the process of acquiring fencing is complex, but also possible, with committed community engagement. This insight seems to have encouraged the committees to follow up with the Xhalanga Landcare Project. Tsengiwe is third on the list for village fencing through this Project.

Although a dam was identified by the community as a potential project for increasing water security, specialists (Umvoto and DWA) were able to address the community's desire and add input so that the village could make an informed decision and focus energy into other projects. The research team facilitated links with the DWA which sped up the process of applying for a feasibility study. The first step was a planned visit by the DWA during the second workshop, to

see whether community ideas to build a small dam had any potential. DWA officials noted that the primary feeder catchment was very small, with mostly no dry season flow. There are no flow records but the community noted that the bridge to the village is often under water in the wet season presenting a flood hazard. The community had assumed from this that there would be more than sufficient water to fill a “farm-size” irrigation dam. DWA suggested that it would be more economically viable to have a site further downslope with small stock ponds and local swales to capture water and supply food gardens coupled with rainwater harvesting at household level. The M&E of the CCA Plans was subsequently adapted (see **Appendix 5** and **Appendix 6**).

The community overcame their misconception that the research team would give hand outs. This conception was facilitated by previous projects in Tsengiwe which were able to pay workshop participants several hundred rand per person per day simply to attend. By the end of the third workshop, the community understood clearly that the research team had a facilitation, not implementation role in the study, in line with the adaptive research process, The research team covered the costs of a third workshop which was necessary in order to transition more smoothly between external involvement and community ownership of the project, particularly M&E and covered the costs of this workshop.

7.1.2 Institutional and Social Context

Although institutions are important in sustainability they are not necessarily the catalysts for it. The institutional context of Tsengiwe can largely be characterized as ineffective. The leadership at village level could be further described as adversarial as there is a lack of consensus on who should be leading the village. A challenge that the community faced was the lack of follow through and ineffective governance on the part of village, LM and DM leadership.

Recognizing this, the study team worked with the community to identify ways around institutional dysfunction such as personal agency and using data acquired through monitoring to hold the municipality accountable through constructive and confrontative dialogue. Through the design of the M&E programme, the youth were required to pose survey questions to committee leaders that reflected the necessity of constructively overcoming these leadership challenges. For example, the community described ways in which engaging directly with the LM and DM without the support of village leadership would be possible and these were translated into the M&E surveys. The survey design negates the option to blame a lack of initiative on the part of village leadership or a lack of follow through on the part of CCA Plan committees. Although the community remains dependent on LM and DM assistance, this approach has enabled the community to overcome the ineffectiveness of traditional leadership by making direct contact with LM and DM officials, and regional officials, such as DWA in Cradock which has offered support to Tsengiwe.

A key challenge that the community still faces is that short term and familial interests are likely to prevail over community interests, even in the case of positive deviants. In terms of the theoretical concept of positive deviance, it is important to highlight that positive deviance is not a moral ground but a continuum which is constantly in flux. Positive deviants are not necessarily morally superior but their actions ultimately set a good example of what is possible in a broader sense. For example, a cooperative fruit farmer that only employs his or her family may display the negative effects of nepotism (e.g. if family members are not capable or do not fulfil their duties), but the establishment of a relatively functional cooperative could still inspire others to do the same or more.

7.1.3 Training and Mentoring

Training and mentoring was part of the study approach (and is discussed in **Section 5.1**). It is important to highlight here that the contact made with Mbewula and Three Crowns were an important addition to LM and DM contacts. The LM and DM and local government often prove ineffective. In these events, Mbewula and Three Crowns provide the community with additional support in terms of expertise and information about resources. Overall training and mentorship has had the effect of turning community expectations, both of the research team and local

government, into aspirations or realistic hopes for the future. The Mbewula and Three Crowns visits highlighted that determined individual agencies and sustained community support (as opposed to external support) were key to achieving change.

The community based initiative, Masiphile, has been instrumental in building community resilience and increasing support within the community for the study. A challenge, however is that CBOs can also result in community resources and skills being spread too thin. To mitigate this, and the withdrawal of the research team, the research team engaged with Rhodes University as possible partners with the team and the community beyond the catalytic role. This is also important in managing the expectations on the part of the community.

Rhodes University, under the Environmental Science Department and with students and support staff from the University of Alberta has been undertaking an International Development Research Centre (IDRC)-funded trans-disciplinary project entitled 'Vulnerability, Coping and Adaptation within the context of Climate Change and HIV/ AIDS in South Africa: Investigating Strategies to Strengthen Livelihoods and Food Security and Build Resilience'.

The research team hopes to expand into new sites later in the year. Through Masiphile, which has become a local development resource centre, the University of Fort Hare with co-funding from the Department of Science and Technology is currently undertaking a study on indigenous knowledge systems with cooperation from traditional healers and local youth.

7.1.4 Inclusive Workshops

An inherent bias of the study approach was that people who did not participate in community workshops were not able to document their aspirations. One elderly woman remarked that she could not attend because of the long walk to the community hall. Still her friend who attended every meeting shared the workshop proceedings with her at the end of every day. A wide variety of people attended in terms of age, gender and village leadership affiliation, indicating that the workshop was not perceived as discriminatory or exclusive. Although there were fewer participants attending as the workshop progressed, those present became more active, which also indicated that the novelty of a free lunch was not the only thing drawing community members.

7.1.5 Risk Assessment

Before the first workshop began, the research team was guided on a transect walk through Tsengiwe by community members in order to gain a better understanding of the environment and could start gathering questions and issues. The intention here was, as outsiders, not to enter the workshops without a basic understanding of the broader social and environmental context. This also involved a meeting with the Village Headman and his Councillors to ensure that the team's presence was acceptable.

The fundamental idea of action-reflection learning is to bring people together to learn from each other's experiences. There is emphasis on "studying one's own situation, clarifying what the organization is trying to achieve and working to remove obstacles" (Kemmis and McTaggart, 2007, pp. 274). In Tsengiwe the first task was to determine which hazards would be the focus of the study. Through PRA techniques, the community ranked the hazards they faced. The research team then shared information on risk and hazards with the community. Together, they and the community defined the hazards that would be the focus of the study and looked at the potential benefits and pitfalls of different activities and how to deal with political sensitivities around various issues.

A challenge with regards to the risk assessment was the conflation of hazard and risk on the part of the community. For example drought was perceived as one of the worst risks by the community. However, they considered risk on the basis of the hazard they experience as the worst, as opposed to that which occurs most often or most severely. However, land degradation, ineffective governance by local and regional leaders, and limited service delivery also contribute to exacerbate drought and the problems experienced by the community. In this

instance mitigation measures related to actual temperature and rainfall changes might not be effective if the causes of the increased impact of drought were not addressed.

The question of scale was also important to address in order to prioritise CCA strategies. The CHDM highlights Snow and Strong Winds as priority hazards for Ward 4 of the Sakhisizwe LM in which Tsengiwe is situated. It is likely that these are both significant hazards at the ward level but the community of Tsengiwe does not consider snow and strong winds to be as pressing because of the more urgent need on a local level to address issues of drought and water and food insecurity.

The game Riskopoly provided a real-life and experiential basis from which to discuss risk. The process highlighted the role of games in increasing community understanding of slow onset disasters and how to prepare for multiple hazards simultaneously in order to reduce compound risk. The game can be adapted for different circumstances and hazards but, given its success, is recommended for adoption as a participatory tool. See **Appendix 3D** for full set of Rules and Instructions.

7.1.6 Monitoring and Evaluation Programme and Results

The research team introduced possible actions and the participants critiqued these and agreed to some. These were further revised and elaborated upon by the community. Once the research and planning was complete the research team developed the M&E programme and a survey for monitoring of water services delivery with the community. While the study team has used the research findings to develop an approach to CCA at the rural community level, Tsengiwe can use the research and their own interpretation of the M&E findings to engage their committees and municipality and continue the Review, Reflect, Revise process.

Working with the youth on the monitoring and evaluation was challenging as they are more mobile than other community members and have competing interests. The research team received the completed surveys three months later than specified in the M&E contracts. Furthermore, not all questions were answered. The surveys required committees to outline plans for dealing with challenges. Instead of simply saying ‘we did not do that’ the survey asked for plans to deal with challenges and specific dates for actions. However, many of these follow up questions were not answered, reinforcing the circular logic of ‘we are waiting’. The two youths who signed contracts for the water services monitoring needed more assistance but did not communicate this to the research team. Only one of these youth undertook the work and was unable to complete all of the monitoring required.

The surveys were overseen by a youth leader who the research team identified as a positive deviant due to his commitment to participation and relaying of important aspects of M&E contracts such as no work, no pay to the rest of the M&E team members. The surveys were meant to be at the research team offices in October but were only mailed at the end of January. The M&E youth leader noted that the other members of his team had either fallen ill, taken job opportunities, or gotten married.

Several community members remarked that the youth are not engaged and do not follow through. Reflecting on these comments it would have been worthwhile having time and resources to involve multiple generations in the M&E team as the youth may not have had the necessary respect to ensure that challenging and probing questions were answered by the committees. On the other hand the M&E was part of the investment to initiate a mentorship relationship between elders and youth in the community. This was also facilitated through participatory mapping, the Riskopoly game and by youth themselves signing up for CCA Plan committees.

7.2 LESSONS LEARNED

Arising from the challenges and team response, several critical lessons can be derived. Lessons learned include:

- Youth are highly mobile and have conflicting interests, which can make it difficult to hold them to contracts from a distance;
- The negative attitudes of peers can be overwhelming even for positive deviants so sustained support a contact is necessary;
- People who did not participate were not part of the process of documenting aspirations, which is an inherent bias that needs to be balanced through community feedback loops;
- It would be valuable to take mentorship further to involve secured funding, partnership, ongoing support outlined in Memorandum of Understanding;
- Advancing in one area but in determined fashion can enable a community to achieve success early on and sustain motivation. This requires a balance between documenting aspirations and diluting focus;
- Time management was a difficult concept for youth and requires specific processes and contact time in order to ensure that it is realised early on. Signing contracts were essential to catalysing a sense of responsibility and follow through among the M&E group;
- The PAR approach is ultimately an adaptive one and therefore requires a flexible budgeting process;
- Games are highly valuable for establishing community solidarity and bring experiential knowledge to the fore, which catalyses action;
- Scale-appropriate hazard analysis as well as local understanding of hazard specific vulnerability and coping capacity is needed to catalyse effective CCA measures as community understanding of risk and hazard is essential for understanding the causes of certain hazards and how to reduce risk; and
- Risk assessment should be conducted at both village and household level, using specialist and community-led approaches as there can be a different outcome if risk of various hazards is evaluated at individual household level (with the sum of households comprising the village) or at a village level as a whole.

The M&E team required more sustained support as the negative attitudes of, or lack of support from peers can be overwhelming for the youth, even for those in a leadership position. Still, signing contracts with youth and sticking to the contract, namely that payment would not be received until the work was done was an important concept, which the youth leader came to appreciate. The role of the catalyst is ultimately to present a choice. Although many of the surveys were incomplete, the youth leader eventually made a choice to stick in part to the contract and send some results. Ten community members signed M&E contracts but only five completed the work.

Umvoto carried the additional costs (e.g. of the third workshop) as far as possible. More community engagement and follow up would have added significant value to the M&E programme and securing next stage of reflection and revision of CCA Plans and more focused implementation.

The disaster risk assessment undertaken by Africon (2009) used local municipalities as the unit of assessment, which influenced the hazard types identified for the assessment as well as the vulnerability and coping capacity, and hence risk assessment. This scale of risk assessment informs the perception of risk at DM and LM level, and will also inform prioritization and roll-out of risk reduction activities by local government.

Buy in to risk reduction activities requires that, so far as possible, risk perception and risk assessment are aligned and agreed upon (during and/ or after due process) between

government levels (traditional and local) and the rural population. Community hazard rankings and specialist hazard assessment was the springboard for discussions around actions that could be carried out by local municipality and community members. Discussions were also centred on those actions that were necessary but would need the support of external agents; be this through planning, direct government intervention, or funding.

7.3 CONTRIBUTION TO THEORY

The study made several practical contributions to the community in the form of written material, a map, video, game and contacts. In this section consideration is given to the contribution of the study to development and risk reduction theory.

7.3.1 The Intersection of Science and Local Knowledge

The role of science in PAR is a source of dispute in PAR literature. Gustavsen (2008) emphasizes good theory – in other words forming and testing a hypothesis, gathering measurable data and interpreting results. However, many PAR practitioners are also critical of mainstream science and its supposed over-emphasis on quantitative data, highlighting the potential for rigor in qualitative methods of research. Others equate research with any involvement in reflexive practice aimed at assessing problems and evaluating study results against group expectations. The work undertaken by the research team in Tsengiwe reflects a practical and theoretical effort to overcome this ambivalence towards scientific research vs. 'lived knowledge.' The study results illustrate the fruitful interaction between the two approaches that was emphasized.

Individual and community narratives are often fragmented but they are important in revealing how a respondent experiences particular social phenomena and answering the 'why' behind quantitative data. A focus on local knowledge, often conveyed in narratives, enables researchers to understand the social relationships that inform quantitative trends (Chomicka, 2007).

Science and local knowledge are not mutually exclusive and as a multi-disciplinary study, a variety of academic positions were incorporated. While the premise of PRA is that communities know and understand their situation better than anyone else, the environment in South African rural communities such as Tsengiwe is changing faster than their traditional knowledge or oral tradition reflects. In addition, most of the community participants have some level of formal education, but few have a university education. Through their education, community members have engaged with western science and history, which has influenced local knowledge systems. It is the nature of a group or society's knowledge and culture to change and local knowledge and culture are no exceptions. This warrants acknowledgment.

The risk equation used by the UN/ISDR (2005) and applied in the previous study (WRC 1888/1/11, 2011) was presented in a way that made it understandable and relevant for the community. This way the community could easily follow the process and add input from their side. This was in line with Goldin et al.'s (2013) call for a participatory development paradigm that considers the capacity of people to participate. Drawing on Amartya Sen's Capability Approach (CA) as a framework, Goldin et al. (2013) highlights that in the context of Integrated Water Resource Management (IWRM), the emphasis on multi-stakeholder participation all too often assumes that all stakeholders have opportunities and capabilities to participate and make informed decisions. In this light, the climate change risk assessment in this study was carried out at a common sense level that did not overcomplicate the process and rather made it practical or 'fit for purpose' instead of theoretical and academic. The research team provided the data and information necessary to think with and add value to insights thus facilitating a fruitful interaction between 'science' and 'local knowledge' which was valuable to all parties. This interaction was important because appropriate and effective risk reduction strategies require an aligned understanding of causes and effects on the part of local and traditional government and communities.

7.3.2 Community Capacity and the Psycho-Social Aspect of Risk

In light of Goldin et al.'s (2013) call for a consideration of the capacity of people to participate in IWRM, the research team focused catalyzing processes that would build community capacity, but also tailored the study to suit community strengths. Tsengiwe, although a highly vulnerable community, was chosen because of the resilience of the community. Rather than waiting for the community to be completely stable, the research team catalyzed the community to understand its own physical and social limitations as well as possibilities so that it could work constructively with municipal authorities and government agents which would place it in a stronger position. This was an integral part of opening the conversation between the village and LM.

Along with the community, the study was also tailored to build on the strengths of the multi-disciplinary team. PAR aims for collective efforts to understand the world through the process of transforming it. Researchers are active participants in changing a situation while conducting research. Indeed Malkki (2007) asserts that researchers cannot be considered neutral bystanders but "take up social space" (p.177) and must draw on emotional intelligence and instinct as much as academic knowledge in research situations. This study supports this view and demonstrated the importance of a team drawing on different technical and social skills as well as meta-skills. Finally, it is imperative that the study team is able and enabled to build relationships in the community and that the project design and budget allocates the required time to do so. Flexibility in project management and measurement of intangible outcomes is too often not considered of worth, however it is an essential ingredient to success.

In considering community capacities and vulnerabilities, this study has also touched on the psycho-social aspects of vulnerability, not often addressed in DRR and social theory. DRR literature highlights the psycho-social impacts of disaster and role of vulnerability in psycho-social effects. In addition, disaster research literature embraces notions of subjective risk perception on the basis of people's gender, ethnicity, age, etc. (Cutter et al., 1996). However, there is little on the psycho-social factors that may increase or decrease a community's vulnerability. In **Section 5.6**, the risk of the study failing is mapped against psycho-social vulnerabilities in the community such as passivity and coping capacities such as positive deviants, based on the M&E results. In the event of a study 'hazard' such as the withdrawal of funding, these vulnerabilities may have a significant impact on how a community experiences a natural hazard or is able to move forward to realise their aspirations. This gap in the conceptualization of disaster risk and development theory requires further investigation.

7.4 RECOMMENDATIONS FOR FUTURE STUDIES

Based on lessons learned and suggested contribution, the recommendations for future work are listed below and summarised further in **Table 21** along with the challenges and team responses. Summary recommendations include:

- Involve multiple generations in monitoring and evaluation to ensure multiple perspectives and accountability;
- Sustained support and flexible budgeting for project plans arising from PRA;
- Studies of this nature require more than three years of face to face contact;
- Invest in face to face interaction time after catalysing intervention;
- If possible formalise collaboration with external projects during project;
- Games can be used as valuable tools for facilitation;
- Coherent purpose and maintaining a balance between broad-scale planning and focused achievement of key goals is essential;
- Conduct scale-appropriate risk assessment which incorporates community knowledge and specialist input;
- Facilitate communication with local mentorship and relevant government officials;
- Households and village clusters should be the two key units of risk assessment;

- If risk is evaluated at village level, vulnerability and coping capacity factors should include evaluation and impact of governance at traditional, local and district level as these differences will also have an impact on the relevance and efficacy of DRM activities rolled out by Provincial and National Government; and
- Community perception of risk must be taken into account. If the perception of risk and evaluation of risk at village level is different, it may be difficult to motivate community self-help and contribution to DRR; and

Further research could explore how to build a culture of self-help in rural South African communities through PAR processes, especially where risk reduction activities are to be drive from the top down. It is also recommended that further research explore the potential impact of hazards such as frost and drought and the risk to specific activities, drawing on the experiential knowledge of villagers. Further research should consider the difference between risk perception and scientific data in order to ensure effective mitigation and appropriate decisions around land use and resource management.

Table 21: Summary of Challenges and Recommendations

Challenges	Team Response	Lessons Learned and Recommendations	Contribution
Study Approach			
• Unclear role of traditional leadership/ Village Committee of Thirteen in relation to LM roles and responsibilities • Stifling of village initiative by traditional leadership and protocol and local government bureaucracy • Ineffective leadership • Poor governance	• M&E designed in such a way that overcoming adversarial leadership in community vs. blame/complain became necessary to move forward and evident through the M&E design • Provided training tools and involved community in M&E to support own leadership and reflect to them issues inhibiting progress • Engaged the community directly with LM, DM and provincial departments so that they could engage with external stakeholders without Headman	• Multi-generational M&E group • Sustained support needed • Study requires more than three years of face to face contact	• Training tools and resource kits • Review-Reflect-Revise – constructive questioning of community leaders and LM service delivery instilled in design of M&E • Identified next phase of study – focus on agency, effectiveness and efficiency
• Line between action research and development planning complex to manage and requires contact time • Action research/ development planning can raise community's expectations and requires that there are enough skills in the community to carry work forward • Community follow through with DWA and DRDAR and vice versa – community must follow leads for funding • LM and DM officials neglect follow up and follow through • Provincial departments neglect to acknowledge community communication and advise on	• Used adaptive PAR framework as theoretical model • Umvoto emphasized that we were not there to implement the CCA Plans and made the line between facilitators and implementers clear • Managed expectations by involving DWA and DRDAR who could answer questions directly • Did a third workshop in order to transition between external involvement and ownership of project, with particular emphasis on M&E	• Invest in face to face interaction time after catalysing intervention • If possible formalise collaboration with external projects during project	• Facilitated relationships with local authorities and specialists which had unique effect of giving community support and easing hand over • Catalysts/ hand over to Rhodes University and UFH involved in study funded by DST • Adaptive study process • Multi-disciplinary team leading to trans-disciplinary insight and practise • Presented picture of what is possible • Community started out with expectations of receiving and moved towards aspirations and documented ideas on what they can do

Challenges	Team Response	Lessons Learned and Recommendations	Contribution
study follow up			
• Short term interests prevail – even in the case of positive deviants (e.g. put family before common good as social practises have become corrupted) • Negative deviants		• Negative attitudes of peers can be overwhelming even for positive deviants so sustained support is necessary	• Positive deviance concept • Positive deviance is not a moral ground but a continuum which is constantly in flux – the key is that positive deviants set examples for what is possible
• Multi-disciplinary studies do not fall clearly into any one WRC directorate focus • Lack of flexible funding limits responsiveness in PAR	• This was anticipated and funds were sought to address this but application was unsuccessful		
		• People who did not participate were not part of the process of documenting aspirations – this is an inherent bias	
Risk Assessment			
• Community risk perception – conflation of hazard and risk inhibited planning of focused Risk Reduction activity	• Game provided real-life basis from which to discuss risk • Scale of risk assessment critical to design of Risk Reduction interventions • Inappropriate scale also misidentify the Hazard and therefore incorrectly evaluate risk which impacts on the prioritisation of the Risk Reduction focus/ does not necessarily realised expected results	• Games are a valuable tool for facilitation and establishing community solidarity • Games bring experiential/ intuitive knowledge to the fore, which catalyses action • Scale-appropriate risk assessment	• Risk reduction game for slow onset disasters and a variety of hazards at once • Align scale of Risk Assessment at government institutional level with grassroots risk reduction
Training and Mentoring			
• CBOs are valuable partners in social change but can also result in community resources and skills to be spread too thin	• Work with these organisations • Hand over to Rhodes University and University of Fort Hare • Mentors from nearby studies who have overcome similar challenges	• It would be valuable to take mentorship further to involve secured funding, partnership, ongoing support outlined in	• Facilitated relationships with local authorities and specialists which had unique effect of giving community support and easing hand over

Challenges	Team Response	Lessons Learned and Recommendations	Contribution
	introduced as an inspiration and resource	Memorandum of Understanding • Coherent purpose essential • Advancing in one area but in determined fashion • Balance between documenting aspirations and diluting focus necessary	• Catalysts/ hand over to Rhodes University and University of Fort Hare
• Community is willing and enthusiastic but sustained support for capacity building limited • Pattern of waiting, not setting clear timeline with specific actions that describe discrete steps to realise goals (i.e. project management skills)	• Inspired community through field visits • Facilitated solidarity in community through game • M&E • CCA Plans are a road map	• Big plans, small steps – start with one purpose, achieve success and move on to another	• Importance of inspiration and networking communities in development/ action research projects • Recognition of psycho-social inhibitors to development
• Effort to get DM and LM officials involved • Mobility of government officials	• Need to find champion in local/ regional government		• Facilitated relationships with local authorities and specialists
Monitoring and Evaluation			
• Getting the youth to follow through in gathering data and information for community process of review-reflect-revise • The youth are highly mobile and have competing interests	• Signed formal contracts with the youth and stuck to contract that payment would not be received before the work was done	• Have multiple generations in a team • No work, no pay very important concept for youth to learn – time management was not realised and requires specific process and contact time to realise this • Relational time vs. transactional time is a specific process issue • There were complaints	• The role of a facilitator is to present a choice, the youth in M&E eventually realised they would not get paid if the work was not done and they made a choice, but this was not imposed; team held to contract
• Most youth may not have the necessary respect or personal skills in a community to undertake task of asking challenging questions to elders	• Facilitated relationship-building activities between the youth and older community members such as participatory mapping • The youth demonstrated initiative and willingness and study process supported and acknowledge this		

Challenges	Team Response	Lessons Learned and Recommendations	Contribution
	• Team ensured space for youth participation in study process and this was recognised by elders	about the youth from elders (that they do no not follow through) which should have been heeded	

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APPENDICES

Appendix 1: Hydrocensus
1A: Hydro-census

Appendix 2: Workshop Attendance Registers
2A: Workshop One Attendance Lists
2B: Workshop Two Attendance Lists
2C: Workshop Three Attendance Lists

Appendix 3: Mentoring and Training
3A: Soil and Conservation Training Resources
3B: List of Mentors Available to Support the Implementation of Community Climate Change Adaptation Plans
3C: Proposals for Additional Funding
3D: Communication and Training Tools (Riskopoly)

Appendix 4: Risk Assessment
4A: Coping Capacity Data
4B: Vulnerability Data
4C: Community Hazard Perception
4D: Guidelines to Mainstreaming Risk Assessment and Disaster Risk Reduction at Rural Village Level
4E: Hyogo Framework of Action Priority Areas

Appendix 5: Community Climate Change Adaptation Plans
5A: Water Supply and Reticulation CCA Plan
5B: Water Supply and Reticulation Flow Chart
5C: Land Degradation and Soil Erosion CCA Plan
5D: Land Degradation and Soil Erosion Flow Chart
5E: Agriculture and Crop Cultivation CCA Plan
5F: Agriculture and Crop Cultivation Flow Chart
5G: Animal Grazing Management CCA Plan
5H: Animal Grazing Management Flow Chart
5I: School Greening CCA Plan
5J: School Greening Flow Chart

Appendix 6: Monitoring and Evaluation
6A: Agriculture and Crop Cultivation Survey (Version 1)
6B: Agriculture and Crop cultivation Survey (Version 2)
6C: Animal Grazing Survey (Version 1)
6D: Animal Grazing Survey (Version 2)
6E: Land Degradation and Soil Erosion Survey (Version 1)
6F: Land Degradation and Soil Erosion Survey (Version 2)
6G: School Greening Survey (Version 1)
6H: School Greening Survey (Version 2)
6I: Water Supply and Reticulation Survey (Version 1)
6J: Water Supply and Reticulation Survey (Version2)
6K: Fact Sheet on Municipal Water Service Delivery and Results
6L: Monitoring and Evaluation Contracts
6M: Monitoring and Evaluation Youth Group
6N: CCA Plans Progress Tables

Appendix 7: Research team capacity building
7A: Capacity Building

APPENDIX 1

HYDROCENSUS

TABLE OF CONTENTS

APPENDIX 1A: UPPER AND LOWER TSENGIWE HYDROCENSUS AND WATER INFRASTRUCTURE AND SUPPLY STATUS

INTRODUCTION

The village of Tsengiwe in the Eastern Cape is bordered to the east by the perennial south flowing Tsomo River (**Map 1**). The elevation rises to the west giving rise to runoff, streams and springs which flow eastward into the Tsomo catchment. The study region falls within the Karoo Supergroup and the geology is dominated by mudstone and sandstone with extensive dolerite intrusions. The indigenous vegetation component is Tsomo Grassland. There are three stock dams in the communal area which capture the runoff. Three reservoirs are currently functional and receiving water from springs and a communal borehole. These reservoirs are also manually sustained by the Sakhisizwe Local Municipality as part of service delivery to the community. Several public and private boreholes are situated throughout the village, and these are generally closed off, non-operational, dry or are not equipped with any mechanism for pumping groundwater. Where the groundwater samples were obtained, the quality was good with salinity of drinking water quality (<170 mS/m, SANS241:2011).

METHODOLOGY

The hydrocensus survey was conducted in May and August 2013. While empirical measurements were taken on parameters such as water level, EC, pH and temperature, a desktop survey was also utilised to supplement information. Further sources of local knowledge were obtained through Participatory Rural Appraisal (PRA) techniques measurements both in the field and in workshops. All three data collection methods were used to compile the hydrocensus.

GEOLOGICAL AND HYDROGEOLOGICAL CONTEXT

- **Geology**

The rocks in the Tsengiwe area are dominated by sandstones and mudstones of the upper Beaufort Group, the Burgersdorp Formation (**Map 2**), which is part of the Karoo Supergroup (**Table 1**). The Burgersdorp Formation is dominated by red and maroon mudstone layers alternating with lesser grey sandstone lenses on average 2 m in thickness and deposited in a meandering river environment. Outcrop of Elliot Formation sandstone, red mudstone and siltstone occurs in the eastern and southern part of the site area.

Extensive intrusive dolerite sills and dykes occur throughout the area. Dolerite sills and dykes cause fracturing of the surrounding rock types during intrusion. The dolerite intrusions themselves, the contact zone and fractures within the surrounding host rock are targeted as areas of high groundwater potential. These targets can yield significant groundwater close to and in the area surrounding dolerite dyke, even in geological settings with usually poor groundwater occurrence. Alluvium is only present in small proportions in the study area.

- **Hydrogeology**

The lithology of the study area yields two types of aquifers, the most significant of which is the secondary (fractured rock) aquifers in dolerite intrusions and the fractured surrounding country rock. This type of aquifer can yield significant, fresh groundwater. Primary

intergranular and fracture rock aquifers in the Burgersdorp Formation can yield small groundwater targets in more continuous sandstone lenses (**Table 1)**. Mudstone within the sandstone, could however significantly reduce quality within these types of aquifers.

Table 22: Geology and hydrostratigraphy of the study area (DWA, 2012)

Group	Subgroup	Formation	Lithology	Hydrostratigraphy
			Alluvium	No significant aquifers
Drakensberg			Basaltic lava	Not present in study area
			Dolerite Intrusion	**Secondary fracture aquifer along intrusion contact in fractured country rock**
		Clarens	Sandstone	Not present in study area
		Elliot	**Sandstone, mudstone, siltstone**	**Intergranular and fractured aquifer**
		Molteno	Mudstone, shale, sandstone	Not present in study area
Beaufort	**Tarkastad**	**Burgersdorp**	**Mudstone, sandstone**	**Intergranular and fractured aquifer, mudstone aquitard dominant**
		Katberg	Sandstone, mudstone	Not present in study area
	Adelaide	Balfour	Mudstone, sandstone	Not present in study area
		Middleton	Mudstone, sandstone	Not present in study area
		Koonap	Mudstone, sandstone	Not present in study area
Ecca		Fort Brown	Shale, mudstone, sandstone	Not present in study area
		Ripon	Shale, mudstone, sandstone	Not present in study area
Dwyka			Tillite	Poor fractured rock aquifer

VEGETATION CLASSIFICATION

The study area is primarily composed of Tsomo Grassland (Gs 15) with Drakensberg Foothill Moist Grassland (Gs 10) occurring on the mountains. Tsomo Grassland is classified as grassland or open thornveld, often grazed short or replaced by dwarf shrub land dominated species with Euryops, Cymbopogon, Elionurus, Eragrostis, Aristida and Themeda being the most common species (Mucina *et al.*, 2006). Drakensberg Foothill Moist Grassland occurs in moderately rolling and mountainous areas, incised by river gorges of drier vegetation types and by forest, and covered in forb-rich grassland dominated by short bunch grasses including Themedatriandra and Tristachyaleucothrix (Mucina *et al.*, 2006). The area is severely infested with Lapesi due to overgrazing, which is being eradicated under a controlled working program with the DRDAR. The vegetation types and land use around Tsengiwe is shown in (**Map 3**).

WATER SUPPLY

The distribution of water both domestic and agricultural throughout village is provided by spring fed reservoirs, supplemented with tanker driven water and groundwater supply from boreholes. Natural catchment stock dams provide additional water supply points and water is pumped from the Tsomo River to supplement agricultural needs. The water distribution and supply network is shown in the hydrocensus map (**Map 3**).

- **Springs**

Three main feeder springs named S1 S2 and S3 occur in the area. Spring S1, a natural spring is located high in the catchment about two-thirds of the way up the catchment and provides water to Upper Tsengiwe. Upslope water harvesting supplements this spring at its source. Water flow from the spring is piped into two reservoirs, a green water storage tank and the Upper Tsengiwe Reservoir (**Figure 1**). A split gate valve controls and directs water to either destination and is controlled manually. The pipeline distribution from the Green Tank and the main reservoir supply water to Upper Tsengiwe (**Map 3**). Both these reservoirs can be supplemented by the municipal delivery water truck should the need arise.

The water from the spring is generated on the large upland areas above the catchment, from which surface drainage is away from the village and towards the Tsomo River. The water supply from the spring is inadequate for the village and regular supply failures occur. Water use is for domestic purposes with limited use for household gardens. No water supply for irrigation occurs from this source and the village inhabitants wish to augment this supply with water tanks for roof rainwater harvesting.

Spring S2 (**Figure 1**) supplies water to the region around the Junior Secondary School. Spring S3 provides water to areas called Manzana Estrong Yard and Entilini. Smaller springs above the village have been privately piped to supply a few private water connections or users.

- **Public Boreholes**

The village has a total of five public boreholes of which two are operational (TSE14 and TSE12) and the other four are dry (TSE13), unused and open (TSE16) or closed (TSE15). Boreholes TSE 13 and TSE16 are located in upper Tsengiwe and boreholes TSE12, TSE14 and TSE15 in lower Tsengiwe (**Map 3**).

The operating municipal borehole TSE14 is called the “Tsengiwe Engine” (**Figure 1**) and is a diesel generator-electric pump combination that supplies water to a square shaped concrete reservoir (**Figure 1**). Borehole TSE14 and reservoir are adjacent to the clinic in the lower Tsengiwe village. This borehole is operated by the municipality on an as-need basis to top up the reservoir which supplies three public taps with water for community use.

One further public borehole is operational TSE 12. This borehole is situated in the proximity of the Shearing Shed and is equipped with a hand pump. The pump and borehole are in good condition but has a very low flow. A water sample from the borehole yielded a pH of 6.7 and salinity of 73.9 mS/m which falls within the SANS 241:2011 drinking water classification. The groundwater in this borehole is colourless, clear and shows no smell.

Public borehole TSE13 is equipped with a hand pump and is easily accessible and in good condition but the borehole is reported to be dry. Public borehole TSE16 is an abandoned,

unused borehole and is unequipped for usage. Public borehole TSE15 comprises a closed borehole which is easily accessible but unused and unequipped. No water level measurements, borehole depths or water samples were obtained from any of these boreholes to provide additional groundwater information.

- **Private Boreholes**

Eleven private boreholes were located during the hydrocensus (**Map 3**). None of the private boreholes are equipped with pumps and no groundwater is being abstracted or used from any of these boreholes. Boreholes TSE01, TSE02, TSE03, TSE08, TSE09, TSE10 and TSE11 occur in upper Tsengiwe and boreholes TSE04, TSE05, TSE06 and TSE07 occur in lower Tsengiwe.

Very little information other that observed on site could be obtained from many of these private boreholes and no water level measurements or borehole depths were taken or obtained from the owners. None of these private borehole are currently being used and comprise open unequipped holes (TSE01, TSE02), equipped holes but the equipment is broken (TSE08, TSE09, TSE04, TSE05, TSE06, TSE07), are buried (TSE11) or no other information is available or could be collected about the boreholes (TSE03, TSE10).

Water samples could be obtained from TSE01 and TSE02 and water levels measured. The groundwater in TSE01 is colourless, odourless and clear. While the groundwater in TSE02 is milky, turbid and smells like mud. Both boreholes contain groundwater of drinking water quality (SANS241: 2011) with pH between 5.3-6.3 and salinity between 33-73 mS/m. No borehole depths were measured. Boreholes TSE01 and TSE02 showed water levels between 14-22 m below ground level.

A collage of images of the public and private boreholes is shown in **Figure 1** and **Figure 2**.

(**Map 3**) shows the location of each public and private borehole in both upper and lower Tsengiwe. **Table 2** and **Table 3** detail the hydrocensus information collected for all boreholes for Upper and lower Tsengiwe, respectively.

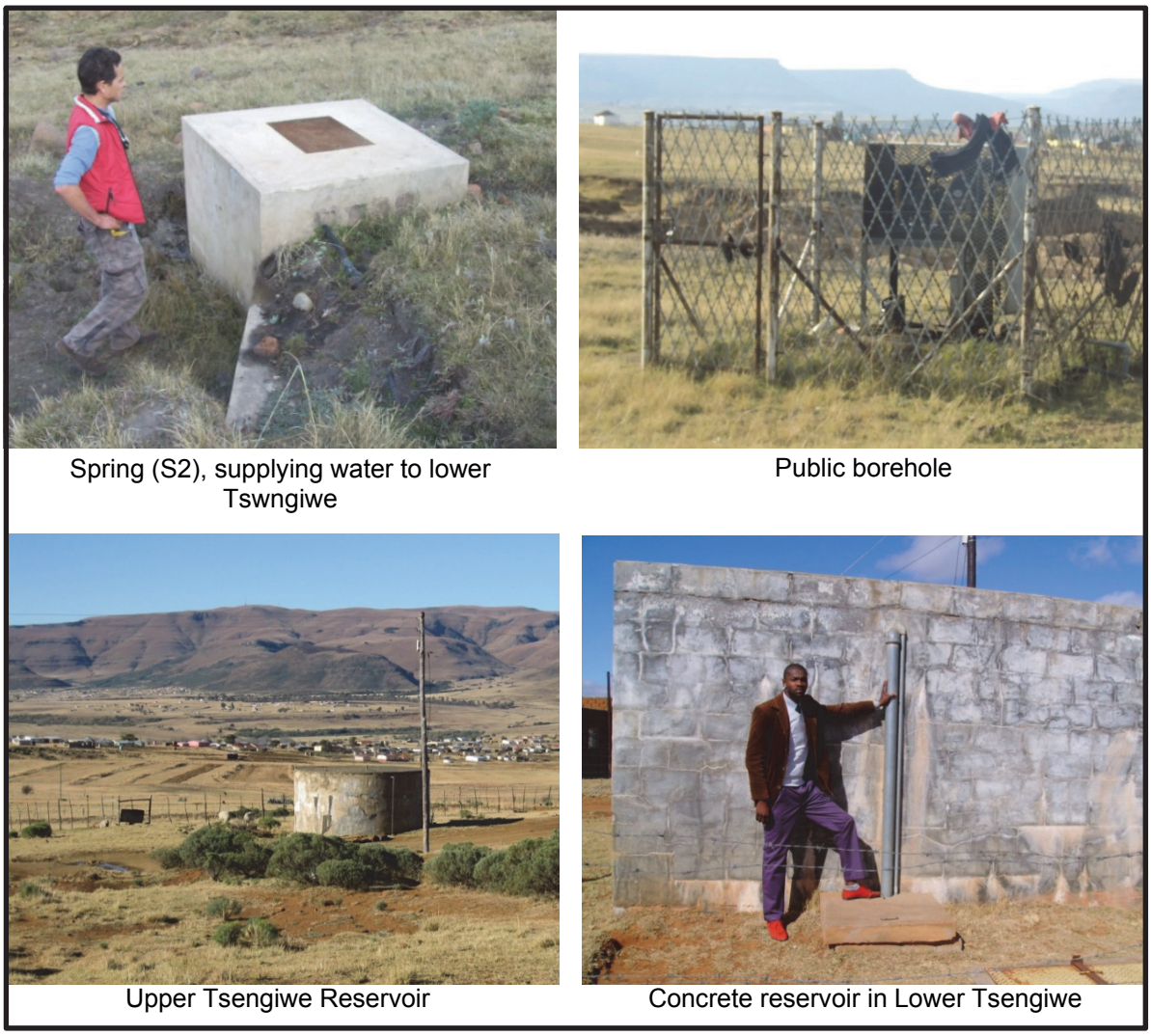

Figure 1: Photographs of Spring S2 (top left), the Tsengiwe engine at public borehole TSE14 (top right) the Upper Tsengiwe Reservoir (centre) and square concrete reservoir in Lower Tsengiwe (bottom)

Table 23: Geology and hydrostratigraphy of the study area (DWA, 2012)

Borehole No	TSE 01	TSE 02	TSE 03	TSE 04	TSE 05	TSE 06	TSE 07	TSE 08
Owner Name & Contact No.	Makohliso 0724934166	Mhlangulana 0839487359	Unknown No Access	Matshotyana 0783511098	Jamjam 0717913275	Zengethwua 0789537764	Jobe 0736969	Ndabula
Latitude	31.58798	31.58732	31.58734	31.55627	31.56698	31.56821	31.5721	31.59464
Longitude	27.66367	27.66104	27.65346	27.65937	27.65893	27.6696	27.67315	27.65839
Elevation	1162	1183	1198	1145	1152	1151	1145	1183
Topographic Setting	Flat	Flat	Unknown	Flat	Flat	Flat	Flat	Hillside
Vegetation Cover	Grassland	Grassland	Unknown	Grassland ploughed Field	No vegetation. In private yard	Grassland	Grassland ploughed Field	Grassland
Geology	Beaufort Group	Beaufort Group	Unknown	Beaufort Group	Beaufort Group	Beaufort Group	Beaufort Group	Beaufort Group
Status	Unused	Unused	Unknown	Equipment broken / blocked	Equipment broken / blocked	Equipment broken / blocked	Equipment broken / blocked	Unused
Well Head Protection	Fenced	Fenced	Unknown	Fenced	Fenced	Open	Open	Open
Water Use	Domestic	Domestic	Unknown	Domestic	Domestic	Domestic	Domestic	Domestic
Households Supplied	0	0	Unknown	0	0	0	0	0
Pump Installation	Not equipped	Not equipped	Unknown	Equipped hand pump	Equipped hand pump	Equipped hand pump	Equipped hand pump	Not equipped
Water Level m below Datum	22.2	14.76	Unknown	Sealed could not dip	Sealed could not dip	Sealed could not dip	Sealed could not dip	Sealed could not dip
Groundwater physical appearance	Clear, non-turbid, no particles, odourless	Milky colour, strongly turbid, much particulate matter and smells like mud	Unknown	Could not be sampled	Could not be sampled	Could not be sampled	Could not be sampled	Could not be sampled
Chemical Measurements	pH = 6.3 EC = 73.4 mS/m T = 20°C	pH = 5.3 EC = 33.6 mS/m Temp = 20.10°C	Unknown	Could not be sampled	Could not be sampled	Could not be sampled	Could not be sampled	Could not be sampled

Borehole No	TSE 09	TSE 10	TSE 11	TSE 12	TSE 13	TSE 14	TS15	TSE16
Owner Name & Contact No.	Polo 0731105945	Unknown No Access	Khonyana 0838681900	Public	Public	Public	Public	Public
Latitude	31.59423	31.58969	31.58977	31.57485	31.58169	31.56884	31.55566	31.58572
Longitude	27.65742	27.66344	27.6601	27.65766	27.6439	27.65624	27.65591	27.66182
Elevation	1187	1189	1186	1179	1225	1173	1146	1166
Topographic Setting	Hillside	Unknown	Flat	Flat	Flat	Flat	Flat	Hillside
Vegetation Cover	Grassland	Unknown	Grassland	None spare cover	None spare cover	None spare cover	Grassland	Grassland
Geology	Beaufort Group	Unknown	Beaufort Group	Beaufort Group	Beaufort Group	Beaufort Group	Beaufort Group	Beaufort Group
Status	Equipment broken / blocked	Unknown	Abandoned & Buried	Used	Abandoned	Used 12 weeks / year	Abandoned	Abandoned
Well Head Protection	Open	Unknown	Open	Open	Open	Fencing locked	Open	Open
Water Use	Domestic	Unknown	Not used	Domestic	Domestic	Domestic	Domestic	Unused
Households Supplied	0	Unknown	0	Anyone needing water	0	+/- 50	0	0
Pump Installation	Equipped hand pump	Unknown	Not equipped	Equipped	Equipped	Submersible	Open Hole	Closed
Water Level m below Datum	Sealed could not dip	Unknown	Buried and blocked could not dip	Sealed could not dip	Not dipped	Sealed could not dip	Not dipped	Not dipped
Groundwater physical appearance	Could not be sampled	Unknown	Could not be sampled	Clear, non-turbid, no particles, odourless	Could not be sampled	Could not be sampled	Could not be sampled	Could not be sampled
Chemical Measurements	Could not be sampled	Unknown	Could not be sampled	EC = 73.0 ms/m	Could not be sampled	Could not be sampled	Could not be sampled	Could not be sampled

Figure 2: Collage of photographs of boreholes located in Upper Tsengiwe, namely TSE01, TSE02, TSE09, TSE11 and TSE16

Figure 3: Collage of photographs of boreholes located in Lower Tsengiwe namely TSE01, TSE02, TSW08, TSE11, TSE13 and TSE 16

- **Other dams**

An old dam is visible in the primary upstream catchment, but this has not been functional for the past 50 years (Chris Ncoko – pers. comm.) and used to irrigate a vegetable garden (**Map 4**). A failed dam is visible in secondary upstream catchment (Ncoko farm), the cause of the failure is unknown (**Map 4**).

- **Stock Dams**

Three stock dams are shown in the land use map (**Map 4**) and are named SD01, SD02 and SD03. They are all located in lower Tsengiwe. Water in these stock dams is derived from surface runoff and supplies drinking water for livestock from the upper & lower Tsengiwe.

-

- ## FUTURE WATER SECURITY PROVISIONING

Four proposed stock dam locations have been identified (**Map 4**), each in a separate grazing camp. Each grazing camp would require a stock dam to supply water for livestock, and each camp would need to be fenced. A larger irrigation dam location has also been identified, and it is also shown on the vegetation and land use map (**Map 4**).

APPENDIX 2

WORKSHOP ATTENDANCE REGISTERS

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APPENDIX 2A: WORKSHOP ONE ATTENDANCE LISTS

WORKSHOP AT SAKHISIZWE LOCAL MUNICIPALITY

10 JULY 2012
9:00-15:00
VENUE: Tsengiwe JSS

NAME	AFFILIATION	TEL NUMBER / CELL
1 Mr. Paul Lee	Umvoto Africa (Pty) Ltd	
2 Dr. L.N. Mlisa	Umvoto Africa (Pty) Ltd	
3 Mr. Dirk Versveld	Umvoto Africa (Pty) Ltd	
4 Miss Jessica Lee	Umvoto Africa (Pty) Ltd	
5 Ms Bukiwe Mboniswa	Umvoto Africa (Pty) Ltd	
6 N. Magam		0833576575
7 F. Jacobs		0787108125
8 D. Matshotyama		0826495429
9 N. Nhlapo		0789345631
10 Z. Tomsana		0730680424
11 L. Zayedwa		0788266890
12 N. Sinzama		0710631940
13 A. Matshotsana		0738713445
14 R. Mtwasa		0731511210
15 P. Jack		0733738888
16 S. Xana		0780115792
17 L Mlandu		0789841510
18 N. Mselemi		0789826788
19 V. Ndwalaza		0730849279
20 JamJam T.		0726431919
21 B. JamJam		0731708349
22 S. T. Shude		0715005229
23 N.N. Jack		0725217124
24 N. Jiza		0728345262
25 X. B. JamJam		0717913275
26 L. L. H. Rono		0711012885
27 Booi Mlandu		0783135664
28 Mlahleni Ndebendwana		0734916890
29 Maphangwana Manyingiz		
30 Mhizana Tyelaphantsi		0734276296
31 Luphumzo Dasheka		0745021067
32 Siphokazi Moyeni		0737540026
33 Chris Ncoko		0725807022
34 L. Arosi		0835880091
35 Armstrong T. Nxoyi		0837520633
36 Thandeka Maxhego		0783873838
37 Sifiso Rono		073680119?
38 Mhatinotyama		
39 Ndebendwana Nomaxabiso		0785128539
40 Mpuhle Vuyiwe		0718137204

41 S. T. Stofile	
42 L. Tayeswa	0738586335
43 M.N. Mpoyi	
44 Ayanda Matshotyana	0735002819
45 Nosimosakme Tyelaphantsi	0728793633
46 Pindelo Foloti	0739410649
47 Sicelo Ntwonzo	071146218
48 Mbulelo	0746257832
49 Thanduxolo Dube	0834799918
50 Thembelani Jack	
51 Feziwe Mphekwana	0725662283
52 Nolufefe Mzonei	0794470081
53 Nonasile Ndebendwana	0727598443
54 Nosandla Mseleni	0735852588
55 Bongani Ndebendwana	
56 Nomatamsanqa Zwane	0721353111
57 Mbuzeli Nhsete	0769162931
58 Maxwell JamJam	0820859941
59 L. Balele	
60 Luzama Zwane	
61 Thobeka Tsishuba	
62 Nothusile Foloti	
63 V. Matsholye	
64 N. Zayedwa	
65 N. Tshungu	0786082141
66 L. Cekiso	
67 V. Nxoyi	
68 M. Mlandu	
69 N. Foloti	
70 N. Dube	0783730256
71 N. Yakabi	
72 Mphekwana	
73 Noncedo Ndiki	0789207967
74 Thabisa Manyingiza	0730755548
75 Nowethu Xana	0835497980

WORKSHOP AT SAKHISIZWE LOCAL MUNICIPALITY

11 JULY 2012
9:00-15:00
VENUE: Tsengiwe JSS

NAME	AFFILIATION	TEL NUMBER / CELL
1 Mr. Paul Lee	Umvoto Africa (Pty) Ltd	
2 Dr. L.N. Mlisa	Umvoto Africa (Pty) Ltd	
3 Mr. Dirk Versveld	Umvoto Africa (Pty) Ltd	
4 Miss Jessica Lee	Umvoto Africa (Pty) Ltd	
5 Ms Bukiwe Mboniswa	Umvoto Africa (Pty) Ltd	
6 JamJam T.		0726431919
7 C.M. Ncoko	Tsengiwe Resident	
8 N. Mselemi	Tsengiwe Resident	0789826188
9 P. Jack	Tsengiwe Resident	0733738888
10 D. Matshotyona	Tsengiwe Resident	0826495429
11 N. Magam	Tsengiwe Resident	0833576575
12 M. JamJam	Tsengiwe Resident	0827118439
13 S. T. Shude	Tsengiwe Resident	0715005229
14 Mphekwana	Tsengiwe Resident	
15 Dasheka Luphumzo	Tsengiwe Resident	0745021067
16 Romo Vuyiswa	Tsengiwe Resident	0711012885
17 A. Matshotyana	Tsengiwe Resident	0735002819
18 Nontsikelelo Jiza	Tsengiwe Resident	0728345262
19 N. Zwane	Tsengiwe Resident	0721353111
20 N. Zayedwa	Tsengiwe Resident	0722959675
21 F. Jacobe	Tsengiwe Resident	0787108125
22 B. Mlandu	Tsengiwe Resident	0783135664
23 N. Nhlapo	Tsengiwe Resident	0789345631
24 Esnyovane		
25 N. N. Jack		0725217124
26 E. Vinyelwa Nllandu		
27 Mlandu Lungisani		
28 Sifiso Rono		
29 Zithulele Mphekwana		
30 Ndebendwana Nomaxabiso		0785128539
31 Manyingiza Thabisa		0730755548
32 Nyakaza Z.		

WORKSHOP AT SAKHISIZWE LOCAL MUNICIPALITY

12 JULY 2012
9:00-15:00
VENUE: SAKISIZWE LM

NAME	AFFILIATION	TEL NUMBER / CELL
1 Mr. Paul Lee	Umvoto Africa (Pty) Ltd	
2 Dr. L.N. Mlisa	Umvoto Africa (Pty) Ltd	
3 Mr. Dirk Versveld	Umvoto Africa (Pty) Ltd	
4 Miss Jessica Lee	Umvoto Africa (Pty) Ltd	
5 Ms Bukiwe Mboniswa	Umvoto Africa (Pty) Ltd	
6 Mr. T.J. Geldenhuys	DWA, ECRO	0828080499
7 Mr. L.J. Mardon	DEDEAT – HO.	0436057128
8 Pat Makohliso	Tsengiwe Resident	0724934166
9 Chris Nkoko	Tsengiwe Resident	0725807022
10 B. Mlandu (Mr)	Tsengiwe Resident	
11 V. Mlandu (Mrs)	Tsengiwe Resident	
12 MM Tshona	Sakhisizwe LM	0786514546
13 T. Jam Jam	Sakhisizwe	0726431919
14 N. Stofile	Sakhisizwe	0782974611
15 Jamjam Maxiwell	Tseng Planning Office	0827118439
16 N. Magam	Tsengiwe	0833576575
18 Ndebendlwana	Tsengiwe	0734916890
19 N. Ninai	Sakisizwe	0839780322
20 S. Sokiseba	Sakhisizwe	0823023248
21 Vuyani Nkalitshane	Dept. of Local Govt.	0781513523
22 Sindisiwe Jafta-Tano	Dept. of Local Govt	0763191133
23 Nomaphelo Tseniza Langa	DLYTA CDW 09	0765644922
24 Tsibani N.	Forte University	0730881238
25 Ncube L.	Forte University	0725523711
26 Slazomba V.	Fort Hare University	0735275773
27 Nogoala L.	University of Fort Hare	0733667959

APPENDIX 2B: WORKSHOP TWO ATTENDANCE LISTS

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ATTENDANCE REGISTER

MASIPHILE PROJECT HALL IN TSENGIWE

MONDAY 20 MAY 2013

Surname	Name	Affiliation	Contact Number	Signature
DASHEKA	LUPHUMZO		0796596313	[illegible]
MARIA	Cudakoa		0717306311	[illegible]
Dube	Asaphiwe		0731859706	[illegible]
MASEKO	INOK	COMMUNITY	0711012885	[illegible]
Siyabonga	Romo			
ROBERT	MTWASA	Community	0731511210	[illegible]
Fezekile	Jacobs	operator	0787108125	[illegible]
S. Mose	Sindiswe		0781638098	Simose
Jack	Nomsonino . Victoria	Community	0733976901	[illegible]
NDABULA	Sikelela	Tsengiwe Residence	0733266336	S. NDAbu[illegible]
Matshatyana	Victor	Community	0822545685	[illegible]

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ATTENDANCE REGISTER

MASIPHILE PROJECT HALL IN TSENGIWE

MONDAY 20 MAY 2013

Surname	Name	Affiliation	Contact Number	Signature
Widas	Jacobs	C.W.P.	0737407666	
Mr Mlandu	Mlandu	Community	0603325379	
Dube	Thozama		0783730886	T. Dube.
Shude	Thelma		0715005229	T. Shude.
MATSHOTSANA	Luvuso	C.W.P.		
ZWANA	Zukisani			
Lizo	Tyelaphantsu			
Ndebendwana	Mlahleni		0738214640	
VOKWANA.	Siphiwo.			Siphi
Jacki	Victoria	Community	0733976901	V. Jack
Vorsfold	Dirk	Umvoto	0823774084	D.B. Vorsfold

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Tyelaphantsi	Timothy		0787140464	T. Tyelaphantsi

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Directors: E R Hay, C J H Hartnady
Associate: K Riemann

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ATTENDANCE REGISTER

SAKHISIZWE MUNICIPALITY BOARDROOM

TUESDAY 21 MAY 2013

Surname	Name	Affiliation	Contact Number	Signature
T. JAMJAM	TOLAKELE	Councillor 06	0726431919	
MS. MADUNA	SAMUEL	HYDROLOGY: DWA	0829035993	
M. LUZOMBE	MXOLISI	SRSAR	0833829146	
M. MTHONGANA	MZIMASI	SRSAR	0459311054	
S. SOKWEBA	SINDISWA	DISASTER MAN	0823023248	
K.X. GONJWA	KHANYILOMZI	COMMUN OFFICER	0849999667	
MAKOHLISO	PAT	Tsenqiwe	0724931166	
MCOKO	Chris Mawaka	Tsenqiwe	072 580 7022	
Matshotyane	Nyabulo	Tsenqiwe	073 692 2228	
Mpofu	Xolelwa	MHS - CHDM	0844103862	
IAFIA - IANA	SINDISIWE	CDW - WARD 3	0763191133	

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Directors: E R Hay, C J H Hartnady
Associate: K Riemann

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Website: www.umvoto.com

ATTENDANCE REGISTER

SAKHISIZWE MUNICIPALITY BOARDROOM

TUESDAY 21 MAY 2013

Surname	Name	Affiliation	Contact Number	Signature
GELDENHUYS	THEO	DWA, EC	082 8080 499	
MASOKA	Z	DWA	0835928395	
MAPEKULA	Luleka	CHDM.	072876 0473	
MBANANGA	NOMALWANDE	CHDM	0839816523	

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Directors: E R Hay, C J H Hartnady
Associate: K Riemann

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ATTENDANCE REGISTER

MASIPHILE PROJECT HALL

TUESDAY 21 MAY 2013

Surname	Name	Affiliation	Contact Number	Signature
THELAPHANISI	TIMOTY	TSENGIWE	0736276296	
DASHEKA	LWPHUMZI	TSENGIWE	0796596313	
MCOKA	SIBUSISO	TSENGIWE		
ROMO	SIYABONGA	TSENGIWE	0711012885	
MAISMOTHOOD	LUVUYO	TSENGIWE		
CUDAKA	MARIA	TSENGIWE	0717306311	
DUBE	MSAPHIWE	TSENGIWE		
NDABULA	SIKELELA	TSENGIWE	0733266336	
Ndamane	Asandiswa	TSENGIWE		
YAKOBI	MZWANDILE	TSENGIWE	0735244135	
MPOYI	NCEBA	TSENGIWE	0729877421	

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MASIPHILE PROJECT HALL

TUESDAY 21 MAY 2013

Surname	Name	Affiliation	Contact Number	Signature
Liwani	Sanele	TSENGIWE.	073 2191 475	S. Liwani
Mkhovi Mkhovi	Yonela	Tsengiwe	0734487 269	[signature]
Ntsunie	Mphumezi	Tsengiwe	0810596182	
Jack	Victoria	Tsengiwe	0733976901	N.V. Jack
Dube	Funiwe	TSENGIWE	0795971219	F. Dube
Tomsana	Zanele	Tsengiwe	0730680424	Z. Tomsana
Zayedwa	Lelethu	Tsengiwe	083 6583 120	[signature]

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Website: www.umvoto.com

ATTENDANCE REGISTER
MASIPHILE PROJECT HALL IN TSENGIWE
TUESDAY 21 MAY 2013

Surname	Name	Affiliation	Contact Number	Signature
NOLUVUYO	Maggzi	TSENSILE		NM
Ntombentsha	Kotosi	Tsengiwe	0783207065	NK
Mlandu	E Vuyelwa	Practitioner	0603325379	[signature]
Ndomas	Nothandekile	Masiphile Projects	073 5530336	[signature]
Shude	Thandazani	Tsengiwe	0603603268	T Shude
Zayedwa	Welethu	Tsengiwe M/A	0836583120	W Zayedwa
JAcobs	Widas	Tsengiwe	0737407666	WJ
Tomsana	Zanele	Tsengiwe	0730680424	Z. Tomsana

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ATTENDANCE REGISTER

OUTING TO THREE CROWNS

WEDNESDAY 22 MAY 2013

Surname	Name	Affiliation	Contact Number	Signature
DASHEKA	LUPHUMEZO	TSENGIWE	0796596313	
TYELAPHANTSI	TIMOTY	TSENGIWE	0736276296	T. Tyelaphantsi.
ROND	SIYABONGA	TSENGIWE	N/A	
MATSHOTYANA	NJABULO	Tsengiwe	0736922228	Njabulo
MATSHOTYANA	LUVUYO	Mngcunube	N/A	
TOMSANA	ZAMELA	Tsengiwe	073 680 4240	Z Tomsana
DUBE	ASAPHIWE	Tsengiwe	0731859706	A. Dube
NDAMANE	ASANDISWA	Tsengiwe	0739998220	A. Ndamane
NDAMANE	SIKELELA	Tsengiwe	0735266586	S. Ndamane
ZAYEDWA	LEHLETHU	Tsengiwe	083 6583 120	L. Zayedwa
DUBE	FUNGIWE	Tsengiwe	0795971218	F. Dube

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Website: www.umvoto.com

ATTENDANCE REGISTER

OUTING TO THREE CROWNS

WEDNESDAY 22 MAY 2013

Surname	Name	Affiliation	Contact Number	Signature
Nkosi	Yonela	Tsenguve	0846366905	
Ncoko	Chris Mawoka	Tsenguve	072 580 7022	
Makhohliso	PAT	Tsenguve	0724934166	
Mlandu	EV Mlandu	Tsenguve	060 3325 379	
Jack	VICTORIA	Tsenguve	0733976901	
Cindela	MARIA	TSENGIWE	0717600617	
Sishuba	Onke	TSENGIWE	N/A	
Matshotyana	Victor	PSC	0822545688	
Nkosi	Yonela	Tsenguve	0844366905	
Siyabonga	RONO	Tsenguve	0711018885	
Mlandu	E Vuyelwa	Tseng	0603325379	

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ATTENDANCE REGISTER

MASIPHILE PROJECT HALL IN TSENGIWE

THURSDAYSDAY 23 MAY 2013

	Surname	Name	Affiliation	Contact Number	Signature
1.	NCOKO	SIBUSISO		0604716394	
2.	Mdamane	Asandiswa		0739998220	M. A
3.	Nkxoyi	Yonela		0843666905	
4.	DASHEKA	LUPHUMZO	TSENGIWE	0796596313	
5.	MATSHOTYANA	NJABULO MPHUMZO	TSENGIWE	0736922278	
6.	MAKOHLISO	PAT	Tsengiwe	0724934166	
7.	Hlobo	Asanda	Tsengiwe	0737561880	
8.	Maqaqi	Nandipha	Masiphile	0737981425	
9.	NONTSIKELELO	JIZA	TSEPA	0728345262	N. Jaza
10.	A. TSHUNGU	FUNDISWA	TSEPA	0810086198	
11.	Sishuba	Dideka	Tsepa	0731086610	

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THURSDAYSDAY 23 MAY 2013

	Surname	Name	Affiliation	Contact Number	Signature
12.	Rono	Vuyiswa	Tsengiwe	0711012885	V Rono
13.	Sishuba	Alicia N	Tsengiwe	0710662442	N. A Sishuba
14.	Sigwevu	Cordelia N.	Tsengiwe	0717575695	C N Sigwevu
15.	Madlungu	Nothobile	Tsengiwe	— —	N Mdlungu
16.	Ndebendlana	Nonasile	Tsengiwe	072 759 5447	N. Ndebendlana
17.	Jack	Victoria	Tsengiwe	0733976901	V.V. Jack
18.	Afosi	Nobandla	Tsengiwe	N/A	N. Afosi
19.	Mlandu	Vuyelwa	Tsengiwe	0603325379	V Mlandu
20.	Tyelaphantsi	Timothy	Tsengiwe	0734276296	T. Tyelaphantsi
21.	NDABULA	SIKELELA	Tsengiwe	0733266356	S.N
22.	Siyabonga	ROKO	TSENGIWE	0711012885	SR

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THURSDAYSDAY 23 MAY 2013

	Surname	Name	Affiliation	Contact Number	Signature
23.	Mpelwana	Ayanda	Tsengiwe		[illegible]
24.	VOLCWANA	Siphiwo.	/		Sip
25.	MATSHOTYANA	Luvuyo	Mageunube		[illegible]
26.	DUBE	Asaphiwe	TSENGIWE	0731859906	A.D.
27.	MNYANI	SIVUYILE	TSENGIWE	0732595325	[illegible]
28.	MPOYI	NCEBA	TSENGIWE		M.N.MPoyi
29.	LIWANI	SANELE	SIYANDA CO-OP	073 2191475	S.LIWANI
30.	Ntsume	mPhumezi	TSENGIWE	0810596182	M.Ntsume
31.	Ndeman	NOTHANDEBELE	Masiphile project	073 8530336	N. Ndeman
32.		SIKELELE	NHLONZE		SN
33.	Agenda	M pelwana	//	07346432	

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THURSDAYSDAY 23 MAY 2013

	Surname	Name	Affiliation	Contact Number	Signature
34.	RHoRHiwana	LiTHA		–	L R
35.	Matshaya	Victor	Tsengiwe	0822545285	Matshaya
36.	MTwasa	ROBERT	TSENGIWE	0731511210	
37.	Shude	Thelma		0715005229	T. Shude
38.	Dube	FUNGIWE	TSENGIWE	"	F. Dube
39.	Tomsana	Zanele	Tsengiwe	0730680424	Z. Tomsana
40.	Mjuleni	Unathi	Tsengiwe	0732155570	
41.	Nyovane	Bongiwo	Tsengiwe	0834642076	B Nyovane
	Zayedwa	Cicketha	Tsengiwe	083 6583 120	

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MASIPHILE PROJECT HALL IN TSENGIWE

FRIDAY 24 MAY 2013

	Surname	Name	Affiliation	Contact Number	Signature
1	Matshotyana	Nyabulo	Tsengiwe	0736922228	Nyabulo
2	Nkxoji	Vonela	Tsengiwe	0844366905	
3	Ndamane	Asandiswo	Tsengiwe	0739998220	A. Ndamane
4	Matshotyana	Luvuyo	Mngcunube		
5	Tyelaphantsi	Timothy	Tsengiwe	0734276296	
6	Mpelawa	Ayanda	"	0784324527	
7	Rono	Sivabonga	Tsengiwe	0711012885	S R
8	Fungiwe	Dube	Tsengiwe	0795971218	
9	Dashekn	Luphumzo	Tsengiwe	0796596312	
10	Makwhiso	Pat	Tsengiwe	0724934166	
11	Jacks	Victoria	Tsengiwe	0733996901	

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MASIPHILE PROJECT HALL IN TSENGIWE

FRIDAY 24 MAY 2013

	Surname	Name	Affiliation	Contact Number	Signature
12	Matshotyana	Victor	PSC.	0825456821	
13	Mlandu	EVuyelwa	ECD Practitioner	0603325379	
14	Ncoko	Chris	Tsengiwe	072 580 7022	
15	NCOKO	SIBUSISO	TSENGIWE	0604716394	
16	MARIA	Cudaka.	TSENGIWE	0717306311	
17	Mzuleni	Unathi	Tsengiwe	0732155570	
18	Nyovane	Bongiwe	Tsengiwe	0834642076	B.Nyovane
19	DUBE	ASAPHIWE	TSENGIWE	0731859706	A. DUBE.
	Shude	Thandazani	Tsengiwe	0603403268	T. Shude
	NDABULA	SIKHELELA	TSENGIWE	0733266536	S. NDABULA.
	LIWANI	SANELE	SIYANDA	0732191475	S. LIWANI.

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MASIPHILE PROJECT HALL IN TSENGIWE

FRIDAY 24 MAY 2013

Surname	Name	Affiliation	Contact Number	Signature
Nkosi	Mphumezi	Tsengiwe	0810596182	Mr Nkosi
Zayedwa	Lethu	Tsengiwe	083 6588 120	L Zayedwa

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APPENDIX 2C: WORKSHOP THREE ATTENDANCE REGISTERS

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804 WRC CC adaptation and DRR in Tsengiwe
Date: 05/08/13
Venue: MASIPHILE

SURNAME	NAME	AFFILIATION	CONTACT NUMBER	SIGNATURE
DAVIS	OLIVIA	UMVOTO	082 409 5462	
LEE	PAUL	UMVOTO		
HAY	PAULA	UMVOTO		
MBONISWA	BUKIWE	"	072 316 4652	
MAKOHLISO	Pat	Masiphile	0724934166	
Ncoko	CHRIS	Masiphile	072 580 7022	
Hlobo	Asanda	DST Intern (UFH)	0733561880	
DASHEKA	LUPHUMZO	WATER SUPPLY	0796596313	
MAFISHOTYANA	LUVUYO	MNGCUNUBE	0799174449	
Mlandu	EVUYELWA	School greening	0603325379	
JACKI	Victoria	Animal grazing	0733976901	
SAM DAMA	BANDILE	Steering Comm SDC	0717511212	
Siyabonga	Rono	STengwe	0711012885	
LIWANI	SAIVELE	WATER SUPPLY	0732191475	
Matshatsana	Victor	Steering Comm.	0742013474	

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Associate: K Riemann

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Website: www.umvoto.com

804 WRC CC adaptation and DRR in Tsengiwe

Date: 05/08/13

Venue: MAGPHILE

SURNAME	NAME	AFFILIATION	CONTACT NUMBER	SIGNATURE
Nkxoyi	Yonela	Tsengiwe	0846 366 905	[signature]
Rono	Sandiswa	Tsengiwe	071 780 2372	[signature]
Ndabula	Sikelela	IK Recorder	0755266326	[signature]
Matshotyana	Njabulo	IK Recorder (DST)	0736786774	[signature]
Mlisa	Andile	Com. Coordinator (DST)	0834722505	[signature]
Tshuncu	Fundiswa	IK Recorder	0810086198	[signature]
Gxotani	Babalwa	Intern - DST CUFH)	0791648004	[signature]
Mbuyana	Nowethu	IK Recorder	0767676196	[signature]

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804 WRC CC adaptation and DRR in Tsengiwe

Date: 6/08/13

Venue: MASIPHILE PROJ HALL

SURNAME	NAME	AFFILIATION	CONTACT NUMBER	SIGNATURE
FUNGIWE	DUBE	~~UMVOTO~~ School Greening	0795971218	F. Dube
Mlandu	Evuyelwa	~~Avatkeo~~ Greening	0603325379	[illegible]
Matshotyana	Victor	Steering Committee	0742012474	V.S. Matshotyana
Jack	Victoria Nkombomia	grazing animal	0733976901	N.V. Jack
BUKIWE	MBONISWA	UMVOTO	0723164456	[illegible]
Siphatho	Afrozi	SUB-Headman		[illegible]
MATSHOTYANA	LUVUYO	MNGCUNUBE	0799174449	[illegible]
DASHELA	LUPHUMZO	SST/S/C M+E	0796576313	[illegible]
MATSHOTYANA	NJABULA	" / M+E	0736781774	Njabulo
LIWANI	SANELE	" / M+E		
NSABULA	SIKELELA	" / M+E		

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Directors: E R Hay, C J H Hartnady
Associate: K Riemann

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804 WRC CC adaptation and DRR in Tsengiwe

Date: 6 AUGUST 2013 DAY 2 WORKSHOP 3

Venue:

SURNAME	NAME	AFFILIATION	CONTACT NUMBER	SIGNATURE
LEE	PAUL	UMVOTO	0835209303	Paul Lee
HAY	PAULA	UMVOTO	0848982718	[illegible]
Asandiswa	Ndamane	Water Supply ~~UMVOTO~~	0739998220	A Ndamane
Matshatyana	Nyakolo	IK recorder	0736786774	Nyakolo
Unathi	Mguleni	~~Umvoto~~ Agriculture	0733215510	[illegible]
BANDILE	SAM SAM	Steering Commetee SDC	0717311212	[illegible]
Jack	Andiswa	~~UMVOTO~~ Agriculture	078 620 6258	A Jack
Tyelaphantsi	Timothy	~~UMVOTO~~ water supply	0787414646	T. Tyelaphantsi
JACK	Sixolile	~~UMVOTO~~ Agriculture	0790918946	S. JACK
Rono	Siyabonga	animal grazing ~~UMVOTO~~	0711012885	S Rono
Ntsume	mphumezi	Water Supply ~~UMVOTO~~	0798016377	M. Ntsume
~~MA~~ DONDOLO	MAHLUBIWE	Water Supply ~~UMVOTO~~	071822102	M. DONDOLO
XANA	[illegible]	[illegible] ~~UMVOTO~~	0735142171	[illegible]
NCOLIWE	AMANDA	DRDAR	0794231267 / 047 877 0085	A. Ncoliwe
KIYANE	LUVO	DRDAR	072 7362297	[illegible]

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804 WRC CC adaptation and DRR in Tsengiwe

Date: 7/08/13

Venue: MASIPHILE PROJ

SURNAME	NAME	AFFILIATION	CONTACT NUMBER	SIGNATURE
MBONISWA	BUKIWE	UMVOTO	0723164686	[signature]
PAULA	HAY	"		
DAVIS	OLIVIA	"		
LEE	PAUL	"		
matchotyana	Ngabula	DST IK recorder	0736785774	[signature]
Nkxoyi	Yonela	Tsengiwe	0844366905	[signature]
Rono	siyabonga	tsengiwe	0711012885	[signature]
Mlandu	Vuyelwa	Tsengiwe	0733325379	[signature]
NDABELA	Sibabalo	DST IK Recorder	0735526336	[signature]
MASHOBANA	Luvuyo	Magcumube	0799174449	[signature]
JACK	Sixolile	Agriculture	0790918946	[signature]
Ntsume	mphumezi	Tsengiwe Water Supply	0732016377	[signature]
CIWANI	SANELE	DST.IK RECORDER	0738191495.	[signature]
Tyelaphantsi	Timothy	Water Supply	0787416[illegible]	T.Tyelaphantsi
DASHUKA	LUPHUMZO	DST IK RECORDER	0796596313	[signature]

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Associate: K Riemann

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804 WRC CC adaptation and DRR in Tsengiwe
Date: 07/08/13
Venue: MASI PHILE

SURNAME	NAME	AFFILIATION	CONTACT NUMBER	SIGNATURE
Ncoko	CHRIS	Masiphile	072 580 7022	
Ncoko	Sibusiso	Masiphile	0604716394	
Ndamane	Asandiswa	water supply	0739998220	A. Ndamane
Jack	Victoria	animal grazing	0735976901	V. V. Jack
Rono	Sandiswa	animal grazing	071 980 2372	
Jam Jam	BANDILE	Steering comitee SDL	0717311212	

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804 WRC CC adaptation and DRR in Tsengiwe
Date: 08/08/13
Venue: MASIPHILE

SURNAME	NAME	AFFILIATION	CONTACT NUMBER	SIGNATURE
MBONYENA	BUKIWE	UMVOTO		
LEE	PAUL	"		
HAY	PAULA	"		
DAVIS	OLIVIA	"		
matshotyana	Njabulo	DST/water supply	0736786774	[signature]
DASHEKA	LUPHUMZO	DST/WATER SUPPLY	0796596313	[signature]
Nkoyi	Anda	LAND DEG/SOIL EROSION	0844866.905	[signature]
JACK	Sikolile	Agriculture	0790918946	
Ndabeula	Sikelela	DST/School Greening	0735266336	S.N
SIBUSISO	NCOKO	Tsengiwe	0604716394	[signature]
LIWANI	SANELE	DST/WATER SUPPLY	0732191475	S.Liwani
MLISA	ANDILE	Com. Coordinator (DST)		
Jack	Victoria	Grazing animal	0733976901	M.V. Jack
Rono	Sandiswa	Grazing animal	071 780 2372	[signature]
Mlandu	E Vuyelwa	Tsengiwe	0603325379	[signature]

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Earth • Water • Science • Life

804 WRC CC adaptation and DRR in Tsengiwe

Date: 09/08/13

Venue: MASIPHILE

SURNAME	NAME	AFFILIATION	CONTACT NUMBER	SIGNATURE
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TSHUNGU	FUNDISWA	BF DST	0810086198	
Mlandu	Evuyelwa	Tsengiwe	0603325379	
DASHEKA	LUPHUMZO	DST/WATER SUPPLY	0796596313	
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DAVIS	OLIVIA	"		
HAY	PAULA	"		

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Directors: E R Hay, C J H Hartnady
Associate: K Riemann

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SURNAME	NAME	AFFILIATION	CONTACT NUMBER	SIGNATURE
LEE	PAUL	UMVOTO		
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APPENDIX 3

MENTORING AND TRAINING

TABLE OF CONTENTS

APPENDIX 3A: SOIL AND CONSERVATION TRAINING

RESOURCES FOR SOIL MANAGEMENT AND CONSERVATION

Table 1: Summary Resources Provided to Committees for Soil Management and Conservation

Resource Provided	Main Topics	Practical Information / Reference
Western Cape "Green Communities" Module 3 – Plant Propagation	- Explanation of the meaning of plant propagation - Outline of different plant propagation techniques.	• Grasses and legumes are should be planted rather than sowed, and this involves wider rows than sowing and precise spacing between individual seeds in the row. Major field crops such as oats, wheat and rye are sowed. • Hand sowing is where handfuls of seed are cast over prepared ground. Hand sowing can also be combined with pre-sowing in seed trays which allows plants to strengthen indoors during cold periods. • Cutting is a technique whereby part of a plant is cut or broken and inserted into water, sand, soil-less mixes, sphagnum or peat moss, vermiculture, perlite or many combinations thereof, where they form roots and become new plants (called cuttings). • Grafting refers to the process whereby a part is taken from one plant and united with another plant or part of a plant called a stock. This increases the chances of successful growth of the original plant section by giving it a new foundation in the form of a more vigorous root system than it had previously, or to change over the form, character fruit bearing quality etc. of the stock plant by substituting some other variety for its original top. • Budding is a form of grafting in which only a single bud of a desired variety with little or no wood is inserted into the stock. • Division is a form of propagation in which new plants are not grown from seeds or bulbs but are separated from the parent plant. • Layering is a technique in which roots are caused or assisted to form on stems that are still a part of the parent plant. **Reference** Contact Dirk Versfeld (021 424 1787) dirki@iafrica.com
Western Cape "Green Communities" Module 4 – Introduction	- Explanation on the relationship between trees and air quality / climate change. - Other benefits of having trees (volatile organic compounds	• Different tree propagation techniques involve wrapping and waxing, scion wood, grafting, budding and growing fruit plants from seed. • Generally, all grafts made by budding or whipping should be wrapped. A scion is a detached shoot or twig containing buds from a woody plant which is used for grafting. Methods of grafting include whip grafting and

Resource Provided	Main Topics	Practical Information / Reference
	lowering ozone levels in urban areas, energy requirement reductions). -Tree propagation techniques	cut grafting and cleft grafting. • Budding can be done with wood attached or removed. **Reference** Contact Dirk Versfeld (021 424 1787) dirki@iafrica.com
Western Cape "Green Communities" Module 5 – Soil Management	-An introduction of the importance of soil and the management thereof. -An explanation of vermiculture as soil management.	• This brief module does not provide any techniques or practical tools. **Reference** Contact Dirk Versfeld (021 424 1787) dirki@iafrica.com
Western Cape "Green Communities" Module 6 – Water Management	-Explanation of Water Conservation and Demand Management and of the importance of water. -Rainwater harvesting and its benefits is explained.	• Drip irrigation is encouraged as water falls directly around the roots. • Reduce areas of lawns, replace them with shrubs, groundcovers and mulch. • Use local and regional indigenous and naturalised plant materials appropriate to the microclimate regimes. • Use associated plant palettes over broader areas to minimise the need for zoning and related controls. Plant in suach a way that plants are grouped according to their watering requirements. **Reference** Contact Dirk Versfeld (021 424 1787) dirki@iafrica.com
Western Cape "Green Communities" Module 7 – Waste Management	-Introduction to the consequences of poor land and waste management as well as pesticides.	• Choose a pesticide that is not harmful to the environment and wildlife. **Reference** Contact Dirk Versfeld (021 424 1787) dirki@iafrica.com
Western Cape "Green Communities" Module 8 – Hard Landscaping	-Explanation of the term 'Hard Landscaping' -Hard landscaping materials and suitability.	• Try to build permeable surfaces rather than impervious ones, in order to reduce unnatural volumes of runoff and feed the soil around and below. **Reference** Contact Dirk Versfeld (021 424 1787) dirki@iafrica.com
UNISDR Africa Educational Series		
Poverty Alleviation and Disaster Risk Reduction	The booklet is intended for community leaders in Africa. It describes the causes and consequences of poverty in Africa and the links between poverty alleviation and disaster risk reduction. Themes: Capacity development, complex emergency	**Reference** http://www.unisdr.org/files/8545_povertyreduction1.pdf

Resource Provided	Main Topics	Practical Information / Reference
Water and Risk in Africa: a school's guide	This booklet seeks to teach the essentials of risks and disasters related to water, and also about what to do to protect lives and property. It seeks to help teachers to help students to be risk aware and learn to protect their own lives and property. Better still, it also seeks to help students to help their family, relatives and friends to protect their own lives and property.	**Reference** http://www.unisdr.org/files/8542_waterriskafricaaschoolsguideenglish1.pdf
Land use, disaster risk and rewards: a school's guide	The present booklet seeks to help school teachers and students understand how land becomes degraded, what to do about it, and the link between good use of land, disaster risk reduction and sustainable development.	**Reference** http://www.unisdr.org/files/8543_landuseschool1.pdf
Land use, disaster risk and rewards: a community leader's guide	The present booklet seeks to help community leaders understand how land becomes degraded, what to do about it, and how proper use of land, disaster risk reduction and sustainable development are linked. Themes: Capacity development, Community-based DRR, environment	**Reference** http://www.unisdr.org/files/8544_landusecommunity1.pdf
Environmental protection and disaster risk reduction: a community leader's guide	This booklet describes what can be done to protect the environment and in turn reduce the impact of disasters. It also provides definitions and explanations in community-friendly language, supported by success stories providing inspiration for others to contribute to disaster risk reduction by protecting their local environment.	**Reference** http://www.unisdr.org/files/8548_environmentalprotectioncommunity1.pdf

BEST PRACTISE EXAMPLES ON LAND AND SOIL MANAGEMENT FROM RURAL VILLAGES IN SOUTH AFRICA

The concluding workshop on 9 August 2013 presented a slideshow with images on land care and soil/water conservation, showing best practise examples from rural villages in South Africa.

Figure 1: Concluding Talk on Soil and Water Conservation

APPENDIX 3B: LIST OF MENTORS AVAILABLE TO SUPPORT THE IMPLEMENTATION OF COMMUNITY CLIMATE CHANGE ADAPTATION PLANS

Table 3: List of mentors available to support CCA Plans Implementation

CCA Plan	Name	Affiliation	Contact Details	Assistance Required	Contact Made	Feedback
Water Supply and Reticulation	Lara Conde	WESSA	043 748 5798	Funding and or procedure for underground rainwater tanks	Phoned 5 June 2013	Will phone me back
Water Supply and Reticulation; Animal Grazing and Agriculture and Crop Cultivation	Theo Geldenhuys	Water Use Regulation DWA	082 8080 499 cell 048 881 3545 fax geldenhuyst@dwa.gov.za	General Advice		
Water Supply and Reticulation; Animal Grazing and Agriculture and Crop Cultivation	At von Coller	National Department of Agriculture (NDA) DAF	daes@nda.aric.za smwuid@nda.agric.za	Funding and assistance		
Water Supply and Reticulation; Animal Grazing and Agriculture and Crop Cultivation	Nokulunga Skeyi	National Development Agency	Tel: 043 721 1226/7 Fax: 043 721 2096 Email: ecaperegion@nda.org.za. NDA website, follow links	Funding and assistance	Phoned 5 June 2013	Funded and assisted Headman's co-op venture for this 12 month period. Other villagers can apply for funding in another period. Gave details of local farmer who is mentoring the Headman's co-op
School Greening	Francois Nel	CHDM Three Crowns Project	fnel@chrishani.dm.gov.za 045 807 9400	General Advice Biogas and School Greening Projects		
Water Supply and Reticulation; Animal Grazing and Agriculture and Crop Cultivation	Kowie Joubert	Department t of Agriculture Chairman of Co-ordinating Committee of Agricultural Water (CCAW)	kowie.joubert@agr.ec.prov.gov.za	Advice for dam		
Water Supply and Reticulation	Ilse Viljoen	DWA Groundwater Division, East London		Boreholes and rehabilitation		
Water Supply and Reticulation	Siziwe Blie	Water Allocation Reform Institutional	BlieS@dwa.gov.za 043 701 0353 / 082 652 7983	Feasibilitiy Studies and funding for the dam		

CCA Plan	Name	Affiliation	Contact Details	Assistance Required	Contact Made	Feedback
		Establishment Proto CMA Directorate East London				
Water Supply and Reticulation; Soil Erosion	Dirk de Villiers	Regional Office of Agriculture , Queenstown	045 807 8000 Dirk.Devilliers@agri.ecprov.gov.za	Engineering support. Design of roads, bridges, dams etc. Support applications that have come through via their representative in the LM's.	Phoned 5 June 2013	Engineering support. Design of roads, bridges, dams etc. Support applications that have come through via their representative in the LM's. No budget for funding
Water Supply and Reticulation; Soil Erosion	Miss Ngeno	Department of Agriculture representative in Sakhisizwe Municipality. Tsengiwe Villagers Must work through her.	083 457 0020 / 045 931 1360	Rainwater harvesting and general advise		
Water Supply and Reticulation; Animal Grazing and Agriculture and Crop Cultivation	Mxolisi Luzombe	Extension Officer Cala	047 877 00451 uzombemxolisi@yahoo.com			
Water Supply and Reticulation; Animal Grazing and Agriculture and Crop Cultivation	Mzimasi Mthongana	Extension Officer Elliot	045 931 1054 tel 045 931 2087 fax mthonganam@webmail.co.za			
Water Supply and Reticulation; Animal Grazing Management; Soil Erosion	Yoliswa Bunu	Extension Officer Cradock	048 881 1211 tel 086 558 0760 fax			
Water Supply and Reticulation; Animal Grazing and Agriculture and Crop Cultivation	Mr Malgas	Extension Officer Tsengiwe Location	083 577 3685 malgasl@gmail.com	General Agricultural Advise	Phoned 5 June 2013	He goes to Tsengiwe village almost weekly and will assist if asked.
Water Supply and Reticulation	Nomalwanda Mbananga	Department of Environmental Affairs, Queenstown	083 981 6523	Funding for larger developments		
Water Supply and Reticulation; Animal Grazing and Agriculture and Crop Cultivation	Lyndon Mardon	DEAET	043 6057 128 Lyndon.mardon@deaet.ecape.gov.za	Economic development . Generql advise, funding and planning		
Water Supply and	Moppo Mene	Municipal Manager	045 808 4600 ndanyela@chrishanidm.gov.za	General Advice		

CCA Plan	Name	Affiliation	Contact Details	Assistance Required	Contact Made	Feedback
Reticulation; Animal Grazing Management; Soil Erosion		CHDM				
Water Supply and Reticulation	Masoka Zwelitsha	DWA East London	MasokaZ@dwa.gov.za 083 522 8395	Rainwater harvesting and general advise	Phoned 5 June 2013	Needs a letter endorsed by their councillor or Headman for the 33 JOJO tanks he has promised the village. Needs names and ID numbers of beneficiaries. Need to ensure that the list of beneficiaries complies with department requirements
Water Supply and Reticulation	Maduma Samuel	DWA Cradock	MadumaS@dwa.gov.za	Rainwater harvesting and general advise		
Water Supply and Reticulation	Cobus Ferreira	Control Engineering Technician (Hydrology) DWA	048 801 1300 tel 048 801 1307 tel 086 624 0352 fax 082 806 3622 cell	Advice on dam and licensing issues		
Water Supply and Reticulation; Animal Grazing and Agriculture and Crop Cultivation	Mr Malgas	Extension Officer Tsengiwe Location	083 577 3685	Rainwater harvesting and general advise		
Water Supply and Reticulation; Animal Grazing and Agriculture and Crop Cultivation	Dirk Versfeld	Natural Resources; cc Dirk Versfeld cc	082 377 4084 cell dirki@iafrica.co.za	General Advice		
Water Supply and Reticulation; Animal Grazing and Agriculture and Crop Cultivation	Mr Kutuka	Local farmer, acting as mentor to Headman's co-op venture	082 431 7963	General Advice		

Development Plan	Name	Affiliation	Contact Details	Assistance Required	Contact Made	Feedback
Water Supply and Reticulation	Lara Conde	WESSA	043 748 5798	Funding and or procedure for underground rainwater tanks	Phoned 5 June 2013	Will phone me back
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Water Supply and Reticulation; Animal Grazing and Agriculture and Crop Cultivation	Mr Kutuka	Local farmer, acting as mentor to Headman's co-op venture	082 431 7963	General Advice		

APPENDIX 3C: PROPOSALS FOR ADDITIONAL FUNDING

PROPOSAL TO WATER RESEARCH COMMISSION

PROPOSAL TO ADDRESS NEGATIVE PRACTICES AND OR LACK OF CAPACITY THAT COULD INHIBIT SUCCESSFUL DEVELOPMENT AND IMPLEMENTATION OF A CLIMATE CHANGE ADAPTATION PLAN TO BUILD WATER AND FOOD SECURITY IN TSENGIWE VILLAGES, CALA LOCAL MUNICIPALITY AND CHRIS HANI DISTRICT MUNICIPALITY.

Director: Jay Bhagwan

KSA: Water Use and Water Management

Thrust: Water Services

Cross Cutting Domain: Water and Society (Investigate Linkages between water and poverty and the role water can play in breaking the poverty cycle and promoting water/food security)

INTRODUCTION

Socio-economic inhibitors at individual, household and institutional level do impact negatively on initiatives to upgrade community. If the space is not open for these issues to be addressed overtly, initiatives to build and promote positive change are bedevilled.

WRC Study K5/1888 invested in establishing the risks to sustained and secure water supply in various contexts, one of these being a collection of rural villages (Tsengiwe) near the town of Cala in the Chris Hani municipality. Recently the DWA completed a study for all small towns and village clusters in the Eastern Cape to reconcile water supply and demand at municipal and village level. Both these studies identified individual and institutional failure as a significant risk to sustained water supply.

The former WRC study identified specific demographic and socio economic factors that exacerbate the situation in informal settlements, rural villages and townships. In Tsengiwe specifically, but also generic to other contexts, it was found that the high levels of poverty as a result of the high illiteracy (90%) and unemployment (80%) rates are a significant factor. This has led to many social problems including crime (such as theft, murder and rape), drug abuse, alcoholism, youth suicide, gender inequality and the rapid spread of HIV/AIDS.

Ineffective governance by local and regional leaders and limited service delivery in general also contribute to the problems experienced by the community. One of the main key issues identified by the local municipality is the dispersed settlement pattern of developed centres surrounded by scattered, underdeveloped rural villages, which makes providing access to basic infrastructure and services more costly, resulting in fragmented development (WRC 2011: iii).

In order for climate change adaptation strategies to be incorporated into the lives of the community, it is necessary that the negative impact of social issues in Tsengiwe be identified and addressed. Factors such as alcoholism, crime and drug and sexual abuse increase the community's perception of risk and for the project to effectively address climate change risk,

it must also engage with the social issues that may hinder the implementation of adaptation strategies. We believe that, because these factors have such a great impact on the lives (and livelihoods) of community members, it is imperative to foreground social risks in conjunction with climate change risks.

In the rural areas water supply and food security are closely related and are fundamental in building a platform for climate change adaptation which is the focus of the present WRC Study entitled 'Capacity Building for Climate Change Adaptation and Disaster Risk Reduction in Rural South African Communities: Tsengiwe, Eastern Cape'. This initiative to facilitate a community led Climate Change adaptation action plan arising out of a risk assessment based on community perceptions as well as expert opinion already highlights that adaptation strategies and the perception of climate change risk cannot function outside of a given social context and that addressing climate change involves a complex set of social, political and economic factors.

The project will therefore be concerned with identifying the 'community' – uncovering how members define themselves, what divisions may exist within a seemingly heterogeneous area and what critical social issues the members of the Tsengiwe community face that cannot be directly addressed in the present project. Opening the space for constructive dialogue around the negative practices that do inform risk perception but can impact negatively impact on correct identification of risk and possible strategies and actions to mitigate against this risk is in effect a risk management and risk reduction initiative for the project.

APPROACH

Developing an approach to integrate community perceptions of risk of Climate Change and issues impacting water and food security, communication of expert opinion and available data and information and institutional and resource constraints to realise a community led climate change adaptation plan (risk reduction initiative) that the community is empowered to implement is at the heart of the project's enquiry.

The project will therefore employ the method of Participatory Rural Appraisal (PRA) which seeks to identify risk factors as set out by community members instead of those presupposed by development practitioners and building on the experience gained in Community Led Total Sanitation (www.communityledtotalsanitation.org) projects and the Water Dialogues of South Africa (Galvin 2009) will adapt this approach using appropriate communication of data and information and feedback sessions that encourage a process of Review Reflect and Revise.

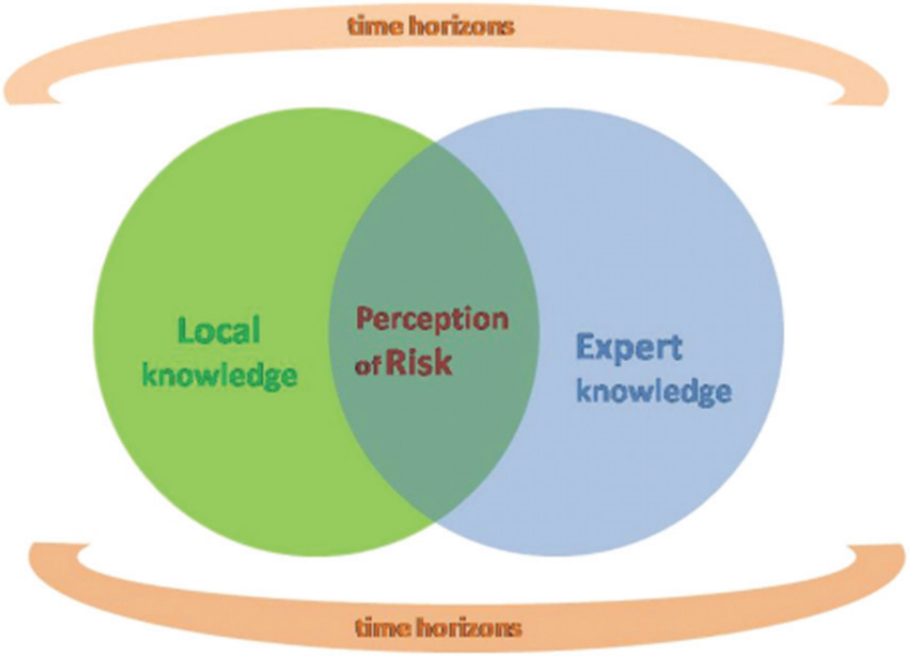


Figure 2: Perception of Risk

Figure 2 draws on Ogden and Inness' (2009) case study in the Southwest Yukon, Canada. It highlights that perception of risk is influenced by socio-economic circumstances and the impact of risk on immediate survival needs. The figure also illustrates the influence of time on risk perception, as time is related to the overcoming of challenges.

It is quite likely that the community will identify the negative social practices as a risk and will be correct in this regard. However in so far as they have a direct causal link to water services and security of supply it will not be easy to address on this project. However once identified it will be necessary to create a space wherein these risks associated with the context and very real experience of their lives can be considered and a community way forward to address them can be facilitated. This will minimise the negative impact on the study purpose and can be undertaken in parallel.

In 1998, David Mosse published an article on process-orientated approaches to development practice and social research. The article speaks to the value of monitoring the development process rather than following the usual causal links between inputs and outcomes. We propose that this method will be effective in addressing the risks posed by negative social practices and context, as process monitoring will allow space for special needs of the community to be considered in special focus groups at any stage without losing focus on the climate change and water services security purpose of the project.

There are existing Community Led initiatives, which will be engaged and coordinated with. The Masiphile Project, which supports victims of HIV/AIDS (WRC 2011: 34), and the Umngcunube Project, which employs young men to tend to the gardens of elderly citizens in the community are addressing and supporting community self-help and strengthening of social bonds that are breaking under the weight of poverty and disease.

The additional work will involve:

- Process monitoring – identifying and consequently interfacing with local CBOs and NGOs in order to ensure that special risk factors are addressed throughout the duration of the project.

- Organizing viewings of training material and facilitating “Special Risk Focus Groups” workshops that links material to the outcomes of the project to encourage cooperation between community members and the project.

- Filming “Special Risk Focus Groups” workshops and putting footage together in a presentable format, so that community members can access it and use it repeatedly.

- Using applicable footage as training material.

BUDGET

The funds for the project are very limited and do not support extended or in depth community interaction. Additional funds of R150 000/annum to support “Special Risk Focus Groups” would be appreciated. These funds will be used to coordinate with existing CBOs, identify specific capacity and empowerment requirements and action plans at LM and DM level in the departments of Water Services and Disaster Risk Management.

Funds will also be used to acquire hardware and software for preparation of additional video and training material that can be used during the project workshops thereby introducing the concept of Learning by Doing in the course of the project and we believe making it more acceptable to community and other parties that all workshops are filmed.

Deliverable	**Cost**	**Schedule**
Capacity building	R 39,880	31/06/2012
Workshop 1	R 16,200	31/08/2012
Workshop 2	R 16,200	30/09/2012
Workshop 3	R 16,200	31/10/2012
Workshop 4	R 16,200	30/11/2012
Process Monitoring	R 22,600	31/03/2012
Product		
Video documentation	R 26,500	31/03/2013
Total	**R 153,780**	

PROPOSAL TO DEVELOPMENT BANK OF SOUTHERN AFRICA (DBSA)

LETTER FROM COMMUNITY OF TSENGIWE VILLAGE

To Ms Julie Clarke

Drylands Fund Manager

Environmental Analyst

PIU Unit DBSA

juliec@dbsa.org

011-3133099; 0829094637

Our village of Tsengiwe comprises 600 households divided into two sub-village areas of Upper and Lower Tsengiwe, near Cala in the Eastern Cape Province. Our village is poor, eroded and badly overgrazed but we believe in its revival through our harnessing of the natural resources at our disposal. To do this we will need to bring in knowledge and some financial support. Together with a team from Umvoto Africa, and thanks to the Water Research Commission, we have identified the climate hazards we experience as Floods, Drought, Frost, Wind, and Fire and ways to address these hazards to reduce our vulnerability and increase our coping capacity. We have noted too that poor governance is a major constraint.

The village has significant communal grazing land that is ineffectively utilised, a catchment that results in flooding but could hold a small dam to be used either for irrigation or for household greening – with food security our objective. There are two Junior Secondary Schools, both of which could see much environmental improvement, offering great opportunities for gardening and greening projects. This would promote awareness and education in the upcoming future scholars.

We have established a Committee of Ten committed community members, comprising largely of the youth that wish to take development forward in the village. Our plans include securing the resources that, along with our own voluntary input, could bring about:

- Planning for grazing camps, with fencing and additional stock watering dams
- A small dam that will allow for either a cooperative irrigation scheme (on 5-10 hectares) or that will supply water to all individual household gardens
- Borehole rehabilitation and introduction of a water utilisation monitoring programme
- The planting of windbreaks and indigenous hedgerows
- The control of animals numbers and regulation of grazing so that grasses can recover and erosion be reduced.

- The active control of soil erosion – recognising that this starts at the head of the catchment and that surface runoff must be reduced. This to be tackled through the laying down of brushpacks, repairs to contours, the construction of swales, and microcatchments.

- The provision of safe drinking water to all inhabitants through the equitable sharing of available spring water, through the rehabilitation of old and non-functional boreholes, though an increase in roof rainwater harvesting, and through the introduction of rainwater harvesting tanks that can capture and utilise excess runoff for gardening. One suitable site for implementation of a large rainwater runoff tank has already been identified as the upper secondary junior school.

- The use of the schools as focal points for greening projects, with school gardening, runoff and water management, rainwater harvesting, composting, the planting of shade trees for children, solar water heating, the recycling of waste and many other strategies aimed at reducing our environmental footprint and building a cadre of environmental conscious school children.

- Improved food security at household level by providing secure water for food gardening, but also by increasing the range of species and varieties of food crops available, along with improved seed, previously unavailable to villagers. Simple and inexpensive technologies such as composting, permaculture, and the use of vermiculture have already been introduced to us and form part of our strategy. So, too, improved crop farming technologies based on then principles of ecological agriculture, diversification and better management of our household fruit trees.

The planning we have done in seeking improved resilience to the vagaries of the weather and the longer-term impacts of climate change have been thought through with low cost and physical and financial sustainability in mind. We have already started the process of drawing upon available government support: for example we will be requesting a feasibility study and ultimately DWA resources in the construction of a village dam that will contain some of the wet season flooding and provide for dry season irrigation; DWA will also be approached for the supply of additional rainwater harvesting tanks (particularly roof water) and the Department of Rural Development and Land Reform for support with grazing camps.

However there is much that we will be unable to achieve without additional resourcing. As community we are seriously lacking in knowledge capacity and will be seeking training. We need a communications and resource centre, or at least to build on the services already provided by the Masiphile Community Project. Already a recent visit by 15 community members to the Three Crowns and Mbewula schools piloting alternative energy and water management, have been greatly inspiring to those afforded the opportunity to attend.

In addition to the above there are many activities that will need support. Starting to list these:

- Schools greening – from waste management to school gardening projects. Rainwater harvesting tanks, composting, shade and fruit trees, are among the introductions we would like to achieve.

- Household fencing, hedgerows and windbreaks.

- Water distribution – especially if water is to be distributed to individual's households for food gardening.

- Planning and capacity building.

- Erosion control programme.

- Woodlots and agroforestry.

- The clearing of invasive alien plants – lapesi and black wattle

- Introduction of energy efficient stoves, sunboxes and hayboxes (noting the severe lack of fuel in our neighbourhood).

- Reductions to animal numbers so that sustainable stocking rates can be achieved – and recognising the difficulties here in the face increasing population pressure.

- And very much more …

We, the villagers of Tsengiwe request that the Drylands Fund support our endeavours to establish a green and sustainable village in line with our vision that Tsengiwe becomes THE development village in the Sakhisizwe Local Municipality and that village greening and resultant improved livelihoods are such that it becomes a tourist attraction as a model village – also winning national and international competitions for its progress in becoming a sustainable green village.

For this we estimate that we need between R5 million and R10 million in financial support over the next three years. More information can be provided should you be willing to entertain this request.

Sincerely

HEADMAN – Benedict Masela

WATER AND GREENING STEERING COMMITTEE co-chairpersons, Chris Ncoko and Pat MaKOHLISO

SCHOOL GREENING – TSENGIWE (LOWER SCHOOL)

The Lower Secondary Junior School has only one tap – behind the school buildings.

Six large (20 000 l) Water Tanks were installed 'years ago' but taps and piping for distribution were never fitted. Some of the guttering connecting pipes was either not installed or has since broken. There is a seventh water tank lying smashed up on the trash heap.

There is a relatively new pit-toilet block quite a long way from the school buildings.

There is a large and very neat vegetable garden (with two large old pear trees) below the school. The gardener is Sibusiso Ncoko. This garden provides food for the school children. Sibusiso claims to have grown fine onions, lots of potatoes, and that the children 'eat spinach on a Wednesday'.

The school is fenced with a normal height and rather ragged fence (probably enough to keep animals out).

There is a rubbish pit to one side that takes all rubbish (which is burnt) including compostables.

There is a very large heap of junk – mostly the metal frames of old desks, and some corrugated sheeting.

The 'playground area comprises only open space, with no shade. There was once a swing, and a few tyres were planted into the ground near the entrance gate.

The classrooms (where the team held a workshop in 2012) are in very very poor condition, lacking much of the needed furniture. Many windows in the upper of the two school blocks are broken. The team did not have access to the school grounds on this occasion and all observations are made from outside the fence and in discussion with community members familiar with the school including gardener Sibusiso.

Five trees were planted in a line along the fence flanking the entrance gate (possibly Erythrina caffra). These are either dead or only a few centimetres high, choked by grasses.

Suggestions

1. Improve the perimeter fence.

2. Complete installation of the water tanks, and reticulate this water to different parts of the school, such as toilets (handwashing) and garden.

3. Water supply: This could come from (a) more piped water (b) Borehole with playpump or hand pump (There is an old rotary (Cemo) hand pump in an open field about 100m outside the school grounds. This did not appear to lift water.

4. Provide water to the toilets with hand washing facilities (the recycling system observed at Three Crowns was favoured but these are not septic tanks).

5. Provide a "hot-water snake" for hand washing

6. Home-made solar water heaters could be installed

7. Sell the unsightly and dangerous piles of scrap

8. Start a compost heap for all vegetable waste. A wizard worm farm should be started as part of the composting process

9. Build a greenhouse for garden seedlings

10. Plant shade trees – this requires:

    a) choosing the right trees

    b) planting in large well-prepared pits with compost

c) fencing each tree until it has grown

d) regular watering

11. Permaculture garden. Cardboard and waste paper from the school can be used (Victoria has some experience of permaculture and could help with this)

12. Runoff from the grounds can be direct to the trees (micro-catchments, use runoff from the road by directing it to the trees.

Training / capacity building/ guidelines

The gardener (Sibusiso) needs training in order to support implementation of the above (tree planting, managing water runoff, permaculture, composting, etc.).

Funding

Very little funding is required to achieve all of the above. R20 000 in seed funding could see this school transformed, with a willing community behind it.

The community made it clear that the process must start with consultations with the school principal and school governing board.

SCHOOL GREENING – TSENGIWE UPPER (PAKAMANI) SCHOOL

(Grade R to Grade 9) >100 children

Most of the schools seem to go only to Grade 9. Where are the High Schools? 9 km to high school.

Victoria particularly wanted the team to visit this school, as a contrast to the school in middle Tsengiwe, and also as she is on the School Governing Board of this upper school.

The reason for keeping the Lower school open is given as being that in the rainy season the river (from the small catchment in which the village dam is proposed) is often impassable and children cannot reach the other school. This seems a very weak reason (improve the bridge – which would in any event greatly reduce overall village vulnerability) but also suggests that there is a lot of water from the catchment that could supply the village dam (noting that here are no measurements of these flows).

The school

- Good building infrastructure
- Six water tanks in the courtyard are the primary source of water. Roofing and guttering new and all in good condition.
- Only one tap outside in the schoolyard
- A large toilet block with VIPs. Many of the rotators have been damaged (wind!) and some tops of the black tanks have been lost. There is clearly a maintenance issue as some of these rotators could probably be repaired in-house or within the village.

- The Toilets have no water, so no hand washing for the children. Apparently there were basins but water has never been connected.

- Excellent drainage off the roof – In the courtyard to water tanks and outside to a good concrete drainage system leading, from both school blocks, to the field below. Given the moderate slope this would provide an excellent opportunity for a rainwater harvesting tank. There is suitable ground for a large garden that could be watered by this tank.

- The school courtyard is also concreted – which will generate significant runoff that could be led to a RWH tank.

- The school has excellent fencing and the land below the school building is well grassed – an indication of protection from grazing.

- There are no trees within the school grounds

- There are no playground toys – swings or anything else.

- There is Eskom power past the school and the building has been wired – but apparently not connected.

Suggestions

1. Discuss plans with the principal and SGB

2. Improved piped water supply to the school. With the village borehole rehabilitated there should be more than enough water, but the school should be prioritised anyway.

3. Borehole and play-pump (or hand-pump) as an alternative or additional water supply.

4. Tap for the basins / sinks connected with a greywater outlet that leads to a vegetable garden.

5. Layout of a vegetable garden below the school.

6. Construction of underground rainwater harvesting tank that takes all storm water from the building and terrain – for use in the vegetable garden. Approach DWA for implementation.

7. Compost heap for vegetable garden.

8. Establishment of shade trees (see suggestions for lower school).

9. Preparation of a maintenance plan with local maintenance for tanks, taps, VIPs, etc.

APPENDIX 3D: COMMUNICATION AND TRAINING TOOLS

RISK GAME (RISKOPOLY)

RISKOPOLY – RULE AND INSTRUCTIONS FOR THE GAME

Players: In general there is no limit to the number of people that can play Risk Reduction. If there are only a few people available to act as facilitators and/ or bankers, players can form teams of four or five individuals.
Set up: Each player receives R100 in paper money and a village scene place mat. The banker(s) has eight sets of cards representing different items for purchase and a list of the items and their costs. The facilitator has a die. Each number on the die symbolises either a particular hazard or a nice season.

Items and Costs:

- Rainwater Tank: R60
- Labour Erosion Control: R40
- Frost Cover: R30
- Frost-friendly Crops: R20
- Goat: R20
- Regular Crops: R10
- Chicken: R10
- Fertilizer: R10

Rules:
There are three hazards to prepare for: drought, frost and heavy rains/ storms.

- To prepare for **DROUGHT** players need a Rainwater tank. If they do not have a Rainwater tank and the die rolls on drought (1, 2) they will lose all regular crops, all frost-friendly crops, one fertilizer and one goat.
- To prepare for **FROST** players need frost friendly crops and a frost cover. If they do not have frost friendly crops and the die rolls on frost (3), they lose one fertilizer and one chicken. If they do not have a frost cover and the die rolls 3, they lose all regular crops and one fertilizer.
- To prepare for **HEAVY RAINS** players need to have the labour for erosion control card. If the die rolls on heavy rains (4, 5), and they do not have labour for erosion control they will lose all regular crops, all frost friendly crops, one chicken and one fertilizer.

Play:

- Each player/ team is given an opportunity to purchase items with their R100 from the banker
- Players do not need to spend all of their R100
- Players can partner with other players to double their funds

- When buying is complete the facilitator rolls the die and players are notified which hazard event has taken place
- The facilitator takes away any items that players have lost
- Players must have at least one crop and one livestock to feed their families. If they do not have this at the end of the round, they will have to sell one of their items in exchange for a crop, goat or chicken
- Every three rounds, players are given an opportunity to buy and sell items with the banker
- At the end of the game, players cash in their items with the banker. Whoever has the most money at the end wins.

APPENDIX 4

RISK ASSESSMENT

TABLE OF CONTENTS

APPENDIX 4A: COPING CAPACITY DATA

There is a clinic in the village, built in 2004. The clinic provides school health services – immunization and vitamins, as well as discussions on the health risks of sexually transmitted diseases and the importance of family planning. According to Nurse Nqobo (pers. Comm. 2010), teenage girls are encouraged to come to clinic for birth control (pill or injection) and many come on the weekends to seek more information. The clinic also does outreach Upper Tsengiwe and Manznana – visiting elderly people once a month in each location. Overall the clinic sees around 200 people a month, mainly elderly women. Patients that cannot be treated at the clinic are referred to Cala hospital and HIV/ AIDS patients are referred to the hospital also. According to Nurse Nqobo at the Tsengiwe clinic (pers. comm, September 2010), the clinic treats a dysentery case approximately once a month usually derived from children playing in the river. Most children are immunized and are registered at the clinic which distributes immunization cards. The clinic does a follow up when immunization is due. The clinic conducts campaigns on measles and polio, and has initiated a Chronic Disease Support Group (hypertension, diabetes, epilepsy, TB). The clinic also has a vegetable garden project (a patch of land dedicated to growing vegetables for the elderly and the families of approximately 50 volunteers that participate). The village has no emergencies services, but does deliver babies and undertakes post natal care.

Despite the clinic's important role, many youth and members of the community do not take full advantage of its services and allegations are made that the clinic managers are negative and do not show up regularly. The clinic is supposed to provide the following services:

- Health education
- Ante and post natal care and delivery
- Immunization of children
- Testing for HIV
- Diagnosis and treatment of TB
- Family planning
- Treatment of sexually transmitted infections
- Screening for cancer – pap smear
- Treatment for minor and chronic ailments and referrals.

The clinic is short staffed since it has only two nurses and one visiting doctor and therefore does not provide all of these services regularly.

COMMUNITY PROJECTS

One of the advantages of using the area of Tsengiwe for a pilot study are the grass roots initiatives underway which are underpinned by on-going studies initiated by the University of Fort Hare (UFH) as well as the government project called Umngcunube.

Umngcunube is reinstating vegetable gardens and community members are encouraged to use their gardens.

The Masiphile Project is a community and church supported, multi-disciplinary social upliftment project (see 753 more details). The project was founded by community member Dr Nomfundo Lily-Rose Mlisa, a former nurse and trained clinical psychologist who is currently the Director of Counselling Services at Fort Hare University and a church leader in Tsengiwe Village. The operation of the Masiphile Project in Upper and Lower Tsengiwe Village demonstrates the impact a small community run project can have in mitigating the impacts of hazards for vulnerable community members.

The project focuses on the support and upliftment of people infected and affected by HIV/AIDS (Mlisa, 2009). They intervene to mitigate the effects of HIV/ AIDS and drought on vulnerable people (elderly, orphans) through the provision of vitamins and food programmes as well as aiming to reduce the stigma around HIV/ AIDS. The project undertakes the development of community awareness campaigns and education around HIV/AIDS, crime, gender issues, alternative positive living, drug abuse and teenage pregnancy. Volunteers from the University of Fort Hare have provided training on home based care and have started a sewing group for ladies to earn extra income as well as a children's choir. They also invest in building longer term coping capacity by assisting vulnerable children with purchasing their uniforms and providing a daily meal to support school attendance, also mitigating short term vulnerability issues such as food insecurity and malnutrition. Food is grown communally by the Masiphile project and distributed. The project also makes an effort to bring water to vulnerable villagers by going to people with tanks and asking them for assistance.

The Masiphile project is currently run by a small group of women from Tsengiwe Village. The project is registered with the Department of Social Development, Eastern Cape and has received funding since 2005. The project started receiving funding in 2010 from the Integrated Development Department of the Sakhisizwe municipality. Masiphile serves as an outreach project for placement of intern students under the Student Counselling Unit at UFH. In 2012 Dr Nomfundo Mlisa introduced a three year National Research Fund & Department of Science and Technology research project called Traditional Health Practitioners in Transition. Through this project an existing Memorandum of Understanding (MoU) with traditional leaders aims to secure partnership with the community. This MoU integrates and represents the community and local headman, which is vital for the acceptance of the project amongst all villagers. The research project is a collaborative effort that includes the UFH, Rhodes University and Umvoto Africa. The research team includes postgraduate students conducting various studies.

In 2013 the Masiphile building became a centre for community development resources and a central meeting point for development committees. This is the first step in the project's goal to establish a 'one-stop' multi-disciplinary research and health centre. The Masiphile project is important in dealing the with long-term causes of vulnerability (education) as well as shorter term causes (food

insecurity and malnutrition) as well as mitigating the effects of HIV/ AIDS and drought on vulnerable people (elderly, orphans) through the provision of vitamins and food programmes. Although the health workers and volunteers are not all well-educated, they have a passion and dedication to servicing the community. During periods of drought or high unemployment such projects increase the coping capacity of those most vulnerable in the village (the elderly, sick, and orphaned). These strong community based initiatives have had a common purpose with this study, namely building community resilience. They have provided contacts and increased likelihood of support within the community for this project. The existence of such projects in other villages is likely to increase the potential for implementation of the approach and will support and encourage cooperation and participation by the LM and DM who are responsible for Water Services, Disaster Management as well as Rural Development.

APPENDIX 4B: VULNERABILITY DATA

The settlement of Tsengiwe has a very high percentage population of children and young people (< 20 years old) on the one hand, and elderly people on the other. The most economically active segment of the population (20-45 years) comprises only 30% of the population, which is hardly surprising given the lack of local employment opportunities (see IDP DATE). In Cala, only 10% of people have competed secondary school, while 34% have some secondary education. Only 13% have Grade 12 and higher, and 2.5% have tertiary education (SOURCE).

At Cala High School, out of approximately 500 students, at least ten girls become pregnant each year (although they do usually manage to finish school), and around 20 students drop out each year (usually in grade ten) (pers comm. 2010). Out of the graduating class of 2009, only two students went on to tertiary education – one girl and one boy, both doing a BSc. The school provides transport for students form the village. There is some career planning and an exhibition by the District Educational Office was held in 2010 to give students an introduction to accessing funding. However, there are limited vocational training opportunities available for students – those that can go to the Queenstown technical college. Most students end up unemployed after high school.

Many people in the area live in poverty as a result of the high illiteracy (90%) and unemployment (80%) rates (Umvoto, 2011). There is no nearby industrial area, and a large percentage of men that worked in mines in Gauteng have been retrenched since 1999. This has led to many social problems including the rapid spread of HIV/AIDS, crime (such as theft, murder and rape), and drug abuse, alcoholism, and gender inequality and youth suicide. The unemployment rate in the Sakhisizwe LM is 24% (IDP). The Cala urban area has an unemployment rate of 34% and the village areas are estimated to have an unemployment rate as high as 80%. Most people go to other provinces such as Gauteng, the Western Cape and Free State to get jobs. Apart from a few stores selling basic grocery items and alcohol, and agricultural activities, there is little sign of any other economic activity in this area. Improvements in Tsengiwe Village are delayed by the limited service delivery systems by the Sakhisizwe LM. The old age pension and child grants help to sustain people and approximately 20% of people rely on these social grants as their primary source of income for themselves and those in their care (Saleni, 2010).

Households in Tsengiwe depend on small crop gardens and the husbandry of domestic livestock. Although 45% of residents are dependent on farming and livestock production for survival, a lack of fencing has resulted in over grazing and people can no longer afford to re-fence. The lack of carrying capacity of the land is compounded by periodic drought and a lack of appropriate water supply and conservation. Few households make their own compost and many villagers complained about a lack of access to seedlings. Appropriate training from extension officers was considered poor and in some instances was non-existent. There is potential for maize farming along the banks of the Tsomo River but the maize-fields that once thrived have not been ploughed for years.

Many residents in Cala are malnourished. There is a high prevalence of TB and HIV/ AIDS and the traditional stigma attached to HIV/ AIDS hampers the halting of the transmission of the virus. It is estimated by the workers at the Masiphile project that 50% of Cala residents have HIV/ AIDS, approximately 60-70% of whom are young parents. Elderly women are usually left to look after children who have lost parents due to AIDS. The elderly are at risk of crimes by youth gangs in the village, stealing their livestock or vandalizing their homes for example. The HIV/AIDS infection is a serious issue in the community and risk of infection is

increased because of crime patterns and generally weakened immune systems associated with food insecurity and the social and health ailments of alcoholism. HIV/Aids is a complex disaster warranting more in-depth study but is not as directly related to water supply and sanitation infrastructure and the management of water and food insecurity which formed the focus of this study in context of climate change.

There is a headman living in the lower part of the village. The headman is supposed to provide general management and governance for the community, but the upper part of the village is led by a group of 13 village members calling themselves 'Committee of Thirteen'. This creates tensions in the management of the village and power struggles between the two parties affect developmental progress in the village. However, the locals are aware of how to manage this and most of the time consultations are made with the headman, which strategy has shown the best results. Village governance is also confused by political structures. The ANC, PAC, COPE, etc. are all present in the community. The ANC is the dominant party and at times other political organizations are not given a chance in the decision making processes. Churches have good social relationships with the community, but they are not popular in managing political situations. Given this relatively complex hierarchy, governance is viewed as a critical risk area.

APPENDIX 4C: COMMUNITY HAZARD PERCEPTION

COMMUNITY HAZARD PERCEPTION AND RANKING

COMMUNITY-BASED HAZARD PERCEPTION

It is noted that the concept of Hazard is conflated with the concept of Risk by the Community. The distinction was not addressed in the workshop. It is easier to demonstrate through Climate Change Adaptation activities because the hydro-meteorological hazard will persist but the adaptation activities will reduce impact i.e. the risk will be reduced. It is the "Demonstrate Don't Debate" Approach to risk reduction or alternatively "Catalyse Risk Reduction" Activities and Let Common Sense Insight into Concepts of Risk prevail.

For example, the community ranked Flooding as second in the Hazard rating. Site inspection however suggests that the perception of floods as a Risk arises from the vulnerabilities created by land degradation at community scale and land use practice at a household scale.

Given the increased variability and likely intensity of rainfall events it is possible that localised sheet flooding could increase while the village continues to remain invulnerable to regional scale floods (being situated well above the flood plain of the Tsomo River).

Analysis of flood risk could be used to question this perception and illustrate or assist to identify contribution of vulnerability factors that cause the local flooding. Insight into, combined with demonstration of how to reduce the vulnerability factors changes the perception of a risk to insight into what causes vulnerability and demonstration of improving Coping Capacity.

COMMUNITY HAZARD RANKING

Table 1: Summary of Hazard and Relative Rank

Hazard	Ranking	Can take a hand in dealing with this ourselves	Need help (govt and/or NGO	We cannot do anything about this
Social breakdown	*****	**	*	/
Institutional / Governance failure	*****	*	*	/
Land degradation	****	**	*	/
Climate Change	****	/	/	*
Water Pollution	**	*	*	/
Air Pollution[1]	*	*	*	/
Food security[2]		*	**	/

[1] *Household smoke noted as being a major problem*

[2] *Food Security is an overarching and consequential hazard*

Factors which comprise the compound Hazard of Climate Change and Land degradation were considered further by the workshop participants.

Table 2: Summary Ranking of Natural Hazards Comprising [1]Climate Change

Natural Hazard	Ranking
Droughts	******
Floods	*****
Hail	****
Wind	***
Frost	**
Fire	*

[1]*Climate Change here includes normal climate / weather factor. Consensus was that "Climate change" and influencing factors listed under climate change were out of peoples' hands – but that they could do something about many of the consequences of Climate Change.*

Table 3: Summary Ranking of Factors Comprising Land Degradation

Factor	Ranking
Soil erosion	***
Invasive Plants	**
Vegetation change[1]	*

[1] *Vegetation change refers to loss of species due to degraded land /* climate change

PROBLEM/ EFFECT SUMMARIES

In order to unpack some of the challenges that the community face, certain elements of the identified projects were considered using a Problem-Solution Tree approach. The problems/ effects are identified in the tables below. Solutions are explored in the following section.

Table 4: Summary of challenges relating to water perceived/experienced as reducing village coping capacity and or increase vulnerability

Water (Problems)	Water (Effects)
Shortage of water	There is less water / no water Cannot put out fires No irrigation
Lack of water from source (Streams / groundwater)	Cannot make bricks / cannot build
Less effective rainfall	Cannot plough and plant with the rains
We waste water (leave taps open, no reuse of water, broken pipes)	
Stormwater ./ meandering water	Erosion (gabions needed)
Not enough dams for stock watering	Difficulty with livestock watering
Generator failure (groundwater pumps)	Cannot pump from boreholes
Water pollution – Dirty drinking water	Diseases
Floods	Houses damaged Drowning Livestock washed away
Saline groundwater	
Hail	
No infrastructure – pipes for homes and to irrigate land	Personal hygiene ; cooking

Table 5: Summary of challenges relating to land that are perceived/experienced as reducing village coping capacity and or increase vulnerability

Land(Causes)	Land (Effects)
Not enough land	Changing land use – conflict for land
Land lost to settlement	Not enough land
Infertile soils	Less production
Shrub invasion (Lapesi)	Impacts on land, grazing, water
Drought	
Soil erosion	Exposes soil
No fencing	Cannot manage grazing
No implements – tractors, discs Lack of seed, fertiliser, weed killer	Cannot farm to extend our economy
No draft animals	Not enough animals for ploughing
Improper demarcation of land	
Shortage of water for farming / No irrigation	
Fire at the wrong time	Fire destroys grazing Fire poses a danger to livestock

Table 6: Summary of Hazards relating to Climate Change and possible or experienced impacts of these

Climate Change	Effects
Weather – inconsistent: hot, cold, windy	Impacts on rainfall Climate change affects farming
Drought for ¾ of the year	Climate change is too much as the years go by
Seasonal uncertainty	
Drought	Climate Change causes drought
No local measurement (rain / temp)	Lack of measure measurement means we do not have insight into what is happening
Low rainfall	Vegetation changes due to changing climate (loss of species)
Variation in temperature (hotter and colder)	Medicinal plants lost
Frost damage	Edible plants lost
High temperatures	Healthy food sources lost
Windy days out of season	Poisonous shrubs
Intense rain when ploughing, then absence in the growing season	Wattle is a problem
Rain in winter instead of summer	Changing vegetation uses water
Wind during autumn also causing changes	

Table 7: Summary of Capacity limits and Vulnerabilities arising

Capacity Problems and Causes	Vulnerability (Effects)
No knowledge in farming (of how to use the land)	People don't talk to each other No coordination of activities
Lack skills in irrigation	
Projects fail to bring training with them	
Impractical and irrelevant training	
Lack of teamwork	
We are irresponsible	
No framework for action (i.e. for things to do)	We do anything and everything in an unplanned way
Lack of planning We don't set targets Do not focus Don't have money	Unstructured and unplanned activity
No cash	

INITIAL COMMUNITY CLIMATE CHAGNE ADAPATION PLANS

The hazard rankings conducted by the community were taken further into discussions around actions that could be carried out by the local municipality and community members, and those actions that were necessary but would need the support of "outsiders" – be this through planning, direct government intervention or funding. These are summarised in the tables below. There remained a strong element of dependency on funding and external support but there were also many actions as possible to undertake from within.

Table 8: Summary of initial Climate Change Adaptation Plan

Action	Can address	Need help	No can do
Development projects e.g. Bricks, aquaculture, biofuels		*	/
Reduce degradation and improve the land. Soil erosion Invasive plants Bring back biodiversity	*	/	/
Food security through: Food gardens Fruit trees	*	/	/
Agriculture: Improve farming through Crop selection Fencing Irrigation	/	 * * *	/
Stock farming (Cattle, sheep, goats) – Stock improvements and improved Management of stock	*	*	/
Fencing	/	*	/
Forestry / agroforestry (need for skills development)		*	/
Firewood production	*	/	/
Charcoal manufacture	/	*	/

Table 9: Summary of Climate Change Adaptation Plans related to Water

Action	Can address	Need help	No can do
Jo Jo Tanks	*	*	/
Underground Tanks (Rainwater Harvesting)	/	*	/
Groundwater Boreholes (wind, electricity, solar)	/	 *	/
Catchment dam	/	*	/
Pump on Tsomo R.	/	*	/
Increase infiltration – stopping runoff and erosion by constructing micro-catchments	*	*	/
Water reuse / recycling (less wastage)	*	/	/

Table 10: Summary of Climate Change Adaptation Plans to address soil erosion and land degradation so as to improve vegetation cover and infiltration

Action	Can address ourselves	Need help	No can do
Stock management	*	*	/
Clearing invasive (Lapesi – ***Euryops Pyroides***, wattle)	*	*	/
Fix contours	*		/
New contours	/	*	/
Stock farming – Stock improvements and improved Management of stock	*	*	/
Donga repair and preventing new dongas from forming	*	*	/
Constructing micro-catchments Adding more contours closer to settlement houses. Improving grass cover through water management.	*	*	/
Fire management (requires a change in attitude and cooperation)	*	/	/

APPENDIX 4D: GUIDLINE TO MAINSTREAMING RISK ASSESSMENT AND DISASTER RISK REDUCTION AT VILLAGE AND HOUSEHOLD LEVEL

INTODUCTION

The UN/ISDR website (http://www.unisdr.org/we/inform/terminology#letter-r) states the following: “Risk is the combination of the probability of an event and its negative consequences.”

The UN/ISDR website succinctly summarises the popular and technical use of the word “risk”. It states that “in popular usage the emphasis is placed on the concept of chance or possibility, as in “the risk of an accident”; whereas in technical settings the emphasis is usually placed on the consequences, in terms of “potential losses” for some particular cause, place and period.”

The website also notes that people do not necessarily share the same perceptions of the significance and underlying causes of different risks. Unpacking these differences and agreeing on the significance or prioritisation of risk in the technical sense and on the factors that contribute to increasing or decreasing the risk is an important element of risk assessment. In this study the UNISDR definition is used.

The aims of developing a common understanding and definition of risk, in any particular setting, as well as consistent use of terminology, is to support a common understanding of, and a coherent approach to, risk reduction activities. That said it is also essential to mainstreaming processes and frameworks dealing with the management of risk and suggests that development of any “sector-specific standards, guides, procedures and codes of practice relating to the management of risk” must start with mainstreaming understanding of the hazards and household and community factors that contribute to exposure to the risk.

The difference between risk perception and risk assessment at community level is explored through combining knowledge and a data dependent approach to hazard analysis and comparing that with the hazard identification and prioritization agreed upon by villagers in participatory workshops. Thus risk assessment and mainstreaming disaster risk reduction becomes a combined guideline.

It is anticipated that this approach will support motivation for a programme of activities that can be undertaken by villagers, in cooperation with the Local Municipality, the combined results of which is to reduce the vulnerabilities and proactively increase the coping capacities to hydro-meteorological hazards identified by the community.

This guideline to mainstreaming risk assessment and disaster risk reduction starts by defining the risk equation. It then goes on to outline the practices and processes involved in conducting a risk assessment. It makes continual reference to the case study of the village of Tsengiwe in the Chris Hani District Municipality, Eastern Cape conducted by Umvoto Africa, drawing on the Africon (now Aurecon) Chris Hani Disaster Risk Assessment (2009). The report concludes by outlining and reflecting on the key issues that require consideration when mainstreaming risk assessment and disaster risk reduction at village level.

DEFINING THE RISK EQUATION

For both the specialist informed and community based risk assessments, the risk of each household or village to each specific hazard can be determined by using the classic risk equation, where:

Risk (R) = (Hazard (H) x Vulnerability (V)) / Coping Capacity (C).

A hazard in the most general sense is defined as 'a potentially damaging physical event, phenomenon or human activity, which may cause loss of life or injury, property damage, social and economic disruption or environmental degradation' (UN/ISDR, 2004). There is a distinction between "natural hazards", of hydrometerological, geological or biological origin, and "technological hazards", associated with "technological or industrial accidents, infrastructure failure or certain human activities which may cause loss of life or injury, property damage, social and economic disruption or environmental degradation" (UN/ISDR, 2004). Environmental degradation, in this context, means "processes induced by human behaviour and activities (sometimes combined with natural hazards) that damage the natural resource base or adversely alter natural processes and ecosystems'. Figure 1 below defines the Hazard Classifications as outlined by the UN/ISDR.

Vulnerability can be defined as the degree to which people, property, natural resources, systems, and prevailing cultural, economic, environmental, and social activities and conditions are susceptible to harm, degradation, or destruction from a specified hazard within a specified future time period.

Coping capacity defines the resilience (both internal and external) a community, area or object has to a disaster or specific hazard i.e. to what extent will an area/community/object be affected by and how long it will take to recover from a disaster/hazard event. Each area/object can be given a coping capacity score for each hazard, based on identified local coping capacity features (e.g. financial resources, education, beliefs), or the implementation of the various stages of the Hyogo Framework for Action (HFA): Priorities for Action (UN/ISDR, 2005). The HFA priority areas strive to reduce the impact of disasters through gender sensitive disaster preparedness and risk reduction i.e. by increasing the coping capacity. It will be released at the next WCDR 2015 with a focus on building resilience to disasters (http://wcdr2015.net/about).

Risk refers to the combined susceptibility (i.e. degree of coping capacity) and vulnerability of the community to potential damage caused by a particular hazard, and is therefore rooted in conditions of physical, social, economic and environmental vulnerability that need to be assessed and managed on a continuing basis. For example, risk to a low-moderate severity/probability hazard might be very high, due to an extremely vulnerable community/environment with little internal or external coping capacities (such as the devastation caused by the 2010 Haiti magnitude-7 earthquake), and vice versa (e.g. 8 magnitude earthquakes causing relatively little damage in Japan). These processes of risk assessment are intended to lead to the application of risk-reduction measures, which may include environmental management and the protection and upgrade of critical facilities, both of which are highly relevant to the terms of the present study.

HAZARD

A potentially damaging physical event, phenomenon or human activity, which may cause the loss of life or injury, property damage, social and economic disruption or environmental degradation.

NATURAL HAZARDS

Natural processes or phenomena occurring in the biosphere that may constitute a damaging event. Natural hazards can be classified according to their geological, hydrometeorological or biological origins.

ORIGIN	PHENOMENA / EXAMPLES
Hydrometeorological hazards Natural processes or phenomena of atmospheric, hydrological or oceanographic nature.	• Floods, debris and mudflows • Tropical cyclones, storm surges, wind, rain and other severe storms, blizzards, lightning • Drought, desertification, wildland fires, temperature extremes, sand or dust storms • Permafrost, snow avalanches
Geological hazards Natural earth processes or phenomena that include processes of endogenous origin or tectonic or exogenous origin, such as mass movements.	• Earthquakes, tsunamis • Volcanic activity and emissions • Mass movements, landslides, rockslides, liquefaction, sub-marine slides • Surface collapse, geological fault activity
Biological hazards Processes of organic origin or those conveyed by biological vectors, including exposure to pathogenic micro-organisms, toxins and bioactive substances.	• Outbreaks of epidemic diseases, plant or animal contagion and extensive infestations

TECHNOLOGICAL HAZARDS

Danger associated with technological or industrial accidents, infrastructure failures or certain human activities which may cause the loss of life or injury, property damage, social and economic disruption or environmental degradation, sometimes referred to as anthropogenic hazards. Examples include industrial pollution, nuclear release and radioactivity, toxic waste, dam failure, transport, industrial or technological accidents (explosions, fires, spills).

ENVIRONMENTAL DEGRADATION

Processes induced by human behaviour and activities (sometimes combined with natural hazards) that damage the natural resource base or adversely alter natural processes or ecosystems. Potential effects are varied and may contribute to an increase in vulnerability and the frequency and intensity of natural hazards. Examples include land degradation, deforestation, desertification, wildland fires, loss of biodiversity, land, water and air pollution, climate change, sea level rise and ozone depletion.

Figure 1: Hazard classification (from UN-ISDR, 2004, Table 2.1).

PROCESS AND PRACTICE

Units of Assessment

The first step in the risk assessment methodology is the identification of the spatial elements, or units, within which risk to specific hazards can be identified. It is important to identify the units to be assessed as studies can be done across a wide range of scales including; individual, household, village, municipal, provincial and national levels. This risk assessment guideline focuses on the evaluation of risk at a household and village level. The process of analysis and manner in which these assessments are carried out also requires definition. This guideline promotes the use of both specialist informed and community led approaches.

It is speculated that there can be a different outcome if risk is evaluated at individual household level (with the sum of households comprising the village), or if risk of various hazards is evaluated at village level as a whole.

Tsengiwe Case Study

The risk assessment units chosen for this case study are therefore twofold: (i) households, and (ii) village clusters (as defined in the DWA All Towns study) at the larger scale. The Chris Hani District Municipality (DM) disaster risk assessment (Africon, 2009) used local municipalities as their unit of assessment, which affected the hazard types identified for the assessment, as well as the scale of vulnerability and coping capacity, and hence risk. The risk assessment done at this scale informs the perception of risk at DM and local municipality (LM) level, and will also inform prioritization and roll out of risk reduction activities by local government.

The Chris Hani DM disaster risk assessment identified a range of hazards for the whole DM, based on workshops within each LM (Africon, 2009). These included hydrometeorological hazards (drought, strong winds/tornadoes, floods, fire, hail, severe storms, lightning, snow), biological hazards (animal disease, swine fever, HIV/AIDS, cholera and tuberculosis) and environmental hazards (soil erosion and land degradation). Only snow and strong winds/tornadoes were identified as hazards within Ward 4 of Sakhisizwe LM (within which Tsengiwe falls). This is in contrast to the hazards identified in the Tsengiwe community workshop for this project (see Table 1) which includes drought, flooding, snow, frost extreme weather events and fire. Thus indicating the importance of scale of assessment and who is interviewed during project workshops.

The Identification of Hazards, Vulnerabilities and Coping Capacities

Various hazards, vulnerabilities and coping capacities need to be identified by the stakeholders and actors that will be involved in and be affected by the risk assessment. These identifications and understandings can be obtained through meetings/workshops organized with stakeholders and actors in individual groups and/or collectively.

Tsengiwe Case Study

In the case of Tsengiwe a workshop was conducted in June 2012 with the village community (see Table 1 for results). Thereafter there was a meeting with the water services sector in the LM and Chris Hani DM as well as Department of Water Affairs, and the Provincial Department of Environment and Tourism, Department of Economic Development. The Traditional Authority was invited but did not attend. The workshop was, however, well attended by community members who had been present at the community workshop. The community output was presented to these parties and further discussed by authorities and community.

Table 1 Climate change hazards, and associated vulnerabilities and coping capacities for Tsengiwe.

Hazards	Vulnerabilities	Coping Capacities
• Droughts • Flooding • Snow and frost • Extreme weather events (hail, lightning etc.) • Fire	• Social breakdown • Institutional/governance a) failure • Land degradation	• Improved food security • Development projects • Alternative and additional water supplies (dams, rainwater harvesting, groundwater, water reuse etc.) • Sustainable agricultural practices

Scoring Hazard

Community based hazard identification and scoring can be difficult, as risk and hazard are often conflated. It is thus recommended that the process is kept simple and understanding of risk and hazard be communicated through the use of games. This community based perception of hazards and their severity forms the basis of further analysis.

Specialist based hazard scores for each household and village as a whole can be calculated by determining the severity and probability of each specific hazard. Severity and Probability are both given a score out of 5, with the equation:

Hazard (H) = (Probability (P) + Severity (S)) / 2

This calculates a final hazard score out of 5. This portion of the risk assessment would be specialist informed, with the probability and severity rankings being based on collected scientific data.

Tsengiwe Case Study
The community-based participatory hazard identification was simplified, with the community identifying the specific hazards they felt vulnerable to, and ranked them using an increasing hazard score of 1 to 5. Results from the 12 July 2012 Sakhisizwe workshop show the community rating drought (hazard score of 5) and flooding (hazard score of 4) as their highest hazard in the area, followed by extreme weather events (hail and strong winds, hazard score of 3), frost and snow (hazard score of 2) and fire (hazard score of 1).

Specialist based hazard scores calculated using severity and probability attained from a number of related indicators are summarized in Table 2.

Table 2: Table of the Hazards to be Evaluated and Quantified

Hazard	Probability	Severity Components	Comment	Score
Drought	The probability is implied in the definition of the severity components	Dry Spell Duration	90th percentile annual maximum dry spell during the summer rainfall months between October and March	5.0
		Dry Year Severity	Ratio of 10th percentile of annual precipitation to Mean Annual Precipitation (MAP)	3.0
Extreme Heat	The probability is implied in the definition of the severity components	Duration	90th percentile of the no. of consecutive days when temperature > 32˚C	1.67-2.33
		Monthly max temperature	90th percentile of max temperature in a given month	
		Month of occurrence	The manifestation of a heat event in relation to the season	
Frost	Frequency of occurrence	Duration	An increase in the duration of the number of days of frost increases the hazard, as crops become increasingly exposed and susceptible to damage. (BOM 2007). Human health may be put at risk by continued periods of sub-0 temperatures.	2-3.7
		Months of occurrence	The seasonality of frost risk	
			The number of days of potential frost occurrences in any given month.	
Floods, Hail, Wind, Fire	Not analysed			

Scoring Vulnerability

The specialist vulnerability assessment should be conducted for each household and village as a whole. The data can be used to assess five vulnerability components, namely family type, health, food security, access to water services and land security (see Table 3). Each of these components should be scored out of 5, with each component then added together and divided by 5 to get a normalized final vulnerability score out of 5. As in the process of scoring hazards this specialist based vulnerability assessment should also take into consideration community based perceptions of vulnerability.

Table 3 Suggested **ranking and scoring methodology for evaluating household and village vulnerability**.

Score	Family Type	Health	Food Security	Access to Water Services	Land Security
1	Nuclear and extended family	Generally healthy, access to clinic	Animal stock, food gardens and fruit trees, with assured water supply	WSA in-house tap and flush sanitation	Full rights to >50% productive landscape
2	Nuclear family	Generally healthy, limited access to clinics	Established food garden and fruit trees, some stock, with limited water storage on-site	Access to WSA water tankers and unmanaged pit latrine	Full rights to <50% productive landscape
3	Single female parent and elderly headed household	Health vulnearble, limited access to clinics	Fruit trees and seasonal planting/stock	Rainwater tank-yard tap and managed pit latrine toilet	Limited to <50% productive landscape
4	Elderly female headed household with children	HIV/AIDS, limited to no access to clinics or social services	Seasonal planting, no water storage or stock	WSA village communal pump and unmanaged pit latrine	No secure land ownership
5	Child headed household	HIV/AIDS and or drug addiction/alcoholism, no access to clinics or social services	No stock/no garden/no fruit trees	Must walk >2 km for water and poor/none sanitation	No land ownership or access

Tsengiwe Case Study

The specialist informed vulnerability assessment was proposed to be conducted for each household and village as a whole using (so far as possible) data collected by a NRF funded study undertaken by UFH. Unfortunately this data was insufficient.

Results from the 12 July 2012 Sakhisizwe community workshop (where a range of vulnerabilities were highlighted), were proposed to be used to determine a community-based score for vulnerability. However due to the lack of data, time and financial constraints this was not able to be done.

The Chris Hani DM disaster risk assessment (Africon, 2009), a broader scope and more generalised vulnerability assessment, was used. It focused on regional societal, economic, environmental and critical facility vulnerability instead of household or village specific vulnerabilities. These regional vulnerability components were scored either as 1 (not vulnerable), 2 (vulnerable) and 3 (extremely vulnerable), and then added together to get a final vulnerability score ranging from 4 to 12 which was converted into a score of 5.

Scoring Coping Capacity

The specialist informed coping capacity assessment for each household was determined by scoring three components out of 5, namely financial resources, education and skills, and belonging/beliefs and traditional knowledge (see Table 4). Each of these component scores was then added together and divided by 3, in order to get a normalized final coping capacity score out of 5. The coping capacity of each village was calculated differently (due to village links to the larger ward, local municipality and district municipality structures), based on the implementation of the various stages of the HFA: Priorities for Action. The HFA priority areas strive to reduce the impact of disasters through gender sensitive disaster preparedness and risk reduction i.e. by increasing the coping capacity (see Appendix 4D). Each HFA priority area can be given a score out of 5, depending on whether there is none to very limited implementation (1), limited implementation (2), partially implemented (3), mainly implemented (4) and fully implemented (5). The final village coping capacity is then calculated using the equation: C = (HFA1 + HFA2 + HFA3 + HFA4 + HFA5) / 5. Community based input on coping capacities is again advised to complement and inform specialist based coping capacity assessment.

Table 4 Suggested **ranking and scoring methodology for evaluating household and village coping capacity.**

Score	Financial Resources	Education and Skills	Belonging, Beliefs and Traditional Knowledge
1	Hand to mouth	Illiterate and unskilled	Alienated from all family and community (social dysfunction issues - drugs, alcohol etc.)
2	Informal sector activities	Basic literate / numerical / artisan skills	Alienated from extended family, strong close family bond
3	Informal sector activities and grants	Primary school / artisan skills	Extended family bond, traditional/church beliefs
4	Informal sector activities, grants and remittances	High school / specialist skills	Extended family bond and active participant in community structures
5	Formal sector employment in addition to one or more of the above	University	Leaders in community structures, church, traditional beliefs, strong family bonds and aspirations

Tsengiwe Case Study

Results from the 12 July 2012 Sakhisizwe community workshop (where a range of coping capacities were highlighted), were proposed to be used to determine a community-based score for coping capacity. However time and financial constraints meant this was not possible and the Chris Hani DM disaster risk assessment's (Africon, 2009) calculation a "manageability" factor (which is similar to the HFAs) was used. It scored the following components as either 1 (poor), 2 (modest) or 3 (good): awareness, legislative framework, early warning systems, government response, government resources, existing risk reduction measures, public participation measures and municipal management capabilities. These components were then summed, resulting in a final manageability score ranging from 6 to 18 which was converted into a score of 5.

Using the Risk Equation

The risk equation of R = H x V / C shows that coping capacity has a significant influence on the final risk assessment, and hence the importance in developing coping capacity mechanisms to deal with disasters in order to reduce the final risk (see Table 5 & 6) e.g. even if a specific village cluster or household had the highest H x V ranking possible of 25, a coping capacity of 5 would reduce the risk of the village or household to that hazard or possible disaster to 5 (moderate risk).

Table 5 and villages. **Suggested risk scoring methodology for evaluating households**

Score	Risk Ranking
0-1.5	Very Low
1.50-3	Low
3.0-6	Moderate
6.0-15	High
15.0-25	Very High

Table 6 **Risk matrix for evaluating households and villages, based on the hazard and vulnerability score (H x V) and coping capacity score.**

		Coping Capacity (C)				
		1	2	3	4	5
Hazard x Vulnerability (H x V)	1	1.0	0.5	0.3	0.3	0.2
	2	2.0	1.0	0.7	0.5	0.4
	3	3.0	1.5	1.0	0.8	0.6
	4	4.0	2.0	1.3	1.0	0.8
	5	5.0	2.5	1.7	1.3	1.0
	6	6.0	3.0	2.0	1.5	1.2
	8	8.0	4.0	2.7	2.0	1.6
	9	9.0	4.5	3.0	2.3	1.8
	10	10.0	5.0	3.3	2.5	2.0
	12	12.0	6.0	4.0	3.0	2.4
	15	15.0	7.5	5.0	3.8	3.0
	16	16.0	8.0	5.3	4.0	3.2
	20	20.0	10.0	6.7	5.0	4.0
	25	25.0	12.5	8.3	6.3	5.0

Risk can be calculated for both household and village levels for each hazard, using the assessment process described above. This “risk reality” can then be compared to the community-based risk assessment results (or “risk perception”), using information and data collected during community workshops. These specialist informed and community-based risk assessments can be compared and contrasted with the results from the 2009 Chris Hani DM disaster risk assessment (and the current update), in order to determine the effects of assessment scale will have on the production of community and local government disaster risk reduction programmes, guidelines and recommendations.

Where risk perception and specialist informed risk assessment (“reality”) between all stakeholders differs, opportunities and process to align them to achieve the common purpose of effective and timeous risk reduction or mitigation will be suggested.

KEY ISSUES TO CONSIDER

This methodology aims to highlight the influence of scale at which a risk assessment is undertaken, the consequent influence of data input and approach to the risk assessment, and to illustrate how these inform risk perception (rightly or wrongly). Buy-in to risk reduction activities requires that, so far as possible, risk perception and risk assessment are aligned and agreed upon (during and/or after due process) between government levels (traditional and local) and the rural population. Where these cannot be aligned, opportunities to support/catalyse householders to focus on family or local community-based organisations/institution led risk reduction can be identified on the basis of local scale semi-quantitative risk assessment results.

The disaster risk assessment undertaken by the Chris Hani District Municipality (DM) used local municipalities as the unit of assessment, which influenced the hazard types identified for the assessment as well as the vulnerability and coping capacity, and hence risk assessment. The risk assessment done at this scale informs the perception of risk at DM and local LM level, and will also inform prioritization and roll-out of risk reduction activities by local government. If the perception of risk and evaluation of risk at village level is different, it will probably be difficult to motivate community self-help and contribution to disaster risk reduction or climate change adaptation activities. Building a culture of Self-Help and Contribution is essential to community resilience.

This report aims therefore to illustrate the need for communities to be supported to undertake their own risk assessment and using these, to engage proactively with government structures, NGOs and other, in planning and undertaking community led risk reduction activities. It also aims to illustrate the importance of communities to query their own perception of risk and vulnerability and the contribution that informed hazard analysis makes to design of appropriate risk reduction climate change adaptation programmes.

It is noted that the concept of hazard can be conflated with the concept of risk by the community. The distinction was not addressed in the workshop. It is easier to demonstrate through Climate Change Adaptation activities because the hydro-meteorological hazard will persist but the adaptation activities will reduce impact i.e. the risk will be reduced. It is the “demonstrate don’t debate” approach to risk reduction or alternatively “catalyse risk reduction” activities and let common sense insight into concepts of risk prevail. The use of the Riskopoly game (see Appendix 3D) was essential to Umvoto’s strategy in dealing with the conflation of the concepts of risks and hazards

Consistent use of terminology and understanding thereof make a difference to buy-in to activities associated with Climate Change Adaptation. There needs to be a clear distinction between activities designed to reduce vulnerability or to increase coping capacity after the impact of an event versus those designed to reduce probability of event occurring.

It is easier to motivate to reduce vulnerability to, or increase coping capacity for, a hazard that is expected to occur (e.g., drought) than it is to motivate to reduce risks associated with a hazard that may occur or is known to occur very seldom. In other words, it is easier to persuade people to mitigate low impact, frequent events than it is to motivate people about mitigation of high- to moderate-impact, low- to medium-frequency events. Even more challenging are the very-low frequency, very-high impact events. One of the challenges of Climate Change Adaptation is that the pattern of hazards is evolving; the threat of high-impact events has increased and a pattern of events has become less predictable. Thus managing this threat becomes increasingly important and mainstreaming risk assessment and disaster risk reduction at village and household level is an important strategy to be considered in this management.

APPENDIX 4E: HYGO FRAMEWORK OF ACTION PRIORITY AREAS

HFA Priority Areas	Core Tasks for Disaster Risk Reduction	Key Indicators for Tsengiwe, Sakhisizwe LM and Chris Hani DM
HFA 1 Making Disaster Risk a Priority	Engage in multi-stakeholder dialogue to establish foundations	Legal framework exists with explicit responsibilities defined for all levels
	Create or strengthen mechanisms for systematic coordination	Local and regional multi-stakeholder platform
	Assess and develop institutional basis	LM and DM policy framework exists that requires plans and activities at all levels
	Prioritise and allocate appropriate resources	Dedicated adequate resources to implement plans at all levels
HFA 2 Improving Risk Information and Early Warning	Establish an initiative for country wide risk assessments (RA)	Local and regional RA based on H and V info/data and include RA for key sectors
	Review availability of risk related info and capacities for data collection and use	Systems are in place to monitor, archive and disseminate data on H and V
	Assess capacities and strengthen early warning	Early warning in place for all major hazards
	Develop communication and dissemination mechanisms	Early warnings reach and serve people at community level
HFA 3 Building a culture of safety and resilience	Develop a programme to raise awareness	Local and regional awareness strategy exists that reaches all communities and people of all education
	Include disaster risk reduction (DRR) in education system and research community	School curricula at all levels includes DRR elements and instructors are trained in DRR at all levels
	Develop DRR training for key sectors	DRR training is included in all forms of work induction
	Enhance the compilation, dissemination and use of DRR info	Community-based DRR booklets and pamphlets are developed
HFA 4 Reducing the Risks in Key Sectors	Environment: DRR is incorporated into environmental and natural resource management	Environmental protection and natural resource management and climate change policies include DRR elements
	Social needs: establish mechanisms for increased resilience of the poor and most vulnerable	Specific policies and plans are implemented to reduce vulnerability of impoverished groups

HFA Priority Areas	Core Tasks for Disaster Risk Reduction	Key Indicators for Tsengiwe, Sakhisizwe LM and Chris Hani DM
	Physical planning: establish measures to incorporate DRR in urban and land use planning	Land-use development zoning, plans and building codes exist, include DRR elements and are strongly enforced
	Structures: strengthen mechanisms for improved building safety and protection of critical facilities	Long term local and regional programmes to protect schools, health facilities and critical infrastructure from common natural hazards. Procedure in place to assess the DRR implications of major infrastructure project proposals
	Financial/economic instruments: create opportunities for Private sector involvement in DRR	Stimulate DRR activities in production and service sector
	Disaster Recovery: develop a recovery planning process that includes DRR	Recovery procedures incorporate DRR during training and documentation
HFA 5 Strengthen Preparedness for Response	Develop a common understanding and activities to support preparedness	Disaster preparedness and contingency plans at all levels with regular training drills and rehearsals to test and develop disaster preparedness and response (DP&R)
	Assess preparedness, capacities and readiness	Independent assessments done and responsibilities for implementing recommendations and resources schedule assigned
	Strengthen planning and programming for response, recovery and review	All organisations, personnel and volunteers responsible for maintaining preparedness are equipped and trained for effective DP&R
		Financial and contingency mechanisms are in place to support effective response and recovery
	Review D&PR and DRR programmes	Procedures are in place to document experience during hazard events and disasters and to undertake post event reviews

APPENDIX 5

CLIMATE CHANGE ADAPTION PLANS

TABLE OF CONTENTS

APPENDIX 5A: WATER SUPPLY AND RETICULATION DEVELOPMENT PLAN

DEVELOPMENT PLAN FOR WATER SUPPLY & RETICULATION

SITUATIONAL ANALYSIS

The Cala area has a temperate inland climate with an annual average rainfall of 495 mm. Rainfall is highly seasonal with only 110 mm in the winter months of April to September and Tsengiwe Village is particularly vulnerable to seasonal drought. Climate change is noticeable in a shift from summer dominated rainfall towards more autumnal rains over the recent years; this is often associated by episodic downpour events. The shift of the wet growing season into a colder temperature regime has placed demands on summer crop selection and created an agricultural drought condition. The situation is further exacerbated by poor water infrastructure and a lack of municipal services. During periods of low water supply the municipality is meant to deliver water tanks to the village. They do not have enough trucks to match the demand and often renege on their duties to deliver, unless paid by a particular household. There is one stock watering dam that services Upper and Lower Tsengiwe but more are necessary for the amount of livestock in Tsengiwe.

Upper Tsengiwe has a spring with one reservoir and community taps located at every 200-500 metres, as well as illegal connections between the taps and houses. There is some upslope water harvesting being done to supplement this spring. There are also smaller springs which have been privately tapped and serve a few private connections. There is a small capped spring with low yield that is added to the main spring. There are several private boreholes that have never had pumps fitted. There is one borehole with a hand pump close to the Tsengiwe Junior Secondary School, however it is unknown if it works or not. The old dam in Upper Tsengiwe has not been functional for approximately 50 years. It is located in the primary upstream catchment and was previously used to irrigate vegetable gardens. A failed dam also exists in the secondary upstream catchment (on the Ncoko farm project). There is also a non-functional reservoir borehole which was once pumped using a windmill. Few households have rain water harvesting tanks, largely due to cost, although most households have recognized the value of having a tank.

In Lower Tsengiwe there is one reservoir and functional borehole with a diesel pump. There is also one non-functional reservoir and borehole. There is one cooperative irrigation scheme (an estimated 5 hectares) with water pumped out of the Tsomo River, funded by the National Development Agency. This is led by the Village Headman and approximately 15 male and female farmers from the village.

KEY GOALS

Key goals for a better water supply include:

- Installation of rainwater tanks for all eligible households.
- Maintenance of existing water infrastructure: Replace or rehabilitate pipelines, non-functional boreholes and reservoirs, provide for village level irrigation with the favoured option being a dam in the catchment area above the village.
- The development of additional stock watering dams, in association with the Development Plan for Animal Grazing Management.
- Instil a culture of household recycling of grey water.

Table 1: Task Group for Water Supply and Reticulation

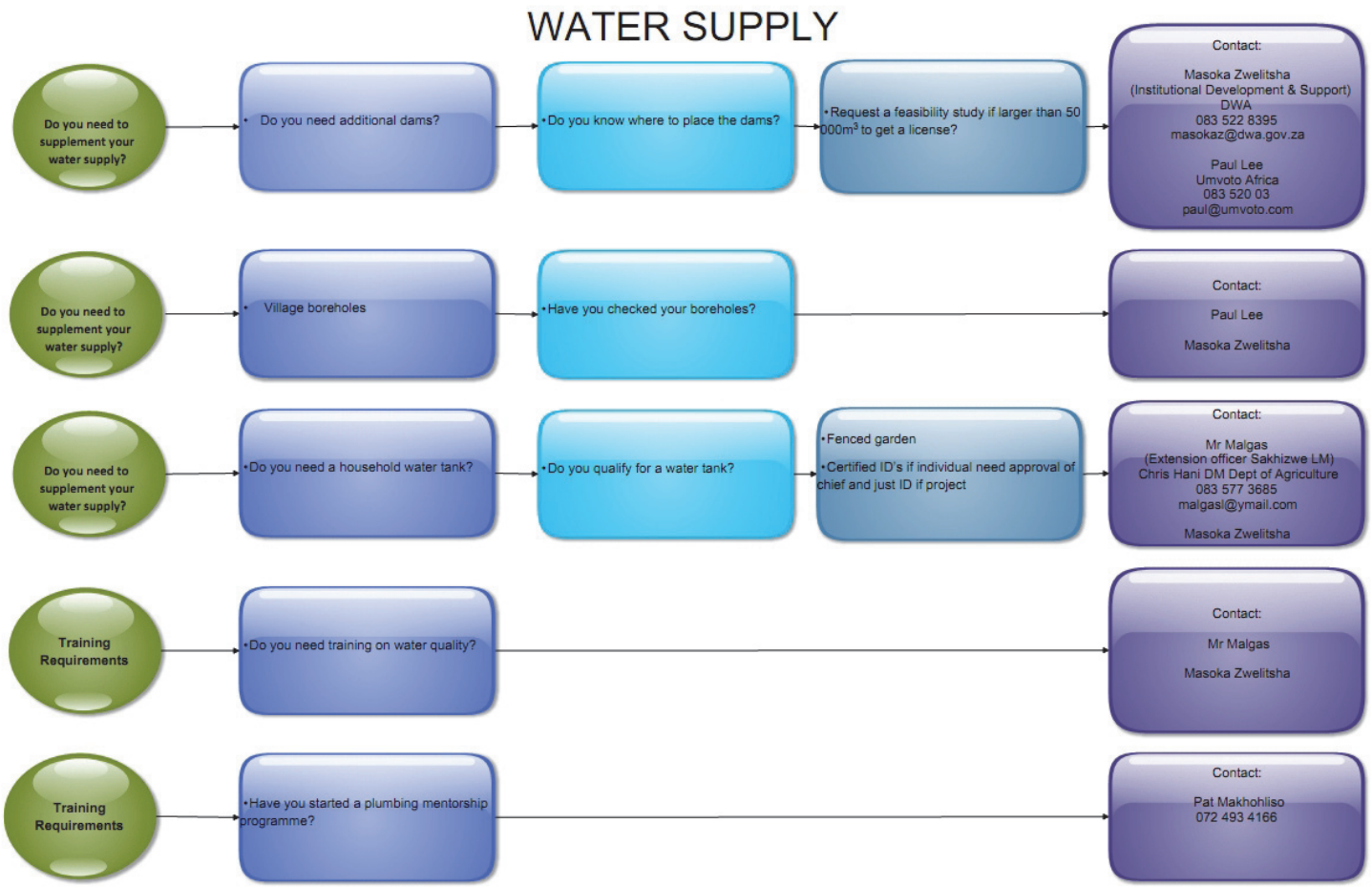
Leaders	Sibusiso Ncoko	060 471 6394
	Chris Ncoko	072 580 7022
Sub Leaders	Asendiswa Ndamane	073 999 8220
	Sanele Liwani	073 219 1475
	Mpumezi Ntsume	081 059 6182
	Timothy Tyelaphantsi	073 427 6296
	Luphumzo Dasheka	079 659 6313
	Njabulo Matshotyana	073 692 2228

Table 2: Action Plan for Water Supply and Reticulation (May 2013)

Plan	Action	Responsibility
Audit of households needing rainwater tanks	• Criteria for need (Umvoto to find out) • Committee to follow up with criteria and do audit of households in village • How many Rainwater tanks are there in the village? / How many households need Rainwater tanks? • Will people given Rainwater tanks put up gardens?	Umvoto Committee
EDUCATION on: **-Rainwater tank** **-Water quality** **-Water infrastructure maintenance** **-Recycling of grey water**	• During audit of Rainwater tanks, can also give education to people who have tanks. A form of inspection • Are there filters to clean roof? • Is the water they are drinking in good condition? Filtered, boiled? • When something goes wrong is there somebody to fix it and are there spare parts? • Group going to households for rainwater tanks should have a checklist for Committee to go from house to house • Taught about grey water (dishes) • Taught about water quality • What quality assurance does Rainwater provide for rural villages? • What is available and where can you get it? • Committee to train youth in plumbing – mentorship programme	Water Committee Committee start and Umvoto to update checklist Umvoto Committee and youth
Boreholes	• Committee will keep attention on public boreholes (eleven private, two public) • How many boreholes? • State of order – what repairs needed? • Are there hand pumps or treddle pumps needed? • Umvoto to send checklist for sate of assessment	Committee Umvoto
Village Stock Dams	• Four stock water dams for upper and lower Tsengiwe (we need three more) • Committee to decide where dams need to be • Draw map and send to Cape Town – where do you want dams positioned? • Umvoto to get dam off the group (meetings in Sakhisizwe, draw up maps, start conversation with DWA and DM)	 Committee Committee Umvoto

APPENDIX 5B:

WATER SUPPLY AND RETICULATION FLOW CHART



APPENDIX 5C:

LAND DEGRADATION AND SOIL EROSION DEVELOPMENT PLAN

DEVELOPMENT PLAN FOR LAND DEGRADATION AND SOIL EROSION

SITUATIONAL ANALYSIS

Erosion in Tsengiwe has affected the roads, grazing fields and pathways. The roads do not have a channeling system for water and during periods of heavy rain pathways around the village are often blocked. There are dongas throughout the village and little erosion control mechanisms. Rocks that have been placed in dongas for erosion control are sometimes removed for building houses.

KEY GOALS

Crowning all is the process of developing plans and gaining assistance at municipal and government level in land care and environmental management. Other key goals with regards to land degradation and soil erosion include:

- Advocating at the municipal level for the improvement of roads, dongas, swales and contours
- Planting hedges as wind breaks
- Household erosion control and water channelling.
- Gaining assistance and training for dealing with invasive alien species
- Identifying effective species for pioneer grass cover.

Table 3: Task Group for Land Degradation and Soil Erosion

Leaders	Pat Makohliso	072 493 4166
	Yonela Nkxoyi	084 436 6905
Sub Leaders	Luvuyo Matshotyana	
	Lelethu Zayedwa	658 9120

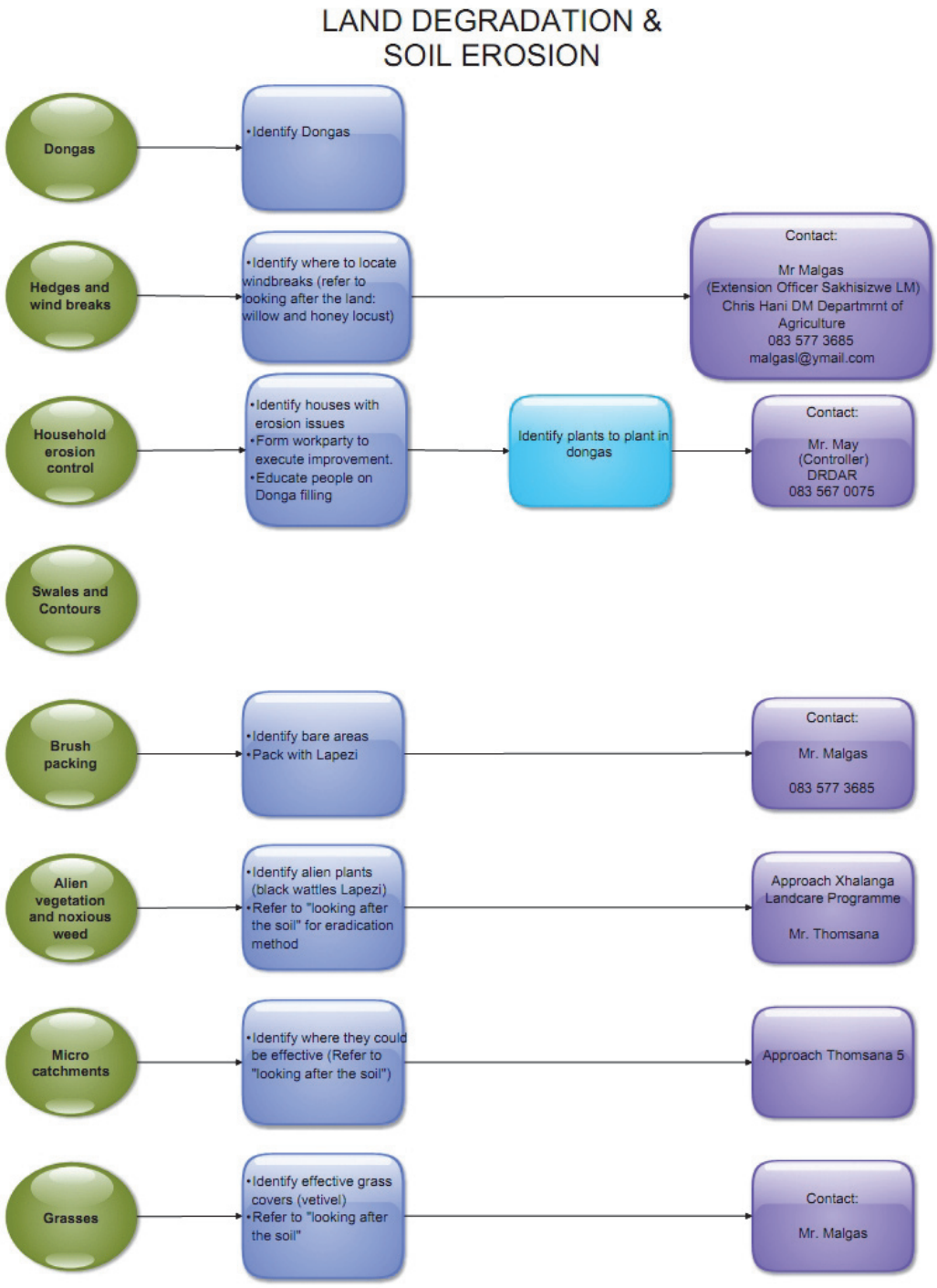
Table 4: Action Plan for Land Degradation and Soil Erosion (May 2013)

Plan	Action	Responsibility
Roads	• Inventory of major erosion on roads/ map • Appeal to Headman and councilor to pressure municipality/ DPW • Sensitize the municipality/ Department of Public Works to situation • Follow up that formal request • Which roads are responsibility of Public Works and which secondary roads are not? Does village take self-responsibility?	Committee
Dongas	• Identify major dongas and what causes those dongas • Approach counselor to work with municipality to do gabion intervention • Highlight houses which have erosion	Committee
Hedges/ wind breaks	• Find place – where to create a wind break • Speak to Department of Agriculture Extension Officer about appropriate trees • Dirk Versfeld to offer information • Kei Apple Tree – indigenous tree (?), eucalyptus and pine (?)	Committee Umvoto to facilitate link to village
Household erosion control	• Do a census of houses – what is the situation with household driveways, tracks and paths? Where are the critical areas? • Form a works party to execute improvements and educate households • Educate people on taking stones from erosion control • Channel water off driveways, paths and tracks • Aloes (and inedible plants) can be planted in erosion gullies/ areas • What training is available at municipal level to educate and train a village representative in land care/ erosion control?	Committee Umvoto to find out about Aloes or other species Umvoto
Swales/ Contours	• Putting in more contours • Training • Maintaining/ repairing existing contours • Do we need to do a survey of the situation regarding contours? • Approach Headman/ councilors on getting in touch with Department of Public Works	Umvoto
Brush packing	• Identify and brush pack bare areas • Research the use of lapesi in brush packing • Training in brush packing	Umvoto and Committee Umvoto Umvoto to facilitate links with appropriate trainers
Lapesi and black wattle	• Control further spread of invasive alien plants • Look at methods such as ring-barking • Training	Committee Umvoto Umvoto facilitate

Plan	Action	Responsibility
Micro-catchments	• Identify where these would be effective • Design and training	Umvoto
Grasses	• Identify effective grass covers • Interaction between grazing and erosion	Committee

APPENDIX 5D:

LAND DEGRADATION AND SOIL EROSION FLOW CHART



APPENDIX 5E:

AGRICULTURE AND CROP CULTIVATION DEVELOPMENT PLAN

DEVELOPMENT PLAN FOR AGRICULTURE & CROP CULTIVATION

SITUATIONAL ANALYSIS

Households in Tsengiwe depend on small crop gardens and the husbandry of domestic livestock. Subsistence farming is a struggle, due to a lack of water, lack of fencing, over grazing of livestock and dependence on the unpredictability of weather. Few households make their own compost and many villagers have also complained about a lack of access to seedlings. Appropriate training from extensional officers is poor and in some instances non-existent. There are two major community garden projects. Pakamani School and the Medical Clinic also have gardens.

KEY GOALS

Key goals at village level are to:

- Establish a Co-Operative
- Establish a Community Resource Centre.to centralise agricultural and livestock production with the specific goal of moving beyond subsistence and into cash farming through the development of irrigated and dry land agriculture methodology.
- At household level, the Development Plan aims to establish rainwater harvesting, household composting and household vegetable gardens.

Table 5: Task Group for Agriculture and Crop Cultivation

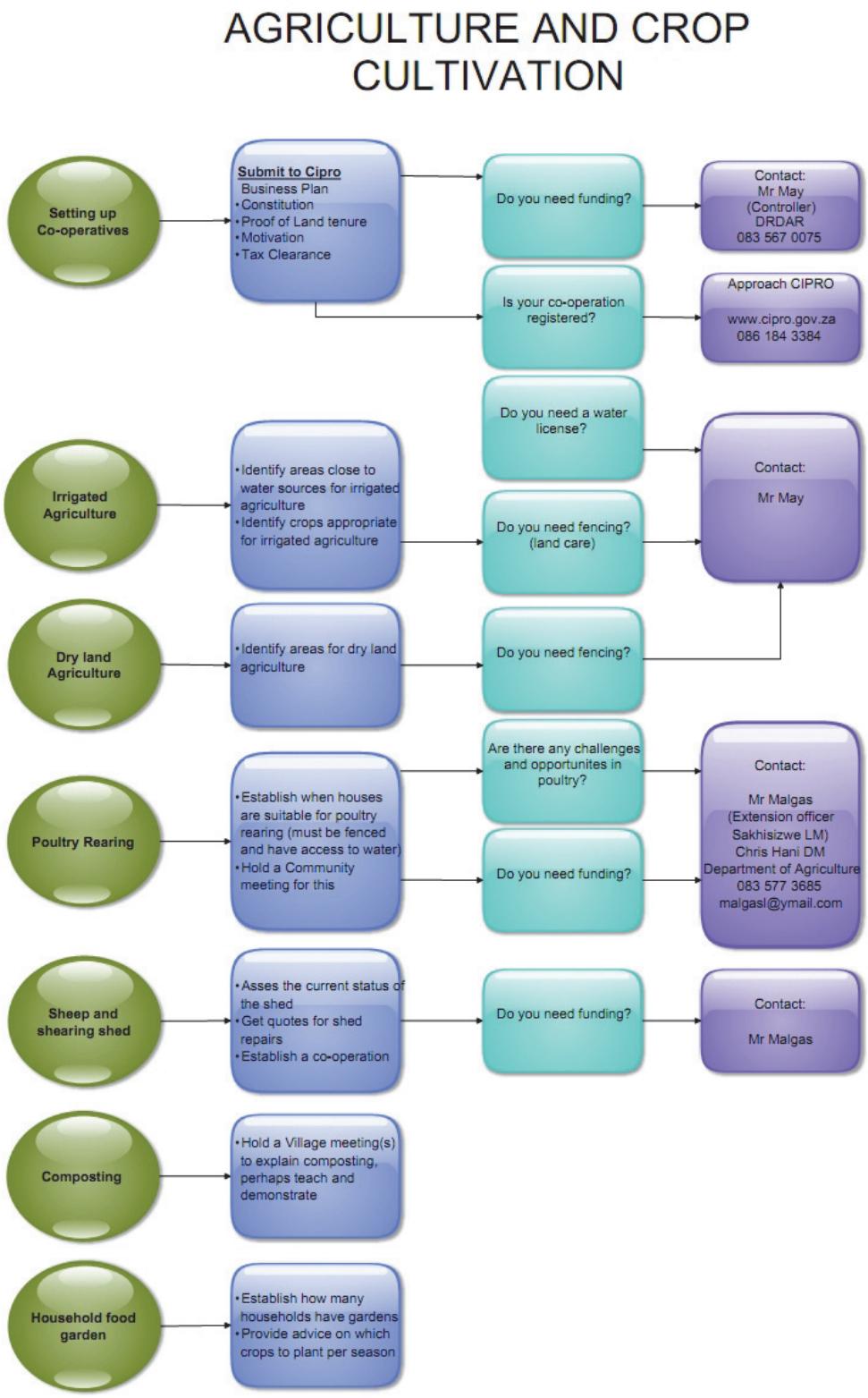
Leaders	Asaphiwe Dube	073 185 9706
	Unathi Mtuleni	073 215 5570
	Bongiwe Nyovane	083 464 2076
	Victor Matshotyana	
	ZaneleTomsana	073 068 0424
	Pat Makohliso	
Sub Leaders	Asaphiwe Dube	
	Maria Cudaka	071 730 6311
	Fungiwe Dube	

Table 6: Action Plan for Agriculture and Crop Cultivation (May 2013)

Plan	Action	Responsibility
Set up Co-op	• Co-op objectives and membership conditions • Set up institutional framework which lays out terms for collective farming (maximum number of donkeys per household, obligations per head of cattle) • Committee to organise training in establishment of Co-op from University of Fort Hare • Approach extension officers and Department of Rural Development and Land Reform regarding funding • Registration of co-op CIPRO (?)	Committee Committee Umvoto to facilitate/ initiate Umvoto
Irrigated Agriculture	• Determine/ review use of water from dam – which lands would be irrigated? Who would use the water? What would they be doing with it? • What area is currently irrigated under current projects? / Headman's project? • Get examples of business plans from Tsengiwe	Agricultural and Water Supply Committees Committee
Dry land Agriculture	• Review status of dry land agriculture (all the fields without irrigation outside of houses) – who is growing what in dry land? • Who and how much farming is there? • What are they farming? • What is the demand for farming? • What is the demand for land and crops?	Committee
Poultry-rearing	• Assess how many households have poultry? • What are the challenges and opportunities?	Committee
Sheep Shearing Shed	• Assess repairs/ extension of sheep shearing shed, get quotes for cost	Committee
Composting at household level	• How many households make compost? • During census the committee must train households/ encourage making of compost	Committee
Household food gardens	• How many household gardens are there? Why or why not? • Making seedlings, seeds and fruit trees available • Advice on which crops per season • Links with Extension Officer to initiate training • Booklets and training material from FSG	Committee Umvoto to make links with Extension Officer Dirk Versfeld
Resource Centre	• Establish resource centre in partnership with Masiphile	Committee

APPENDIX 5F:

AGRICULTURE AND CROP CULTIVATION FLOW CHART



APPENDIX 5G:

ANIMAL GRAZING MANAGEMENT DEVELOPMENT PLAN

DEVELOPMENT PLAN FOR ANIMAL GRAZING MANAGEMENT

SITUATIONAL ANALYSIS

After 1994, the majority of fences in Tsengiwe were destroyed due to the view that they were a negative legacy of apartheid. The destruction of fencing around communal grazing areas has been particularly devastating. Animals, namely cattle and donkeys, roam freely, resulting in severe land degradation. This in turn has an impact on the growth of invasive species such as lapesi (which is prolific in Tsengiwe) and erosion.

KEY GOALS

Key goals for better animal grazing management include:

- Identifying and fencing off areas for the livestock
- Fencing off ploughing fields for crops
- Fencing off and securing individual households

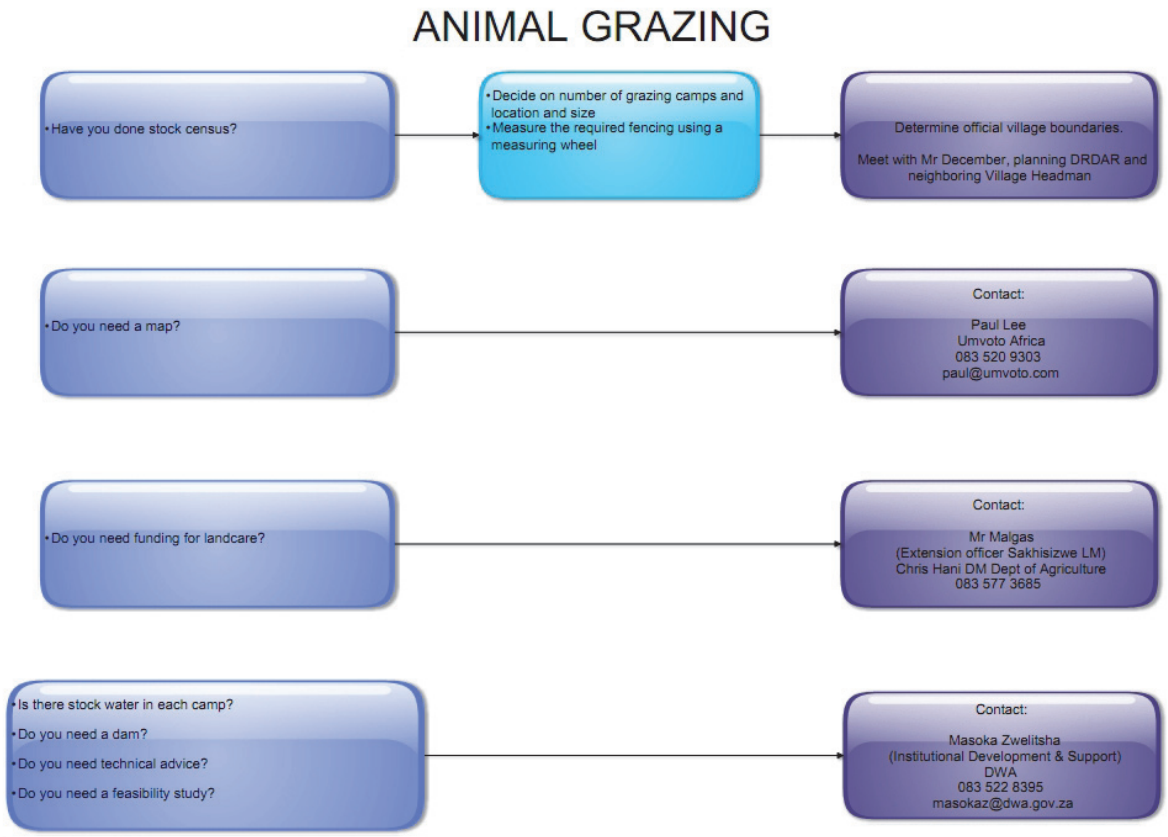
Table 7: Task Group for Animal Grazing Management

Leaders	Victor Matshotyana	082 254 5685
	Victoria Jack	073 397 6901
Sub Leaders	Siyabonga Rono	071 101 2885
	Ayanda Mphekwana	

Table 8: Action Plan for Animal Grazing Management (May 2013)

Plan	Action	Responsibility
Plan for Camps	• Have size of ploughing fields and can figure out camp sizes from there with maps.	Umvoto to provide maps and Google satellite image to assist with contour map
	• Fill out application with application for funding with Department of Agriculture or Department of Rural Development and Land Reform/ consultant	Committee and Umvoto Committee and Umvoto
	• Plan for rotational burning of camps – find out which Extension Officer – Umvoto to facilitate linkages and community to come up with rotational burning plan	Committee
	• Where must they be? Decide where in each camp to position a stock dam • Measure fencing – give a rough idea how much would be required for each camp in metres or kilometres • Need counting wheel from Department of Rural Development • Decide on number of camps • Draw this in maps in relation to houses • Do a stock census • Donkey census • Make contact with an Extension Officer, Department of Water Affairs	
Ploughing Fields	• Measure fencing – give a rough idea how much would be required for ploughing • Educate people about taking stones from ploughing fields	Committee
Fencing for households	• How do people qualify for fencing funding?	Umvoto

APPENDIX 5H: ANIMAL GRAZING FLOW CHART



APPENDIX 5I:

SCHOOL GREENING DEVELOPMENT PLAN

DEVLOPMENT PLAN FOR SCHOOL GREENING

SITUATIONAL ANALYSIS

There are two Junior Secondary Schools in Tsengiwe, one situated in Upper Tsengiwe (Tsengiwe Junior Secondary School) and one located in Lower Tsengiwe (Pakamani Junior Secondary School). Both schools teach from Grade R to Grade 9; the nearest high school for learners from Tsengiwe Village is 9km away in nearby Cala.

Pakamani School was built in Lower Tsengiwe as a response to the river being impassable during periods of heavy rain. In the rainy season the river (from the small catchment in which the village dam is proposed) becomes flooded and children from Lower Tsengiwe are unable to reach the Upper Tsengiwe School. Pakamani has good building infrastructure and six Rainwater tanks in the courtyard as the school's primary source of water, although there is only one tap outside in the school yard. Roofing and guttering are generally in good condition and there is good drainage off of the roof. The gutters in the courtyard lead to the Rainwater tanks and outside to a concrete drainage system leading from both school blocks to the field below. The school sits on a moderate slope, indicating an opportunity for a rainwater harvesting tank and there is suitable ground for a large garden that could be watered by this tank. Furthermore the school courtyard is made of concrete, which could generate significant runoff that could lead to a rain water harvesting tank. There is a large toilet block with ventilated pit latrines, however many of the ventilating rotators have been damaged due to wind and some of the tops of the black tanks have been lost, revealing a possible maintenance issue at the school. The toilets have no water and the hand basins have not been connected to a water source, indicating that the children do minimal hand washing. The school has excellent fencing and grassy lands below the school, indicating protection from grazing. However, there are no trees within the school grounds and there is no playground equipment for children (e.g. swings or jungle gym). There is Eskom power to the school and the building has been wired but not connected.

The Tsengiwe Junior Secondary School is in much worse condition than Pakamani School. It has six large (20 000l) Rainwater tanks on its premises but taps and piping for distribution were never fitted. Furthermore, some of the guttering connecting pipes was either not installed or has since broken. A seventh Rainwater tank was seen lying smashed up on a trash heap outside of the school. This trash heap also contained metal from frames of old desks and corrugated sheeting. There is also a rubbish pit to one side of the school that takes all rubbish (which is burnt) including compostable items. There is one tap and one pit latrine (located quite a long distance form the school buildings) for over 100 students. The principal is generally considered uncaring and uninterested in the affairs for Tsengiwe Village. There is a large and very neat vegetable garden (with two large old pear trees) below the school. The gardener is Sibusiso Ncoko. This garden provides food for the school children. Sibusiso claims to have grown fine onions, lots of potatoes, and that the children 'eat spinach on a Wednesday'. The school is fenced with a normal height and rather ragged

fence (probably enough to keep animals out).The 'playground area comprises only open space, with no shade. Five trees were planted in a line along the fence flanking the entrance gate (possibly *Erythrinacaffra*). These are either dead or only a few centimetres high, choked by grasses. There was once a swing, and a few tyres were planted into the ground near the entrance gate. The classrooms (where the team held a workshop in 2012) are in very poor condition, lacking much of the needed furniture. Many windows in the upper of the two school blocks are broken.

KEY GOALS

The key goals for community and school greening include:

- The development of a comprehensive greening plan along similar lines to the Three Crown Project.

- To further present a strategy towards improving the functioning and use of existing infrastructure for both Pakamani and Tsengiwe Junior Secondary Schools. This is to include:

- Solar energy capture,
- Rainwater harvesting and gardening,
- Greenhouses,
- Vermiculture,
- Hydroponics,
- Algal pond,
- Biogas digester,
- Composting,
- Contouring, swales and use of surface runoff.

- Plans also include training for relevant school staff.

Table 9: Task Group for School Greening

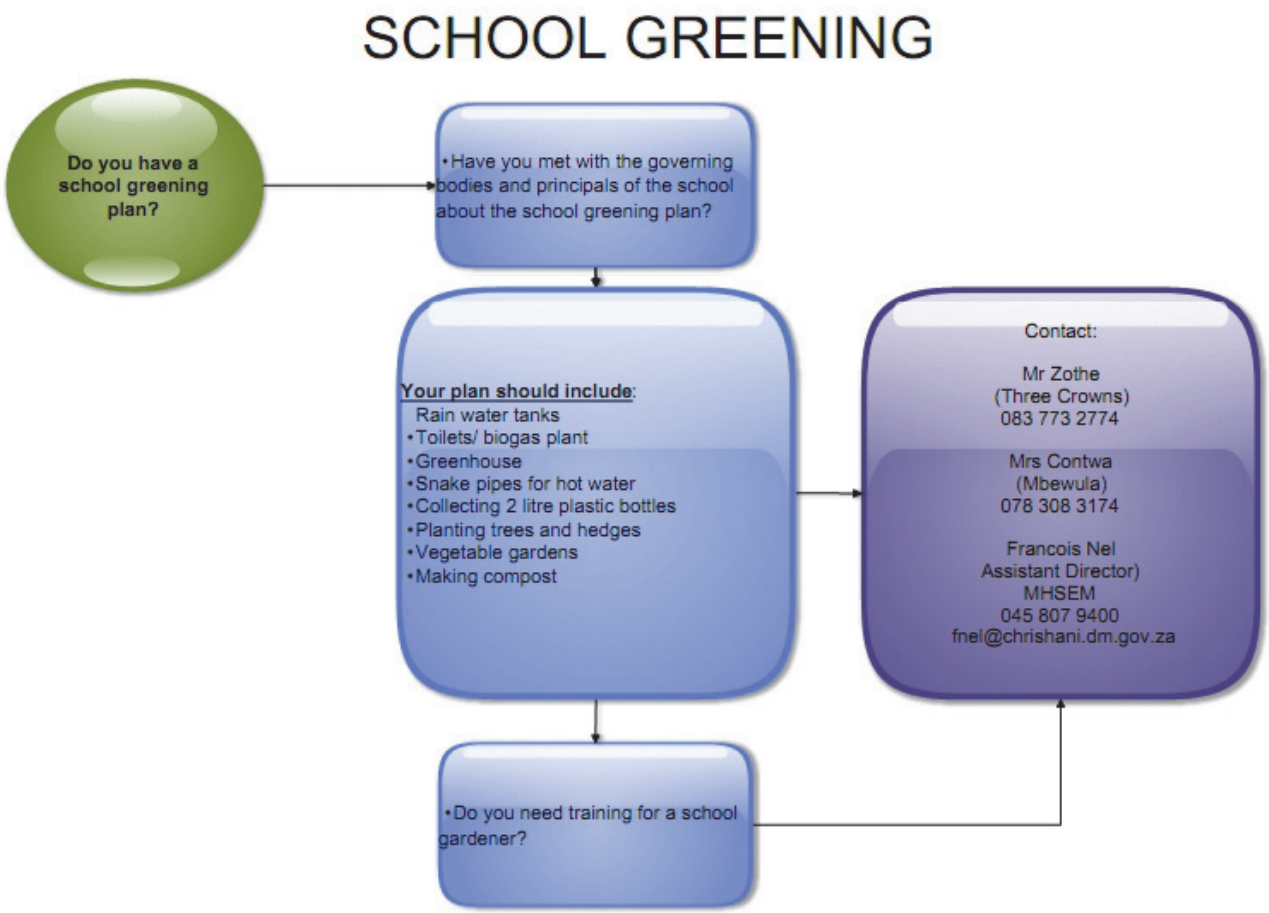
Leaders	Emily Mlandu	060 332 5379
	Fungiwe Dube	079 597 1218
	Sikela Ndabula	11 6 6336

Table 10: Action Plan for School Greening (May 2013)

Plan	Action	Responsibility
Communication	• Open discussions with school principal and school governing board (SGB) of both Junior Secondary schools • Umvoto to send materials	Committee Umvoto
Write Comprehensive Greening Plan for both schools	• Work with Principal and SGB to write a plan for school greening Ideas include: o Get Rainwater tanks working o Discuss toilets o Initiate discussion with Department of Public Health and Department of Education o Build greenhouse o Snake pipes for hot water o Make contact with Mbeula and Three Crowns (invite to Tsengiwe) o Bottle project with children (oranges for every plastic bottle) o Planting trees at school/ hedges o Vegetable gardens o Make compost out of grass • Funding plan (purification of water, cleaning and maintenance, etc.) • Training for school gardener • Training for Committee • Access materials from Three Crowns and Mbeula for resource centre (design for solar pipes, etc.) • Umvoto to send more ideas	Committee Committee Umvoto

APPENDIX 5J:

SCHOOL GREENING FLOW CHART



APPENDIX 6

MONITORING AND EVALUATION

TABLE OF CONTENTS

APPENDIX 6A:

AGRICULTURE AND CROP CULTIVATION SURVEY (VERSION 1)

Agriculture and Crop Cultivation – Committee Survey

Interviewer	
Survey number	
Date	
Village area	
Committee Member	

PART A: Co-op

1) Has Pat organised training in the establishment of a co-op from the University of Fort Hare?
   ☐ Yes ☐ No

   a. If yes, please list the activities to date.

Start Date	End Date	Training Activities	Participants (Name, Age, Gender, Household Head, Upper or Lower Tsengiwe)

   b. If no, please list the main challenges that Pat and/ or the Committee faces, the action that has been taken by the Committee and/ or Pat to overcome these challenges and/ or what action can be taken.

Challenge	Action Taken (date, action, people)	Possible Action (date, action, people)

2) Has the Committee retrieved examples of co-operative farming business plans originating in Tsengiwe and elsewhere?
   Tsengiwe:
   ☐ Yes ☐ No
   Elsewhere:
   ☐ Yes ☐ No

a. If yes to Tsengiwe or elsewhere, please fill in the table below.

Business Plan	Useful elements of business plan	Activities undertaken as a result of information from example plans (date, activities, people)

b. If no to Tsengiwe and elsewhere, list the main challenges that the Committee faces, the action that has been taken by the Committee to overcome these challenges and what action can be taken.

Challenge	Action Taken (date, action, people)	Possible Action (date, action, people)

3) Has the Committee written a business plan for co-operative farming?
☐ Yes ☐ No

a. If yes, present plan.
b. If yes, does the plan include the following?

Co-op plan	Y/ N
Member obligations per head of cattle	
Membership fees	
Membership obligations	

c. If no, list the main challenges that the Committee faces, the action that has been taken by the Committee to overcome these challenges and what action can be taken.

Challenge	Action Taken (date, action, people)	Possible Action (date, action, people)

4) Has Pat approached Extension Officers and/ or Department of Rural Development and Land Reform regarding funding for co-operative farming?
☐ Yes ☐ No

a. If yes, fill in the table below.

Contact Person	Date	Main discussion points	Follow up made	Funding opportunities

b. If no, please list the main challenges that Pat and/ or the Committee faces, the action that has been taken by the Committee and/ or Pat to overcome these challenges and/ or what action can be taken.

Challenge	Action Taken (date, action, people)	Possible Action (date, action, people)

5) Has the Committee followed up on any funding opportunities?

☐ Yes ☐ No

a. If yes, fill in table below.

Funding Opportunity	Source	Amount	Contact Person	Application deadline	Documents required

a. If no, list the main challenges that the Committee faces if different to question 4, the action that has been taken by the Committee to overcome these challenges and what action can be taken.

Challenge	Action Taken (date, action, people)	Possible Action (date, action, people)

6) Has Umvoto provided information on how to register a co-op with CIPRO?

☐ Yes ☐ No

a. If yes, please fill in Table 1 at the back of the survey.
b. If no, please fill in Table 2 at the back of the survey.

PART B: Donkey and Cattle Management

1) In order to manage grazing lands, has a maximum number of donkeys allowed per household been determined?

☐ Yes ☐ No

a. If yes, what is the maximum number of donkeys per household?

_____

b. How was this maximum number reached?

_____

c. If no, list the main challenges that the Committee faces, the action that has been taken by the Committee to overcome these challenges and what action can be taken.

Challenge	Action Taken (date, action, people)	Possible Action (date, action, people)

PART C: Irrigated Agriculture

1) Has the Committee determined the use of water from the dam?

☐ Yes ☐ No

a. If yes, fill in the table below.

Dam	How will water be used?	How much of the water?

b. If no, list the main challenges that the Committee faces, the action that has been taken by the Committee to overcome these challenges and what action can be taken.

Challenge	Action Taken (date, action, people)	Possible Action (date, action, people)

2) Has the committee determined which areas are currently irrigated under current projects?

☐ Yes ☐ No

a. If yes, present map.

b. If yes, fill in table below.

How are current projects irrigated?	Has this information been useful? (Y/ N)	List activities that have arisen from information? (date, activities, participants)	List activities that have been planned (date, activities, participants)
Project 1:			
Project 2:			
Project 3:			

c. If no, list the main challenges that the Committee faces, the action that has been taken by the Committee to overcome these challenges and what action can be taken.

Challenge	Action Taken (date, action, people)	Possible Action (date, action, people)

PART D: Dry Land Agriculture

1) Has the Committee mapped the fields outside of household gardens without irrigation?
   ☐ Yes ☐ No
   a. If yes, present map of size, location and crops grown.

   b. If yes, fill in table below.

Fields without irrigation (list and crops grown)	Has this information been useful? (Y/ N)	List activities that have arisen from information? (date, activities, participants)	List activities that have been planned (date, activities, participants)

   c. If no, list the main challenges that the Committee faces, the action that has been taken by the Committee to overcome these challenges and what action can be taken.

Challenge	Action Taken (date, action, people)	Possible Action (date, action, people)

PART E: Sheep Shearing

1) Has the committee assessed repairs and extension of sheep shearing shed?
   ☐ Yes ☐ No
   a. If yes, fill in table below.

Repairs	Costs	How were costs determined?	Extensions	Costs	How were costs determined?

   b. If no, list the main challenges that the Committee faces, the action that has been taken by the Committee to overcome these challenges and what action can be taken.

Challenge	Action Taken (date, action, people)	Possible Action (date, action, people)

PART F: Composting at Household Level

1) Has the committee trained any individuals or households on composting?
   ☐ Yes ☐ No
a. If yes, how many individuals? How many households?

b. If yes, list the Committee's activities to date.

Start Date and Time	End Date and Time	Activity	List Participants (Name, Age, Gender, if Household Head, Upper or Lower Tsengiwe)

c. If no, please list the main challenges, the action that has been taken to overcome these challenges and/ or what action can be taken.

Challenge	Action Taken (date, action, people)	Possible Action (date, action, people)

PART G: Household Food Gardens

1) Has the Committee made any of the following available to households: seedlings, seeds and fruit trees?

☐ Yes ☐ No

a. If yes, please fill in the table below.

	Have households or individuals been provided with these? Y/ N	How many households (HH) or individuals (I) have been provided with these?
Seedlings		
Seeds		
Fruit trees		

b. If no, please list the main challenges, the action that has been taken to overcome these challenges and/ or what action can be taken.

Challenge	Action Taken (date, action, people)	Possible Action (date, action, people)

2) Has the committee made contact with an Extension Officer to provide information on which crops are suitable for each season?

☐ Yes ☐ No

a. If yes, please fill in the table below.

Contact Person	Date	Response from Contact Person	Suitable crops (Winter)	Suitable crops (Summer)

b. If yes, has this information been relayed to the community?

Start Date and Time	End Date and Time	Activity	List Participants (Name, Age, Gender, if Household Head, Upper or Lower Tsengiwe)

c. If no, please list the main challenges, the action that has been taken to overcome these challenges and/ or what action can be taken.

Challenge	Action Taken (date, action, people)	Possible Action (date, action, people)

3) Has the Committee provided advice to households on which crops are suitable for each season?

☐ Yes ☐ No

a. If yes, how many individuals? How many household heads?

_____

_____

b. If yes, list the Committee's activities to date.

Start Date and Time	End Date and Time	Activity	List Participants (Name, Age, Gender, if Household Head, Upper or Lower Tsengiwe)

c. If no, please list the main challenges, the action that has been taken to overcome these challenges and/ or what possible action can be taken.

Challenge	Action Taken (date, action, people)	Possible Action (date, action, people)

4) Has Umvoto provided training materials?

☐ Yes ☐ No

a. If yes, please fill in Table 1 at the back of the survey.
b. If no, please fill in Table 2 at the back of the survey.

End of survey.

Table 1

Information from Umvoto	Has this information been useful? (Y/ N)	List activities that have arisen from information? (date, activities, participants)	List activities that have been planned (date, activities, participants)
Training materials			

Table 2

Information	Umvoto Explanation	What challenges does this lack of information present?	What can the committee do to overcome these challenges? (date, activities, people)

APPENDIX 6B

AGRICULTURE AND CROP CULTIVATION SURVEY (VERSION 2)

Agriculture and Crop Cultivation – Committee Survey

Interviewer	
Survey number	
Date	
Village area	
Committee Member	

PART A: Co-op

1) Has funding been approved for shed shearing co-op?
   ☐ Yes ☐ No

2) Has funding been approved for piggery/ poultry co-op?
   ☐ Yes ☐ No

3) Has registration with CIPRO of the shearing shed been successful?
   ☐ Yes ☐ No

4) Please fill in table below.

Co-op	**Members**

5) Has seed funding been received?
   ☐ Yes ☐ No

6) Has the sheep shearing shed been repaired?
   ☐ Yes ☐ No

PART B: Donkey and Cattle Management

1) In order to manage grazing lands, has a maximum number of donkeys allowed per household been determined?

☐ Yes ☐ No

d. If yes, what is the maximum number of donkeys per household?

_____

e. How was this maximum number reached?

_____

f. If no, please list the main challenges, what action can be taken to overcome these challenges (including dates set for action and responsible parties).

Challenge	Action to be taken (date, action, people)

PART C: Community Meetings

1) At the most recent community meeting(s), was the following discussed in one or more meeting?
   Please provide the attendance list from the meeting

Community Meeting(s) Dates	Topic discussed (Y/ N)	Details of Discussion
	Donkey management system for village (Y/ N)	
	Household composting (Y/ N)	
	Crops suitable for dry season (Y/ N)	
	Crops suitable for frost (Y/ N)	
	Alternative crop sources (Y/ N)	

   a. If no to any of the above, please list the main challenges in each area not discussed, what action can be taken to overcome these challenges (including dates set for action and responsible parties)?

Aspect not discussed and why?	Action to be taken (date, action, people)

PART D: Household Food Gardens

1) Has the Committee made any of the following available to households: seedlings, seeds and fruit trees?

☐ Yes ☐ No

c. If yes, please fill in the table below.

	Have households or individuals been provided with these? Y/ N	**How many households (HH) or individuals (I) have been provided with these?**
Seedlings		
Seeds		
Fruit trees		

d. If no, please list the main challenges, what action can be taken to overcome these challenges (including dates set for action and responsible parties).

Challenge	**Action to be taken (date, action, people)**

End of survey.

APPENDIX 6C:

ANIMAL GRAZING SURVEY (VERSION 1)

Animal Grazing Management – Committee Survey

Interviewer	
Survey number	
Date	
Village area	
Respondent	

PART A: Plan for Camps

1) Has the Committee mapped the following:

Map Element	Y/ N
Location of the communal grazing land	
Extent of communal grazing land	
Which land is to be used for grazing only	
Which land is to be used for ploughing only	
Houses that are on communal grazing land	
Houses that are on ploughing land	

a. Present map(s).
b. Regarding those areas that were not mapped, what were the main challenges, the action that has been taken to overcome these challenges and/ or what action can be taken.

Map Element	Challenge	Action Taken (date, action, people)	Possible Action (date, action people)

2) Has the Committee mapped where stock water dams will be located in each camp? Present map.

☐ Yes ☐ No

b. If yes, present map.

c. If no, please list the main challenges, the action that has been taken to overcome these challenges and/ or what action can be taken.

Challenge	Action Taken (date, action, people)	Possible Action (date, action, people)

Part B: Fencing

1) Has the Committee measured how much fencing would be needed to secure communal grazing?

☐ Yes ☐ No

a. If yes, how much fencing is required?

_____

b. If yes, how did the Committee arrive at the measurement?

_____

c. If no, please list the main challenges, the action that has been taken to overcome these challenges and/ or what action can be taken.

Challenge	Action Taken (date, action, people)	Possible Action (date, action, people)

2) Has the Committee estimated the cost of the required for fencing for communal grazing land?

☐ Yes ☐ No

a. If yes, what is the cost?

_____

b. If yes, how did the Committee arrive at the cost?

_____

c. If no, please list the main challenges, the action that has been taken to overcome these challenges and/ or what action can be taken.

Challenge	Action Taken (date, action, people)	Possible Action (date, action, people)

3) Has the Committee measured how much fencing is required for ploughing fields?
☐ Yes ☐ No

a. If yes, how much fencing is required?
_____

b. If yes, how did the Committee arrive at the measurement?

_____

c. If no, please list the main challenges, the action that has been taken to overcome these challenges and/ or what action can be taken.

Challenge	Action Taken (date, action, people)	Possible Action (date, action, people)

4) Has the Committee estimated the cost of the required fencing for ploughing fields?
☐ Yes ☐ No

a. If yes, what is the cost?
_____

b. If yes, how did the Committee arrive at the measurement and cost?

_____

c. If no, please list the main challenges, the action that has been taken to overcome these challenges and/ or what action can be taken.

Challenge	Action Taken (date, action, people)	Possible Action (date, action, people)

5) Has the Committee taken any steps with regards to fencing communal grazing areas?
☐ Yes ☐ No

a. If yes, list activities to date.

Start Date and Time	End Date and Time	Activity	List Participants (Name, Age, Gender, if Household Head, Upper or Lower Tsengiwe)

b. If no, please list the main challenges, the action that has been taken to overcome these challenges and/ or what action can be taken.

Challenge	Action Taken (date, action, people)	Possible Action (date, action, people)

6) Has the Committee taken any steps with regards to fencing ploughing areas?
☐ Yes ☐ No

a. If yes, list activities to date.

Start Date and Time	End Date and Time	Activity	List Participants (Name, Age, Gender, if Household Head, Upper or Lower Tsengiwe)

b. If no, please list the main challenges, the action that has been taken to overcome these challenges and/ or what action can be taken.

Challenge	Action Taken (date, action, people)	Possible Action (date, action, people)

7) Has the Committee received the criteria for fencing for households from Umvoto?
☐ Yes ☐ No

c. If yes, please fill in Table 1 at the back of the survey.
d. If no, please fill in Table 2 at the back of the survey.

8) Has Umvoto provided information on funding for household fencing?
☐ Yes ☐ No

a. If yes, please fill in Table 1 at the back of the survey.
b. If no, please fill in Table 2 at the back of the survey.

End of Survey.

Table 1

Information from Umvoto	Has this information been useful? (Y/ N)	List activities that have arisen from information? (date, activities, participants)	List activities that have been planned (date, activities, participants)
Funding for household fencing			

Table 2

Information	Umvoto Explanation	What challenges does this lack of information present?	What can the committee do to overcome these challenges? (date, activities, people)

APPENDIX 6D:

ANIMAL GRAZING SURVEY (VERSION 2)

Animal Grazing Management and Ploughing Committee Survey

Interviewer	
Survey number	
Date	
Village area	
Respondent	

PART A: Plan for Camps and Fencing

1) Has the Committee determined the appropriate physical location of each stock water dam for each grazing camp? Why were these locations chosen?

Grazing Camp (Y /N)	**Reason for location**
Grazing camp 1 (Kwancoko)	
Grazing camp 2 (Kwamnethe)	
Grazing camp 3 (Matyeni)	
Grazing camp 4 (Ngaphakoqolo)	

a. If no, please tell us **why** (challenges), **what** you have done (action taken), and **what** you will do (planned action). Also tell us **how** you will do these things, **who** will do them (responsible person) and **when** (dates and deadlines).

Challenges/ Why	**Action Taken** (action, people, date) **What, how, who, when**	**Planned Action** (action, people, date) **What, how, who, when**

Part B: Fencing

1) Has the committee got the counting wheel from the municipality?

☐ Yes ☐ No

a. If no, please tell us **why** (challenges), **what** you have done (action taken), and **what** you will do (planned action). Also tell us **how** you will do these things, **who** will do them (responsible person) and **when** (dates and deadlines).

Aspect not discussed	**Action Taken** (action, people, date) **What, how, who, when**	**Planned Action** (action, people, date) **What, how, who, when**

2) Has the Committee measured how much fencing is required for the following areas?

Fencing Area (Y/ N)	**How much fencing is required?**	**How did the committee arrive at this measurement?**
Internal Ploughing Fields		
Internal Grazing Fields		

d. If no to any of the areas above (**internal ploughing and internal grazing fields**), please tell us **why** (challenges), **what** you have done (action taken), and **what** you will do (planned action). Also tell us **how** you will do these things, **who** will do them (responsible person) and **when** (dates and deadlines).

Challenges/ Why	**Action Taken** (action, people, date) **What, how, who, when**	**Planned Action** (action, people, date) **What, how, who, when**

3) Has the Committee organized the following meetings? Please fill in the table below.
***M&E: If relevant, please photocopy attendance lists to send to Umvoto**.
a. If yes please fill in table below.

Meeting	**Date and People present**	**Main discussion points**	**Planned Action** (action, people, date) **What, how, who, when**
Meeting with the Headmen from neighbouring Villages to discuss fencing on borders?			
Meeting with the municipality to determine the official borders?			

b. If no, please tell us **why** (challenges), **what** you have done (action taken), and **what** you will do (planned action). Also tell us **how** you will do these things, **who** will do them (responsible person) and **when** (dates and deadlines).

Challenges/ Why	**Action Taken** (action, people, date) **What, how, who, when**	**Planned Action** (action, people, date) **What, how, who, when**

4) Have the official borders of the village been determined?
☐ Yes ☐ No

PART B: Donkey and Cattle Management

1) In order to manage grazing lands, has a maximum number of donkeys allowed per household been determined?
☐ Yes ☐ No

a. If yes, what is the maximum number of donkeys per household?

_____

b. How was this maximum number reached?

_____

c. How will this be enforced?

_____

d. If no, please tell us **why** (challenges), **what** you have done (action taken), and **what** you will do (planned action). Also tell us **how** you will do these things, **who** will do them (responsible person) and **when** (dates and deadlines).

Challenges	**Action Taken** (action, people, date) **What, how, who, when**	**Planned Action** (action, people, date) **What, how, who, when**

PART C: Umvoto

1) Please fill in the table below on training information provided by Umvoto.

Information or Action from Umvoto	**Has this information been useful? (Y/ N)**	**If useful list activities that have come from this information.** (who, what, how, when)	**List activities that have been planned for the future** (who, what, how, when)	**If not useful, please explain why.** (who, what, how, when)
Initiated Contact with Department of Rural Development and Agrarian Reform				
Greening Community Books				
Looking After the Soil – D. Versfeld				

Additional Information

End of Survey.

APPENDIX 6E:

LAND DEGRADATION AND SOIL EROSION SURVEY (VERSION 1)

Land Degradation and Soil Erosion – Committee Survey

Interviewer	
Survey number	
Date	
Village area	
Committee Member	

PART A: Roads and Erosion

1) Has the Committee educated any individuals or households on erosion control around the house, driveways, paths and tracks?

☐ Yes ☐ No

a. If yes, how many individuals? How many household heads?

_____

_____

b. If yes, list the Committee's activities to date.

Start Date and Time	End Date and Time	Activity	List Participants (Name, Age, Gender, if Household Head, Upper or Lower Tsengiwe)

c. If no, please list the main challenges, the action that has been taken to overcome these challenges and/ or what possible action can be taken.

Challenge	Action Taken (date, action, people)	Possible Action (date, action, people)

2) Has the Committee educated any individuals or households on not removing stones from erosion control areas?

☐ Yes ☐ No

a. If yes, how many individuals? How many household heads?

_____

b. If yes, list activities to date.

Start Date and Time	End Date and Time	Activity	List Participants (Name, Age, Gender, if Household Head, Upper or Lower Tsengiwe)

c. If no, please list the main challenges, the action that has been taken to overcome these challenges and/ or what possible action can be taken.

Challenge	Action Taken (date, action, people)	Possible Action (date, action, people)

3) Has a works party been formed to fix major areas of erosion?

☐ Yes ☐ No

a. If yes, list activities to date.

Start Date and Time	End Date and Time	Activity	List Participants (Name, Age, Gender, Upper or Lower Tsengiwe)

b. If no, please list the main challenges, the action that has been taken to overcome these challenges and/ or what action can be taken.

Challenge	Action Taken (date, action, people)	Possible Action (date, action, people)

4) Has Umvoto clarified whether aloes are appropriate for managing erosion gullies/ areas?

☐ Yes ☐ No

e. If yes, please fill in Table 1 at the back of the survey.
f. If no, please fill in Table 2 at the back of the survey.

5) Has Umvoto provided information on training available from the municipality and/ or government for a village representative on erosion control?

☐ Yes ☐ No

a. If yes, please fill in Table 1 at the back of the survey.
b. If no, please fill in Table 2 at the back of the survey.

6) Has the Committee mapped major erosion on roads?
   a. If yes, present map.
   b. If no, please list the main challenges, the action that has been taken to overcome these challenges and/ or what action can be taken.

Challenge	Action Taken (date, action, people)	Possible Action (date, action, people)

7) Has the Committee taken any action with regards to repairing major erosion on village roads?

☐ Yes ☐ No

   a. If yes, list activities to date.

Start Date and Time	End Date and Time	Activity	List Participants (Name, Age, Gender, Upper or Lower Tsengiwe)

   b. If no, please list the main challenges, the action that has been taken to overcome these challenges and/ or what action can be taken.

Challenge	Action Taken (date, action, people)	Possible Action (date, action, people)

8) Has the Committee appealed to the Headman/ Councillor to pressure the municipality/ Department of Public Works to fix major erosion on the roads?

Headman:
☐ Yes ☐ No

Councillor:
☐ Yes ☐ No

   a. If yes to Headman or Councillor, has the Headman or Councillor made contact with the municipality/ Department of Public Works to fix major erosion on the roads?

Headman:
☐ Yes ☐ No

Councillor:
☐ Yes ☐ No

   c. If yes to Headman and/ or Councillor, please fill in the table below.

Contact Person	Date	Main discussion points	Response from Contact Person	Follow up made and Date

d. If yes, what action has arisen or been planned through this contact?

Contact	Action Taken (date and action)	Possible Action (date and action)	Responsible people

e. If no to both Headman and Councillor, what can the Committee do to ensure that the Headman and/ or Councillor makes contact with the relevant government body? What can the Committee do if the Headman and Councillor are not responsive?

Councillor	Headman	Action to be taken by Committee if Headman and Councillor are not responsive

PART B: Dongas

1) Has the Committee identified major dongas?
☐ Yes ☐ No

a. What are the causes of these dongas?

_____

_____

_____

b. How is a 'major donga' defined?

_____

_____

_____

2) Has the Committee identified ways to deal with major dongas?
☐ Yes ☐ No

a. If yes, please list measures identified by the Committee and actions taken to date.

Measures for major dongas	Action Taken (date, action, people)

b. If no, please list the main challenges, the action that has been taken to overcome these challenges and/ or what action can be taken.

Challenge	Action Taken (date, action, people)	Possible Action (date, action, people)

3) Has the Committee identified ways to prevent smaller dongas from becoming major dongas?

☐ Yes ☐ No

a. If yes, please list the preventative measures identified by the Committee and actions taken to date.

Preventative Measures	Action Taken (date, action, people)

b. If no, please list the main challenges, the action that has been taken to overcome these challenges and/ or what action can be taken.

Challenge	Action Taken (date, action, people)	Possible Action (date, action, people)

4) Has the Committee approached the Councillor to work with the municipality to do gabion intervention?

☐ Yes ☐ No

a. If yes, has the Councillor made contact with the municipality/ Department of Public Works to maintain and repair existing contours?

☐ Yes ☐ No

b. If yes, please fill in the table below.

Contact Person	Date	Main discussion points	Response from Contact Person	Follow up made and Date

c. If yes, what action as arisen or been planned through this contact?

Contact	Action Taken (date and action)	Possible Action (date and action)	Responsible people

d. If no, what can the Committee do to ensure that the Headman and/ or Councillor make contact with the relevant government body? What can the Committee do if the Headman and Councillor are not responsive?

Councillor	Headman	Action to be taken by Committee if Headman and Councillor are not responsive

PART C: Hedges and Windbreaks

1) Have locations been identified where a wind breaks would be effective in agricultural and crop areas?

☐ Yes ☐ No

a. If yes, present map.
b. If yes, list main reasons that the areas identified were chosen.

_____

_____

_____

2) Has Umvoto facilitated links between the Department of Agriculture and an Extension Officer about appropriate trees (Kei, Eucalyptus, Pine?) to use as wind breaks?

☐ Yes ☐ No

a. If yes, please fill in Table 1 at the back of the survey.
b. If no, please fill in Table 2 at the back of the survey.

3) What trees would the Committee prefer to plant? Why?

Tree	Main Reason to Plant

4) Has the Committee taken any action towards planting wind breaks?

☐ Yes ☐ No

a. If yes, list activities to date.

Start Date and Time	End Date and Time	Activity	List Participants (Name, Age, Gender, Upper or Lower Tsengiwe)

b. If no, please list the main challenges, the action that has been taken to overcome these challenges and/ or what action can be taken.

Challenge	Action Taken (date, action, people)	Possible Action (date, action, people)

PART D: Swales and Contours

1) Has Umvoto conducted training on putting in contours and maintaining and repairing existing contours?

☐ Yes ☐ No

a. If yes, please fill in Table 1 at the back of the survey.
b. If no, please fill in Table 2 at the back of the survey.

2) Has the Committee appealed to the Headman or Councillor to pressure the municipality/ Department of Public Works to maintain and repair existing contours?

Headman:
☐ Yes ☐ No

Councillor:
☐ Yes ☐ No

a. If yes to Headman or Councillor, has the Headman or councillor made contact with the municipality/ Department of Public Works to maintain and repair existing contours?

Headman:
☐ Yes ☐ No

Councillor:
☐ Yes ☐ No

b. If yes to Headman and/ or Councillor, please fill in the table below.

Contact Person	Date	Main discussion points	Response from Contact Person	Follow up made and Date

c. If yes to Headman and/ or Councillor, what action has arisen or been planned through this contact?

Contact	Action Taken (date and action)	Possible Action (date and action)	Responsible people

d. If no to both Headman and Councillor, can the Committee do to ensure that the Headman and/ or Councillor make contact with the relevant government body? What can the Committee do if the Headman and Councillor are not responsive?

Councillor	Headman	Action to be taken by Committee if Headman and Councillor are not responsive

PART E: Brush Packing, Lapesi and Black Wattle

1) Has the Committee identified the brush pack bare areas with the assistance of Umvoto?

☐ Yes ☐ No

a. If yes, please fill in Table 1 at the back of the survey.
b. If no, please fill in Table 2 at the back of the survey.

2) Has Umvoto conducted training on brush packing?

☐ Yes ☐ No

a. If yes, please fill in Table 1 at the back of the survey.
b. If no, please fill in Table 2 at the back of the survey.

3) Has Umvoto provided information on the use of lapesi in brush packing?

☐ Yes ☐ No

a. If yes, please fill in Table 1 at the back of the survey.
b. If no, please fill in Table 2 at the back of the survey.

4) Has the Committee led any activities towards the control of the spread of invasive alien plants?

☐ Yes ☐ No

a. If yes, list activities to date.

Start Date and Time	End Date and Time	Activity	Participants

b. If no, please list the main challenges, the action that has been taken to overcome these challenges and/ or what action can be taken.

Challenge	Action Taken (date, action, people)	Possible Action (date, action, people)

5) Has Umvoto provided information on the use of ring-barking methods?

☐ Yes ☐ No

a. If yes, please fill in Table 1 at the back of the survey.
b. If no, please fill in Table 2 at the back of the survey.

PART F: Micro-catchments

1) Has Umvoto identified where micro catchments would be effective?

☐ Yes ☐ No

a. If yes, please fill in Table 1 at the back of the survey.
b. If no, please fill in Table 2 at the back of the survey.

2) Has Umvoto designed and conducted training on micro-catchments/ management?

☐ Yes ☐ No

a. If yes, please fill in Table 1 at the back of the survey.
b. If no, please fill in Table 2 at the back of the survey.

PART G: Grasses

1) Has Pat identified effective grass covers?

☐ Yes ☐ No

a. If yes, what are the effective grass covers? Why has the Committee selected these grasses? What action has been taken to plant effective grass covers?

Grass type	Reason it is an effective cover	Action Committee has taken (date and action)	Possible Action (date and action)

b. If no, please list the main challenges that Pat and/ or the Committee faces, the action that has been taken by the Committee and/ or Pat to overcome these challenges and/ or what action can be taken.

Challenge	Action Taken (date, action, people)	Possible Action (date, action, people)

End of Survey

Table 1

Information from Umvoto	Has this information been useful? (Y/ N)	List activities that have arisen from information? (date, activities, participants)	List activities that have been planned (date, activities, participants)
Use of aloes for managing erosion/ gullies			
Training available from municipality/ government for village representative on erosion control			
Links between Department of Agriculture and an Extension Officer about appropriate trees to use for wind breaks			
Assistance with identifying brush pack areas			
Training on brush packing			
Use of lapesi in brush packing			
Use of ring-barking methods			
Where micro-catchments would be effective?			
Designed and conducted training on micro-catchments/ management?			

Table 2

Information	Umvoto Explanation	What challenges does this lack of information present?	What can the committee do to overcome these challenges? (date, activities, people)

APPENDIX 6F:

LAND DEGRADATION AND SOIL EROSION SURVEY (VERSION 2)

Land Degradation and Soil Erosion Committee Survey

Interviewer	
Survey number	
Date	
Village area	
Committee Member	

PART A: Community Meetings

1) At the most recent community meeting(s), was the following discussed in one or more meeting?
   ***M&E: Please photocopy attendance list to send to Umvoto.**

Topic discussed (Y/ N)	**Community Meeting(s) Dates**	**Details of Discussion**
Household erosion control (Y/ N)		
Not removing stones from erosion control areas (Y/ N)		

b. If no to any of these (**household erosion control, not removing stones**), please tell us **why** (challenges), **what** you have done (action taken), and **what** you will do (planned action). Also tell us **how** you will do these things, **who** will do them (responsible person) and **when** (dates and deadlines).

Aspect not discussed	**Action Taken** (action, people, date) **What, how, who, when**	**Planned Action** (action, people, date) **What, how, who, when**

PART B: Land Care

1) Please describe progress on the Xhalanga Land Care Project?

_____

2) Has contact been made with the following people regarding Xhlanga Land Care projects?

Contact Person (Y/ N)	**Date**	**Main discussion points**	**Follow Up and Action to be Taken** (action, people, date) **What, how, who, when**
Mr. Malgas			
Mr. May			
Mr. Luzomba			
Mr. Tomsana			
Mr. Arosi			

a. If no, please describe challenges (**why), what** you have done (action taken), and **what** you will do (planned action). Also tell us **how** you will do these things, **who** will do them (responsible person) and **when** (dates and deadlines).

Challenges In Making Contact with people listed above	**Action Taken** (action, people, date) **What, how, who, when**	**Planned Action** (action, people, date) **What, how, who, when**

3) Please describe progress in repairing major roads and dongas in the table below.

Progress Area	**Describe Progress**	**Describe Planned Action (what, who** will do it**, how,** and **when)**
Has the Headman been notified about the need to repair major roads and dongas		
Has Councillor Jam Jam been approached with a list/ description of repairs needed on major roads and dongas?		
Has Councillor Jam Jam taken the list/ description to Public Works at the LM?		
What has Public Works (LM) done to repair major roads and dongas?		

b. Please list any **challenges** in the progress areas above. Pease tell us **why**, **what** you have done (action taken), and **what** you will do (planned action). Also tell us **how** you will do these things, **who** will do them (responsible person) and **when** (dates and deadlines).

Challenges in Progress Areas above	**Action Taken** (action, people, date) **What, how, who, when**	**Planned Action** (action, people, date) **What, how, who, when**

PART C: Lapesi and Erosion

1) Please describe progress in regards to Lapesi.

Progress Area	**Describe Progress**	**Describe Planned Action (what, who** will do it**, how,** and **when)**
Is lapesi being used to pack eroded areas?		
What is the progress on the eradication of lapesi?		
What is the progress with brush packing?		
What is the progress on creating micro-catchments to control soil erosion on slopes and hillsides?		

c. Please describe **challenges** in these progress areas. **Why, what** you have done (action taken), and **what** you will do (planned action). Also tell us **how** you will do these things, **who** will do them (responsible person) and **when** (dates and deadlines).

Challenges in Progress Areas above	**Action Taken** (action, people, date) **What, how, who, when**	**Planned Action** (action, people, date) **What, how, who, when**

PART D: Hedges and Windbreaks

1) Has the Committee discussed trees for windbreaks with Mr. Malgas?

☐ Yes ☐ No

c. If yes, describe contact to date.

Dates of Contact	**Main discussion points**	**Planned Action** (action, people, date) **What, how, who, when**

a. If no what are the challenges (**why**)**, what** you have done (action taken), and **what** you will do (planned action). Also tell us **how** you will do these things, **who** will do them (responsible person) and **when** (dates and deadlines).

Challenges/ Why	**Action Taken** (action, people, date) **What, how, who, when**	**Planned Action** (action, people, date) **What, how, who, when**

PART E: Grasses

1) Has Pat identified effective grass covers for donga repair?

☐ Yes ☐ No

c. If yes, what are the effective grass covers? Why has the Committee selected these grasses? What action has been taken to plant effective grass covers?

Grass type	**Reason it is an effective cover**	**Action Committee has taken** (date, action, people)	**Possible Action** (date, action, people)

d. If no, why (challenges) **what** you have done (action taken), and **what** you will do (planned action). Also tell us **how** you will do these things, **who** will do them (responsible person) and **when** (dates and deadlines).

Challenges/ Why	**Action Taken** (action, people, date) **What, how, who, when**	**Planned Action** (action, people, date) **What, how, who, when**

PART F: Umvoto Work

2) Please fill out the survey below with the Committee on Umvoto work.

Information or Action from Umvoto	**Has this information been useful? (Y/ N)**	**If useful list activities that have come from this information.** (who, what, how, when)	**List activities that have been planned for the future** (who, what, how, when)	**If not useful, please explain why.** (who, what, how, when)
Links between Department of Rural Development and Agrarian Reform (DRDAR) and an Extension Officer about appropriate trees to use for wind breaks				
Looking after the Soil – D. Versfeld • **Brush packing** • **Micro-catchments**				
Green Community Reports				
Tsengiwe Map				

<u>Additional Information</u>

End of Survey

APPENDIX 6G:

SCHOOL GREENING SURVEY (VERSION 1)

School Greening – Committee

Interviewer	
Survey number	
Date	
Village area	
Committee Member	

PART A: Comprehensive Greening Plan for Both Schools

1) Has the Committee initiated a discussion with the school principal and School Governing Board (SGB) of both Junior Secondary Schools? Please mark with a Y (yes) or N (no).

Communication with:	**Tsengiwe Junior Secondary School**	**Pakamani Junior Secondary School**
School Governing Board		
Principal		

a. If yes to SGB and/ or principal, please fill in the table below.

Contact Person or group	**Date**	**Main discussion points**	**Response from Contact Person**	**Follow up made and Date**

b. If yes, please describe the activities that have arisen or been planned out of this contact.

Contact	**Action Taken (date and action)**	**Possible Action (date and action)**	**Responsible people**

c. If no, please list the main challenges, the action that has been taken to overcome these challenges and/ or what action can be taken.

Challenge	**Action Taken (date, action, people)**	**Possible Action (date, action, people)**

2) Has the Committee worked with the principal and SGB to write a plan for school greening?
Principal:
☐ Yes ☐ No

School Governing Body:
☐ Yes ☐ No

a. If yes to Principal and/ or SGB, please present plan.

b. If no to both Principal and SGB, please describe challenges if different from those identified in question 1, the action that has been taken to overcome these challenges and/ or what action can be taken.

Challenge	Action Taken (date, action, people)	Possible Action (date, action, people)

3) Has the Committee identified the potential of the following ideas? Fill in whether each idea is a potential or not:

Idea	Potential (Y/ N)	Provide reasoning behind response
Getting rain water tanks working		
Getting toilets		
Initiating discussion with Department of Public Health and Department of Education		
Building greenhouses		
Snake pipes for hot water		
Made contact with Mbeula and Three Crowns (invite to Tsengiwe and source materials for resource centre)		
Bottle project with children (recycling)		
Planting trees or hedges at school		
Vegetable gardens		
Make compost		

4) Has the Committee developed a funding plan for the purification of water, cleaning and maintenance?

☐ Yes ☐ No

a. If yes, please present plan.

d. If no, please list the main challenges, the action that has been taken to overcome these challenges and/ or what action can be taken.

Challenge	Action Taken (date, action, people)	Possible Action (date, action, people)

5) Has Umvoto sent materials on school greening?

☐ Yes ☐ No

a. If yes, please fill in Table 1 at the back of this survey.

b. If no, please fill in Table 2 at the back of this survey.

6) Has the Committee initiated training for the school gardener?

☐ Yes ☐ No

a. If yes, list activities to date.

Start Date and Time	End Date and Time	Training Activity

b. If no, list the main challenges, the action that has been taken to overcome these challenges and/ or what action can be taken.

Challenge	Action Taken (date, action, people)	Possible Action (date, action, people)

End of survey.

APPENDIX 6H:

SCHOOL GREENING SURVEY (VERSION 2)

School Greening Committee Survey

Interviewer	
Survey number	
Date	
Village area	
Committee Member	

1) Has the Committee worked with Pakamani Junior Secondary School to write a plan for school greening?
   ☐ Yes ☐ No

b. If yes, please present plan
   ***M&E: make a photocopy of plan to send to Umvoto**

c. If no, please tell us **why** (challenges), **what** you have done (action taken), and **what** you will do (planned action). Also tell us **how** you will do these things, **who** will do them (responsible person) and **when** (dates and deadlines).

Challenges	**Action Taken** (action, people, date) **What, how, who, when**	**Planned Action** (action, people, date) **What, how, who, when**

2) Has the Committee worked with Tsengiwe Junior Secondary School to write a plan for school greening?
   ☐ Yes ☐ No

a. If yes, please present plan.
   ***M&E: please make a photocopy of plan to send to Umvoto**

d. If no, please tell us **why** (challenges), **what** you have done (action taken), and **what** you will do (planned action). Also tell us **how** you will do these things, **who** will do them (responsible person) and **when** (dates and deadlines).

Challenges	**Action Taken** (action, people, date) **What, how, who, when**	**Planned Action** (action, people, date) **What, how, who, when**

3) Has contact been made with the following departments/ schools regarding School Greening?

Contact (Y/ N)	Date	Main discussion points	Response from Contact Person	Follow up made and Date
Three Crowns				
Mbeula				
Department of Education				
Department of Health				

a. If yes, what action as arisen or been planned through these contacts?

Contact Person (at Three Crowns, Mbeula, Dept. Education, or Dept. Health)	**Taken or Planned Action** (action, people, date) **What, how, who, when**

b. If no to any of them (**Three Crowns, Mbeula, Dept. Education, Dept. Health),** please tell us **why** (challenges), **what** you have done (action taken), and **what** you will do (planned action). Also tell us **how** you will do these things, **who** will do them (responsible person) and **when** (dates and deadlines).

Challenges	**Action Taken** (action, people, date) **What, how, who, when**	**Planned Action** (action, people, date) **What, how, who, when**

4) Please list the sources of funding for Three Crowns and the progress that has been made for getting funding for Pakamani and Tsengiwe Junior Secondary?

Source of Funding	**Progress** (action, people, date) **What, how, who, when**

a. Please describe the challenges with regards to getting in touch with these sources of funding.

Challenges	**Planned Action** (action, people, date) **What, how, who, when**

5) Please describe the Committee's progress in the following areas?

Idea	**Progress has been made? (Y/ N)**	**Details of Progress** (action, people, date) **What, how, who, when**
Getting rain water tanks working		
Getting toilets repaired and working		
Building greenhouses		
Snake pipes for hot water		
Made contact with Mbeula and Three Crowns (invite to Tsengiwe and source materials for resource centre)		
Bottle project with children (recycling)		
Planting trees or hedges at school		
Vegetable gardens		
Make compost		
Biogas plant		

6) Has the Committee developed a funding plan for the purification of water, cleaning and maintenance?

☐ Yes ☐ If yes, please present plan.

***M&E: make a photocopy and send to Umvoto**

e. If no, please tell us **why** (challenges), **what** you have done (action taken), and **what** you will do (planned action). Also tell us **how** you will do these things, **who** will do them (responsible person) and **when** (dates and deadlines).

Challenges	**Action Taken** (action, people, date) **What, how, who, when**	**Planned Action** (action, people, date) **What, how, who, when**

7) Has Chris trained Sibusiso in gardening?

☐ Yes ☐ No

c. If yes, list activities to date.

Training Activity (Activities, start and end dates, participants)

a. If no, please tell us **why** (challenges), **what** you have done (action taken), and **what** you will do (planned action). Also tell us **how** you will do these things, **who** will do them (responsible person) and **when** (dates and deadlines).

Challenges	**Action Taken** (action, people, date) **What, how, who, when**	**Planned Action** (action, people, date) **What, how, who, when**

Please fill out the survey below with the Committee on Umvoto work.

Information or Action from Umvoto	**Has this information or contact been useful? (Y/ N)**	**If Yes: List activities that have come from this information.** (who, what, how, when)	**If Yes: List activities that have been planned for the future** (who, what, how, when)	**If No: Please explain why.**
Umvoto facilitated contact with Three Crowns and Mbeula				
Umvoto provided information on school greening				

Additional Information

End of survey.

APPENDIX 6I:

WATER SUPPLY AND RETICULATION SURVEY (VERSION 1)

Water Supply and Reticulation Survey – Committee

Interviewer	
Survey number	
Date	
Village area	
Committee Member	

PART A: Audit of Households Needing Rain Water Tanks

1) Has the Committee received the criteria for receiving a rain water tank from Umvoto?

☐ Yes ☐ No

g. If yes, please fill in Table 1 at the back of the survey.
h. If no, please fill in Table 2 at the back of the survey.

2) Has the Committee educated any individuals or households on using grey water for gardens?

☐ Yes ☐ No

c. If yes, how many individuals? How many household heads?

_____

d. If yes, list the Committee's activities to date.

Start Date and Time	End Date and Time	Activity	List Participants (Name, Age, Gender, if Household Head, Upper or Lower Tsengiwe)

e. If no, please list the main challenges, the action that has been taken to overcome these challenges and/ or what action can be taken.

Challenge	Action Taken (date, action, people)	Possible Action (date, action, people)

3) Has the Committee educated any individuals or households on how to clean their drinking water?

☐ Yes ☐ No

f. If yes, how many individuals? How many household heads?

_____

g. If yes, list the Committee's activities to date.

Start Date and Time	End Date and Time	Activity	List Participants (Name, Age, Gender, Household Head, Upper or Lower Tsengiwe)

h. If no, please list the main challenges, the action that has been taken to overcome these challenges and/ or what action can be taken.

Challenge	Action Taken (date, action, people)	Possible Action (date, action, people)

4) Has Pat initiated a mentorship programme to train youth in plumbing?

☐ Yes ☐ No

a. If yes, please list the activities to date.

Start Date	End Date	Training Activities	Participants (Name, Age, Gender, Household Head, Upper or Lower Tsengiwe)

b. If no, please list the main challenges that Pat and/ or the Committee faces, the action that has been taken by the Committee and/ or Pat to overcome these challenges and/ or what action can be taken.

Challenge	Action Taken (date, action, people)	Possible Action (date, action, people)

PART B: Boreholes

1) Has Umvoto provided the Hydro-census on boreholes?

☐ Yes ☐ No

c. If yes, please fill in Table 1 at the back of the survey.
d. If no, please fill in Table 2 at the back of the survey.

Part C: Village Stock Dams

1) Has the Committee decided where dams should be?
   ☐ Yes ☐ No

a. If yes, present map.
b. If yes, please fill in the table below.

Dam	On Communal Land? (Y/N) Present map.	How will the dam water be used?

c. If no, please list the main challenges that Pat and/ or the Committee faces, the action that has been taken by the Committee and/ or Pat to overcome these challenges and/ or what action can be taken.

Challenge	Action Taken (date, action, people)	Possible Action (date, action, people)

2) How many households will have access to the dam water?
   _____

3) How was this number reached?
   _____

4) Has Umvoto initiated dialogue and liaised with the Department of Water Affairs and the Chris Hani DM on building of stock dams?
   ☐ Yes ☐ No

End of survey.

APPENDIX 6J:

WATER SUPPLY AND RETICULATION SURVEY (VERSION2)

Water Supply and Reticulation Committee Survey

Interviewer	
Date	
Location	
Committee Members Present	

3) At the most recent community meeting(s), was the following discussed in one or more meeting?

***M&E: Please photocopy attendance list to send to Umvoto.**

Topic discussed (Y/ N)	Community Meeting(s) Dates	Details of Discussion
Using grey water for gardens (Y/ N)		
Jojo tank care (filters, boiling water) (Y/ N)		
Requirements for Jojo tanks (fencing, household food garden, unemployment) (Y/N)		

i. If no to any of these (**using grey water, Jojo tank care, Jojo tank requirements**), please tell us **why** (challenges), **what** you have done (action taken), and **what** you will do (planned action). Also tell us **how** you will do these things, **who** will do them (responsible person) and **when** (dates and deadlines).

Aspect not discussed	**Action Taken** (action, people, date) **What, how, who, when**	**Planned Action** (action, people, date) **What, how, who, when**

4) Has Pat initiated a mentorship programme to train youth in plumbing?

☐ Yes ☐ No

d. If yes, please list the activities to date.

Training Activity (Activities, start and end dates, participants)

e. If no, please tell us **why** (challenges), **what** you have done (action taken), and **what** you will do (planned action). Also tell us **how** you will do these things, **who** will do them (responsible person) and **when** (dates and deadlines).

Challenges/ **Why**	**Action Taken** (action, people, date) **What, how, who, when**	**Planned Action** (action, people, date) **What, how, who, when**

5) Has the Committee made the applications to the Department of Water Affairs/ Institutional Development and Support for the main village supply dam and for the stock dams?
Please describe progress in the following areas.

Aspect of Application **(Y/ N)**	**Describe Progress**	**Describe Challenges**	**Describe Planned Action (what** will you do**, who** will do it**, how,** and **when)**
Approach Institutional Development and Support			
Fill out application form			
Business Plan			
Constitution			
Proof of Land Tenureship			
Water Rights			
Motivation			

6) Has the Committee made progress in household water tanks?
Please fill in the table below.

Progress Area	**Describe Progress**	**Describe Challenges**	**Describe Planned Action (what** will you do**, who** will do it**, how,** and **when)**
Permission of Headman on behalf of each household			

7) Has the Committee put in an application to Department of Water Affairs for the feasibility study on the Tsengiwe Village Irrigation Dam?
Please fill in the table below.

Progress Area	**Describe Progress (What was the response from the DWA?)**	**Challenges**	**Describe Planned Action (what** will you do**, who** will do it**, how,** and **when)**
Approach Department of Water Affairs, Institutional Development and Support to request feasibility study			

8) Please fill out the survey below with the Committee on Umvoto work.

Information or Action from Umvoto	**Has this information been useful? (Y/ N)**	**If useful list activities that have come from this information.** (who, what, how, when)	**List activities that have been planned for the future** (who, what, how, when)	**If not useful, please explain why.** (who, what, how, when)
Hydro-census				
Initiated dialogue with the Department of Water Affairs (Mr. Masoka) on building of stock dams				

Additional Information

End of Survey.

APPENDIX 6K:

FACT SHEET ON MUNICIPAL WATER SERVICE DELIVERY

Please answer the following questions and fill out the answers for each week.	10-16 Aug	17-23 Aug	24-30 Aug	31 Aug-6 Sept	7-13 Sept	14-20 Sept
Did the municipal water service truck deliver water to any tanks in Tsengiwe? (Y/N). If yes dates						
Did you need to contact (call or visit) the municipality to organize the delivery? (Y/N). If yes how many times? & dates)						
Were any of the community reservoirs or tanks empty? (Y/N). If yes how many days?						
Was the Upper Tsengiwe Green Tank from the spring ever empty? (Y/N). If yes how many days?						
Were the Upper Tsengiwe communal taps ever empty? (Y/N). If yes how many taps? How many days for each tap?						
Were the Lower Tsengiwe communal taps ever empty? (Y/N). If yes how many taps? How many days for each tap?						
Did the Tsengiwe Engine pump operate? (Y/N). If yes what dates						
Was the Tsengiwe Engine reservoir ever empty? (Y/N). If yes how many days?						
Was the Shearing Shed hand pump ever dry? (Y/N). If yes how many days?						
Did the municipal grader operate this week on the roads in Tsengiwe? (Y/N). If yes which roads and what dates?						
Was the CDW Officer on duty and seen in the village? (Y/N). If yes, where and what dates?						
Did the Controller visit the village? (Y/N). If yes what dates?						
Did the local stakeholders forum convene? (Y/N). If yes what dates?						

FACT SHEET RESULTS

Please answer the following questions and fill out the answers for each week.	10-16 Aug	17-23 Aug	24-30 Aug	31 Aug-6 Sept	7-13 Sept	14-20 Sept
Did the municipal water service truck deliver water to any tanks in Tsengiwe? (Y/N). If yes dates	[Yes] 13-2013.	[Yes] 19-21-2013 Both lowers Tsengiwe and upper Tsengiwe.	[No] 24-0-2013	[Yes. 29-4-2013.	[No]7-13-2013,	[Yes] 16-2013.
Did you need to contact (call or visit) the municipality to organize the delivery? (Y/N). If yes how many times? & dates)	[No] we did not contact them, 11-2013.	[Yes] we called the truck but they did not come.18-2013.	[Yes] Two times in a week. 20-26-2013.	[No] 31-6-2013	[No] 7-13-2013.	[Yes] 16-2013.
Were any of the community reservoirs or tanks empty? (Y/N). If yes how many days?	[No] it was not empty since Umvoto left.	[Yes]	[Yes]	[Yes]	[Yes]	[Yes]
Was the Upper Tsengiwe Green Tank from the spring ever empty? (Y/N). If yes how many days?	[Yes]Green tank was ever pumping since 10 Aug – 20 Sept 2013, but in December there was no water at all.	[Yes]	[Yes]	[Yes]	[Yes]	[Yes]
Were the Upper Tsengiwe communal taps ever empty? (Y/N). If yes how many taps? How many days for each tap?						
Were the Lower Tsengiwe communal taps ever empty? (Y/N). If yes how many taps? How many days for each tap?	[Yes] 3 taps at Ntilini , 2 in Bakpot and 1 at Strongyard	Two to Three days each, at Ntilini.	Bakpot pump for a week but sometimes they do not pump.	Strongyard pump for 7 days only.	Did not pump.	Pump for a week then after that week It was not working.
Did the Tsengiwe Engine pump operate? (Y/N). If yes what dates	[Yes] Engine pump for two days and then after they were not working for a long time, 18-20-2013.	Reason is that there is no diesel,	Since August until now.	[No]	[No]	[No]
Was the Tsengiwe Engine reservoir ever empty? (Y/N). If yes how many days?	It working ever since Umvoto left until now	But during October and November it was	Not working	Not working	Not working	Not working

Please answer the following questions and fill out the answers for each week.	10-16 Aug	17-23 Aug	24-30 Aug	31 Aug-6 Sept	7-13 Sept	14-20 Sept
		working.				
Was the Shearing Shed hand pump ever dry? **(Y/N). If yes how many days?**	[Yes] Shearing shed hand pump is not working.	Not working	Not working	Not working	Not working	Not working
Did the municipal grader operate this week on the roads in Tsengiwe? **(Y/N). If yes which roads and what dates?**	[Yes] It operates the main road.	[Yes] 29-Sept-2013.	[No] 17-Oct-2013.	[Yes] 8-Nov 2013.	[Yes]-Dec-10-2013.	[No]
Was the CDW Officer on duty and seen in the village? **(Y/N). If yes, where and what dates?**						
Did the Controller visit the village? **(Y/N). If yes what dates?**						
Did the local stakeholder's forum convene? **(Y/N). If yes what dates?**	[Yes] On the 8-Sept 2013.	They held meeting on the 24-Oct 2013.	[No] 11-Nov 2013.			

APPENDIX 6L:

MONITORING AND EVALUATION CONTRACTS

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Contract of Agreement NJabula Matshyotyana and Luphumzo Dasheka to monitor status of Municipal delivery to Tsengiwe

I, Luphumzo Dasheka, hereby commit to the terms and conditions below to which I have been assigned.

I commit to the following:

1) Being honest in my work by correctly and factually filling out all data.
2) Completing the form once weekly for a time period of six weeks.
3) Enure that completed form is handed over to Yonela Nkxoyi by 30 September.

Umvoto agrees to send a payment R180 to the person specified above, to the bank account details provided once the survey has been received and verified as correct by Umvoto Africa Pty (Ltd).

Signed _____

Paul Lee,
Project Manager
Umvoto Africa

Signed _____

09 August 2013,
Monitoring and Evaluation
Tsengiwe Village

Date: 09 Aug 2013

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Reg. No.: 2001\013609\07

Contract of Agreement NJabula Matshyotyana and Luphumzo Dasheka to monitor status of Municipal delivery to Tsengiwe

I, Njabulo Matshotyana, hereby commit to the terms and conditions below to which I have been assigned.

I commit to the following:

1) Being honest in my work by correctly and factually filling out all data.
2) Completing the form once weekly for a time period of six weeks.
3) Enure that completed form is handed over to Yonela Nkxoyi by 30 September.

Umvoto agrees to send a payment R180 to the person specified above, to the bank account details provided once the survey has been received and verified as correct by Umvoto Africa Pty (Ltd).

Signed Paul Lee

Paul Lee,
Project Manager
Umvoto Africa

Signed Njabulo

Njabulo,
Monitoring and Evaluation
Tsengiwe Village

Date: 09 Aug 2013

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CONTRACT OF AGREEMENT WITH MONITORING AND EVALUATION COMMITTEE SUPERVISOR

I, Yonela Nkxoyi, hereby commit to do the work that has been specified in my list of instructions that apply to the monitoring and evaluation of the Tsengiwe Development Plan Committees.

I commit to the following:

1) Calling a Monitoring and Evaluation Group meeting to review the surveys and confirm the plans for each Development Plan Committee meeting.
2) Taking attendance of the aforementioned meeting.
3) Calling each committee together for a Monitoring and Evaluation meeting where these committees are surveyed.
4) Taking attendance at Development Plan Committee meetings.
5) Posting a package with all the necessary documents (specified in supervisor instructions) to Umvoto by Monday the 1st of October, 2013.
6) Ensuring that all necessary attendance lists and documents to be photocopied (as specified in the surveys) are sent to Umvoto by Monday the 1st of October, 2013

I understand that my position includes the following responsibility:

- Should any member choose not to carry out his/her work, I am in a position to allocate their work to a member who is willing to do it. The person reassigned will receive the payment for the work instead of the pre-assigned member.
- This will be communicated to Umvoto.

Umvoto will pay R75 per survey. If all of these are received, you will receive a R100 bonus.

Signed _____ Signed _____

Paula Hay,
Trainer
Umvoto Africa

Yonela Nkxoyi,
Monitoring and Evaluation
Committee Supervisor,
Tengiwe Village

Date: 09/08/13

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Contract of Agreement with Monitoring and Evaluation Committee Member

I, Jacki . Ntombonino . Victoria, hereby commit to the terms and conditions that apply to the monitoring and evaluation of the Tsengiwe Development Plan Committee to which I have been assigned.

I commit to the following:

1) Being honest in my work by correctly and factually filling out all data.
2) Attending the meeting of the Committee to which I have been assigned to survey.
3) Complete a survey of this committee and ensure that it is handed over to Yonela Nkxoyi by 30 September 2013.
4) Work with Yonela Nkxoyi to complete a final, neat survey.
5) If I am unable to follow through with the above, I agree to Yonela handing over my work to another Monitoring and Evaluation member of his choice, and I will forfeit payment.

Umvoto agrees to send a payment R75 to the person specified above, to the bank account details provided once all surveys have been received and verified by Umvoto Africa Pty (Ltd). If the work I done poorly, Umvoto reserves the right to withhold payment.

Signed _____

Paula Hay,
Trainer
Umvoto Africa

Signed N. V. Sack

Soil Erosion,
Monitoring and Evaluation Group
Tsengiwe Village

Date: 09/08/2013

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Contract of Agreement with Monitoring and Evaluation Committee Member

I, Ncoko Sibusiso, hereby commit to the terms and conditions that apply to the monitoring and evaluation of the Tsengiwe Development Plan Committee to which I have been assigned.

I commit to the following:

1) Being honest in my work by correctly and factually filling out all data.
2) Attending the meeting of the Committee to which I have been assigned to survey.
3) Complete a survey of this committee and ensure that it is handed over to Yonela Nkxoyi by 30 September 2013.
4) Work with Yonela Nkxoyi to complete a final, neat survey.
5) If I am unable to follow through with the above, I agree to Yonela handing over my work to another Monitoring and Evaluation member of his choice, and I will forfeit payment.

Umvoto agrees to send a payment R75 to the person specified above, to the bank account details provided once all surveys have been received and verified by Umvoto Africa Pty (Ltd). If the work I done poorly, Umvoto reserves the right to withhold payment.

Signed _____

Paula Hay,
Trainer
Umvoto Africa

Signed _____

School Greenings,
Monitoring and Evaluation Group
Tsengiwe Village

Date: 09-08-2013

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Contract of Agreement with Monitoring and Evaluation Committee Member

I, Rono Sandiswa, hereby commit to the terms and conditions that apply to the monitoring and evaluation of the Tsengiwe Development Plan Committee to which I have been assigned.

I commit to the following:

1) Being honest in my work by correctly and factually filling out all data.
2) Attending the meeting of the Committee to which I have been assigned to survey.
3) Complete a survey of this committee and ensure that it is handed over to Yonela Nkxoyi by 30 September 2013.
4) Work with Yonela Nkxoyi to complete a final, neat survey.
5) If I am unable to follow through with the above, I agree to Yonela handing over my work to another Monitoring and Evaluation member of his choice, and I will forfeit payment.

Umvoto agrees to send a payment R75 to the person specified above, to the bank account details provided once all surveys have been received and verified by Umvoto Africa Pty (Ltd). If the work I done poorly, Umvoto reserves the right to withhold payment.

Signed _____

Paula Hay,
Trainer
Umvoto Africa

Signed _____

Soil Erosion,
Monitoring and Evaluation Group
Tsengiwe Village

Date: 09/08/2013

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Contract of Agreement with Monitoring and Evaluation Committee Member

I, Ncoko Sibusiso, hereby commit to the terms and conditions that apply to the monitoring and evaluation of the Tsengiwe Development Plan Committee to which I have been assigned.

I commit to the following:

1) Being honest in my work by correctly and factually filling out all data.
2) Attending the meeting of the Committee to which I have been assigned to survey.
3) Complete a survey of this committee and ensure that it is handed over to Yonela Nkxoyi by 30 September 2013.
4) Work with Yonela Nkxoyi to complete a final, neat survey.
5) If I am unable to follow through with the above, I agree to Yonela handing over my work to another Monitoring and Evaluation member of his choice, and I will forfeit payment.

Umvoto agrees to send a payment R75 to the person specified above, to the bank account details provided once all surveys have been received and verified by Umvoto Africa Pty (Ltd). If the work I done poorly, Umvoto reserves the right to withhold payment.

Signed _____

Paula Hay,
Trainer
Umvoto Africa

Signed _____

SCHOOL GREENING
Monitoring and Evaluation Group
Tsengiwe Village

Date: 09-08-2013

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Contract of Agreement with Monitoring and Evaluation Committee Member

I, Sikelela Nkabula, hereby commit to the terms and conditions that apply to the monitoring and evaluation of the Tsengiwe Development Plan Committee to which I have been assigned.

I commit to the following:

1) Being honest in my work by correctly and factually filling out all data.
2) Attending the meeting of the Committee to which I have been assigned to survey.
3) Complete a survey of this committee and ensure that it is handed over to Yonela Nkxoyi by 30 September 2013.
4) Work with Yonela Nkxoyi to complete a final, neat survey.
5) If I am unable to follow through with the above, I agree to Yonela handing over my work to another Monitoring and Evaluation member of his choice, and I will forfeit payment.

Umvoto agrees to send a payment R75 to the person specified above, to the bank account details provided once all surveys have been received and verified by Umvoto Africa Pty (Ltd). If the work I done poorly, Umvoto reserves the right to withhold payment.

Signed _____

Paula Hay,
Trainer
Umvoto Africa

Signed _____

Animal grazing
Monitoring and Evaluation Group
Tsengiwe Village

Date: 09/08/2013

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Reg. No.: 2001\013609\07

Contract of Agreement with Monitoring and Evaluation Committee Member

I, Jack Sixolile, hereby commit to the terms and conditions that apply to the monitoring and evaluation of the Tsengiwe Development Plan Committee to which I have been assigned.

I commit to the following:

1) Being honest in my work by correctly and factually filling out all data.
2) Attending the meeting of the Committee to which I have been assigned to survey.
3) Complete a survey of this committee and ensure that it is handed over to Yonela Nkxoyi by 30 September 2013.
4) Work with Yonela Nkxoyi to complete a final, neat survey.
5) If I am unable to follow through with the above, I agree to Yonela handing over my work to another Monitoring and Evaluation member of his choice, and I will forfeit payment.

Umvoto agrees to send a payment R75 to the person specified above, to the bank account details provided once all surveys have been received and verified by Umvoto Africa Pty (Ltd). If the work I done poorly, Umvoto reserves the right to withhold payment.

Signed _____

Paula Hay,
Trainer
Umvoto Africa

Signed J.S

Agriculture,
Monitoring and Evaluation Group
Tsengiwe Village

Date: 08 August 2013

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Reg. No.: 2001\013609\07

Contract of Agreement with Monitoring and Evaluation Committee Member

I, Sanele Lwandi, hereby commit to the terms and conditions that apply to the monitoring and evaluation of the Tsengiwe Development Plan Committee to which I have been assigned.

I commit to the following:

1) Being honest in my work by correctly and factually filling out all data.
2) Attending the meeting of the Committee to which I have been assigned to survey.
3) Complete a survey of this committee and ensure that it is handed over to Yonela Nkxoyi by 30 September 2013.
4) Work with Yonela Nkxoyi to complete a final, neat survey.
5) If I am unable to follow through with the above, I agree to Yonela handing over my work to another Monitoring and Evaluation member of his choice, and I will forfeit payment.

Umvoto agrees to send a payment R75 to the person specified above, to the bank account details provided once all surveys have been received and verified by Umvoto Africa Pty (Ltd). If the work I done poorly, Umvoto reserves the right to withhold payment.

Signed _____

Paula Hay,
Trainer
Umvoto Africa

Signed _____

WATER SUPPLY,
Monitoring and Evaluation Group
Tsengiwe Village

Date: 09/08/2013

APPENDIX 6M: MONITORING AND EVALUATION YOUTH GROUP

Table 1: List of Monitoring and Evaluation Members

Luphumzo Dasheka
Njabulo Matshotyana
Yonela Nxoyi
Sandiswa Rono
Victoria Jack
Sibusiso Ncoko
Sikelela Ndabula
Sixolile Jack
Sanele Liwani

APPENDIX 6N: CCA PLANS PROGRESS TABLES

Table 2: Water Supply and Reticulation

Water Supply and Reticulation	Plan Details	Progress August 2013	Updated Plan August 2013	Progress January 2014	Challenges
Audit of households needing rain water tanks	Umvoto to provide criteria for receiving rain water tank	Facilitated links with DWA	**Committee to get permission from Headman for household rain water tanks**	Permission has been obtained from the headman, a list of community members requiring Jojo tanks has been compiled	Contact with Mr Masoka has been irregular, Pat will try follow up with him in East London (in September 2013)
	Committee to educate individuals and/ or households on using grey water for gardens	The Committee conducted a survey of 158 households on whether they have Jojo tanks (120 have Jojo tanks). Also informed these households about gutters and filters so that the water doesn't run down the house, putting the tank on top of a platform and using grey water.	**Committee to discuss at next community meeting the use of grey water for gardens, Jojo tanks, requirements for Jojo tanks**	Discussion of grey water and how it can be used profitably. Requirements for Jojo tanks discussed including leakages, stands, filters, boiling of water, fencing as well as the establishment of a food garden and consideration of unemployment.	Many water supply members have resigned so activities had to be carried out by committee members.
	Committee to educate individuals and/ or households on how to clean their drinking water	The Committee educated households on boiling water and opening jojo tanks to prevent water worms (Jubalala), insects and tadpoles. Approximately 158 households			
Boreholes	Umvoto to provide hydrocensus on boreholes	Provided	**Committee to make applications to DWA/ Institutional Development and Support for the main**		

Water Supply and Reticulation	Plan Details	Progress August 2013	Updated Plan August 2013	Progress January 2014	Challenges
			village supply dam and for the stock dams		
Village stock dams	Committee to decide where dams should be	This has been mapped	**Committee to review use of map/ mapping process. Committee to put application in with DWA for feasibility study on Tsengiwe Village Irrigation Dam**	The committee has written to the DWA about the main village supply dam and stock dams	As yet the DWA has not responded, Pat will try follow up before the end of January 2014.
	Committee to determine how many households will have access to dam water	X			
	Umvoto to initiate dialogue and liaise with DWA and CHDM on building of stock dams	Facilitated links with DWA and CHDM			

Table 3: Land Degradation and Soil Erosion

Land Degradation and Soil Erosion	Plan Details	Progress August 2013	Updated Plan August 2013	Progress January 2014	Challenges
Roads and Erosion	Committee to educate individuals and/ or households on erosion control around households, driveways, paths and tracks	The committee has trained people in meetings to control the water and rain and encouraged people to have gutters around their household. Will do more in next meeting	**Committee to discuss household erosion control at the next community meeting**	Soil erosion discussed with committee as well as community members. How to channel water of drive ways and paths to gardens was also discussed.	
	Committee to educate households and/ or individuals on not removing stones from erosion control areas	This has been discussed in general meetings. There is no one to report that people are taking stones – in that sense it is political. The Headman and Councillor will have to educate people.	**Committee to discuss stone removal from erosion control areas at the next community meeting**	Discussion of why it's important not to remove stones and what should be done in the event of seeing someone removing these stones	
	A works party to be formed to fix major areas of erosion	There is a project coming soon (Xhalanga Land Care) for fencing and closing dongas. The Committee will choose which aspect of the programme they will focus on. This will be determined at the next Stakeholder's forum in January.	**Committee to make contact with Mr. Malgas, Mr. May, Mr. Luzomba, Mr. Tomsana, and Mr. Arosi regarding the Xhalanga Land Care Project**	Tsengiwe is the third on the list of the Xhalanga Land Care Project. The project is currently underway in Mazimahle (the first on the list). Contact was made with Mr Tomsana and Mr Arosi and people were taken for training	Tsengiwe is third on the list for the project and is still awaiting tools and material. Mr May has retired and the committee will follow up with his successor
	Umvoto to clarify whether aloes are appropriate for		**Committee to review this information**		

Land Degradation and Soil Erosion	Plan Details	Progress August 2013	Updated Plan August 2013	Progress January 2014	Challenges
	managing erosion gullies/ areas	Facilitated links with Extension Officer			
	Umvoto to provide information on training available from the municipality and/ or government for a village representative on erosion control	Training presentation; training guides and links with Extension Officer	**Committee to review this information**		
	Committee to map major erosion on roads	This has been mapped.	**Committee to review use of map/ mapping process**		
	Committee to take action with regards to repairing major erosion on village roads	No progress	**Committee to notify headman about the need to repair major roads and dongas; approach Councillor with a list/ description of major roads and dongas; Committee to follow up that Councillor Jam Jam has taken the concern to the LM Department of Public Works; Committee to follow up with Public Works and get in touch with Mr. Malgas – by 31 August 2013**	Public Works people are busy working on secondary roads as they claim not to have resources to repair major roads. The committee is still waiting for the Xhalanga Land Care project to repair dongas.	The headman is not interested in anything that involves Umvoto as he is too busy, the committee plans to meet with the headman's son who is in charge when the headman is away
	Committee to appeal to headman/ councillor to pressure the municipality/ Department of Public works to fix major erosion on the roads				
Dongas	Committee to identify				

Land Degradation and Soil Erosion	Plan Details	Progress August 2013	Updated Plan August 2013	Progress January 2014	Challenges
	major dongas, causes and define 'major donga'				
	Committee to identify ways to deal with major dongas				
	Committee to approach the councillor to work with the municipality to do gabion intervention	Committee to notify headman about the need to repair major roads and dongas; approach Councillor with a list/ description of major roads and dongas; Committee to follow up that Councillor Jam Jam has taken the concern to the LM Department of Public Works; Committee to follow up with Public Works and get in touch with Mr. Malgas – by 31 August 2013			
	Committee to identify ways to prevent smaller dongas from becoming major dongas	No progress.	**Committee to identify ways to prevent smaller dongas from becoming major dongas**		
Hedges and windbreaks	Locations to be identified where a windbreak would be effective in agriculture and crop areas	This has been mapped – the committee selected public areas – church, clinic, schools. Social problem of planting too many trees in one place (e.g. hiding	**Committee to review use of map/ mapping process**		

Land Degradation and Soil Erosion	Plan Details	Progress August 2013	Updated Plan August 2013	Progress January 2014	Challenges
		place for criminals) was noted.			
	Umvoto to facilitate links between the DRDAR and an Extension Officer about appropriate trees to use as windbreaks	Mr. Malgas	**Committee to review**		
	Committee to identify preferred trees for windbreaks	Committee identified fruit trees and will explore trees such as pine which have long roots. Had initially thought of gum trees but Mr. Malgas advised against them.	**Committee to discuss trees for windbreaks with Mr. Malgas, Extension Officer**	Trees suitable for windbreaks discussed.	
	Committee to take action towards planting wind breaks	Identified places and possible trees.	**Committee to acquire trees for wind breaks (approach mayor and Department of Environmental Affairs by 31 August 2013)**	Where to acquire trees discussed	Committee has applied for trees from the municipality but is still awaiting them
Swales and contours	Umvoto conducted training on putting in contours and maintaining and repairing existing contours	Training guides provided	**Committee to review**		
	Committee to appeal to headman or councillor to pressure the municipality/ Department of Public Works to maintain and repair existing contours	No progress.	**Committee to appeal to headman or councillor to pressure the municipality/ Department of Public Works to maintain and repair existing contours**		

Land Degradation and Soil Erosion	Plan Details	Progress August 2013	Updated Plan August 2013	Progress January 2014	Challenges
Brush packing lapesi and black wattle	Committee to identify brush pack bare areas with the assistance of Umvoto	Brush packing is happening on smaller dongas. Committee has started to do some brush packing and training with people cutting lapesi who have agreed to take it to the dongas and pack them instead of burning it. The committee plans to extend the terms of reference of the lapesi project by discussing with Land Care at the Municipality – next meeting 31 August 2013	**Committee to follow up**		
	Umvoto to provide information on the use of lapesi in brush packing	Training guides provided	**Committee to review**	Only Lapesi Project people were taught to do brush packing. In the next community meeting the Lapesi Project people aim to educate community members about brush packing	
	Committee to lead activities towards the control of the spread of invasive alien vegetation	Committee will undertake as part of Land Care Project	**X**		

Land Degradation and Soil Erosion	Plan Details	Progress August 2013	Updated Plan August 2013	Progress January 2014	Challenges
	Umvoto to provide information on the use of ring-barking methods	Training talk held	**Committee to review**		
			Committee to make progress in brush packing, use of lapesi to pack eroded areas, eradicating lapesi and creating micro-catchments to control soil erosion on slopes and hillsides	There is a project that is responsible for eradicating the lapesi in the mountains in UpperTsengiwe. Brushpacking is underway in most of the Upper Tsengiwe dongas.	In the next headman's meeting the committee will discuss how the Lapesi project can come to Lower Tsengiwe
Micro-catchments	Umvoto to identify where micro-catchments could be effective	Training talk held	**Committee to review**	There are not enough people to do micro-catchments for all the households in the two villages	Educating people to make these micro-catchments themselves.
	Umvoto to design and conduct training on micro-catchment management	Training guides provided	**Committee to review**		
Grasses	Committee to identify effective grass covers	No progress	**Committee to identify effective grass covers for donga repair**		

Table 4: Agriculture and Crop Cultivation

Agriculture and Crop Cultivation	Plan Details	Progress August 2013	Updated Plan August 2013	Progress January 2014	Challenges
Set up Co-op	Committee Leader to organise training in the establishment of a co-op from the university of Fort Hare	The training has taken place	**X**		
	Committee to retrieve examples of co-operative farming business plans originating in Tsengiwe and elsewhere	Committee has examples	**X**		
	Committee to write a business plan for co-operative farming	The committee has written a constitution for a piggery and poultry co-op and presented it to the members. It has to be signed. Imvaba will send the forms for a business plan, constitution and application for funding.	**Committee to write a business plan for co-operative farming**	**Business Plan**: there is a proposed business plan. It is not yet approved. The business plan will be drawn in October by the co-op members **Shearing co-op**: the shearing co-op has a constitution **Tax Clearance**: the committee is still waiting for the registration certificate which they will receive in December from CIPC **Proof of Tenureship**: they are still waiting for the letter of approval from the headman but they already have informal approval **Motivation CIPRO**: no progress	

Agriculture and Crop Cultivation	Plan Details	Progress August 2013	Updated Plan August 2013	Progress January 2014	Challenges
	Committee leader to approach an Extension officer and/ or Department of Rural Development and Land Reform for funding for co-operative farming	Economic Development and Environmental Affairs Officer coming on 21 September to train people in the terminology required for applications for both shearing, piggery and poultry	**Committee to review progress**		
	Committee to follow up on funding opportunities	No progress	**Committee to get funding approved for sheep shearing co-op**		
			Committee to get funding approved for piggery/ poultry co-op	No funding approved	Siyanda poultry and piggery and sheep shearing shed co-op members list not provided
	Umvoto to provide information on how to register a co-op with CIPRO	Committee has filled in necessary forms	**Committee to register sheep shearing co-op with CIPRO**		
Irrigated Agriculture	Committee to determine the use of water from the dam	The Headman and committee are identifying priority areas	**Committee to review progress**	Committee did not review Umvoto information or maps	
	Committee to determine which areas are irrigated under current projects	This has been mapped	**Committee to review use of map/ mapping process**		
Dry Land Agriculture	Committee to map the fields outside of household gardens without irrigation	This has been mapped	**Committee to review use of map/ mapping process**	Tsengiwe is listed as village number three to be fenced by the Xhalanga Land Care Project. Fence measurements were taken in July 2013	

Agriculture and Crop Cultivation	Plan Details	Progress August 2013	Updated Plan August 2013	Progress January 2014	Challenges
Sheep Shearing	Committee to assess repairs and extension of sheep shearing shed	The committee must first register as a Co-op to get assistance with agricultural matters and infrastructure repair. The registration application will be sent through in October, processed in November and determined in December. Work will likely start in April 2014	**Committee to repair sheep shearing shed**	No progress	
Composting at Household Level	Committee to train individuals and/ or households in composting	In the community meetings at the headman's home on July 15 and 16, 2013, the committee encouraged people to compost (60 people from Tsengiwe attended this meeting). It is a challenge because the elderly people need youth to assist them with household/ garden labour but the youth do not see the value. "They will take it more seriously if it comes from an outsider" – mentioned to Mr. Malgas. The committee plans to continue with encouragement and training and discuss it in committee meetings	**Committee to discuss household composting at the next community meeting**	Not discussed because it is still too dry to teach people. Waiting for summer rains.	

Agriculture and Crop Cultivation	Plan Details	Progress August 2013	Updated Plan August 2013	Progress January 2014	Challenges
		and involve clinic.			
Household Food Gardens	Committee to make seeds, seedlings and fruit trees available to households	Could not get seedlings as the Social Development Department was going to bring them but did not. The committee spoke to Mr. Malgas about fruit trees but will struggle to water them. Challenge is not seeds or pruning but lack of water.	**Committee to make seeds, seedlings and fruit trees available to households**	Pat has organised Social Development to come to Tsengiwe on the July 18, 2013. As yet no seedlings have been provided as there is no rain.	
	Committee to educate households on crops suitable for different seasons	No progress	**Committee to discuss crops suitable for different seasons, particularly frost and dry seasons, and poultry rearing at the next committee meeting**	Crops suitable for frost and the dry season were discussed at the community meeting on September 10, 2013. The extension officer advised the community to plough potatoes during the dry season. The community was advised that peas, cabbages, and onions are suitable for the frost season. No discussion on other alternative crops as the committee is still seeking advice from the Department of Agriculture. How to care for poultry was discussed in terms of feeding and diseases at the community meeting on September 10, 2013.	

Agriculture and Crop Cultivation	Plan Details	Progress August 2013	Updated Plan August 2013	Progress January 2014	Challenges
	Committee to make contact with an Extension Officer to provide information on which crops are suitable for each season	The committee has information on what crops are suitable but the issue is fences and water. There is an increase in drought activity which is affecting entire crop and seed planting.	**X**		
Pruning	Committee to assist with pruning and grafting.	The committee assisted 9 households with pruning (21 trees in total). Few people have fruit trees due to water shortage. 90% of households have chickens	**X**		

Table 5: Animal Grazing Management

Animal Grazing Management	Plan Details	Progress August 2013	Updated Plan August 2013	Progress January 2014	Challenges
Plan for camps	Committee to map the location and extent of communal grazing land; which land is to be used for grazing or ploughing only; homes that are on communal grazing or ploughing land	This has been mapped	**Committee to review use of map/ mapping process**	Not reviewed	
	Committee to map where stock water dams are to be located in each camp	This has been mapped	**Committee to review use of map/ mapping process**	The committee has decided on the location of the following stock water dams: Grazing camp 1 (Kwancoko): the local was chosen because the Krwaqaza passes through this grazing camp. Grazing camp 2 (Kwamnethe): there is a spring which does not run out of water so the camp will have a water source Grazing camp 3 (Matyeni): The rain water is the main supply at the camp because the water runs down the dongas to the dam Grazing camp 4 (Ngaphokoqolo): There is a river (Tsomo River) that will provide water	

Animal Grazing Management	Plan Details	Progress August 2013	Updated Plan August 2013	Progress January 2014	Challenges
				for the animals	
Fencing	Committee to measure how much fencing would be needed to secure communal grazing	Committee to get the counting when from Mr. Malgas. First the committee must meet with the headman and sub-headman and work with the village on the other side of the mountain to determine fencing borders.	**Committee to get counting wheel and organise meeting with Headman and/ or sub-headman and neighbouring village and measure how much fencing would be needed to secure communal grazing fields and determine official borders of the village.**	The committee did not measure grazing fields. The committee got the wheel from the Department of Agriculture but since it was the festive season they had to return the wheel before they started measuring the grazing fields. After Masiphile (one-stop centre) re-opened on January 6th, Pat tried to get Mr. Malgas from Department of Agriculture to give the committee the wheel so that they can continue with the work. This is still pending but the committee (namely Mr. B.W. Makhohliso) to meet with Mr. Malgas to discuss the matter further at the end of January. The new committee members will try to make an appointment with the Headman and municipality. The official borders of the village have not been determined.	All of the members from the Animal Grazing Committee resigned, including the leader Mr. Victor Matshotyana.
	Committee to estimate	Mr Malgas to give the	**Committee to estimate**	No cost given	

Animal Grazing Management	Plan Details	Progress August 2013	Updated Plan August 2013	Progress January 2014	Challenges
	the cost of the required fencing for communal grazing fields	committee costs on the price of one km of fencing on 6 August 2013	**the cost of the required fencing for communal grazing fields**		
	Committee to measure how much fencing would be needed to secure communal ploughing fields	The committee will get the counting wheel from an agricultural extension officer. The committee plans to meet with headman on 20 August 2013. Meeting with all the committees and households to discuss measuring land by 10 September 2013.	**Committee to measure how much fencing would be needed to secure communal ploughing fields**	The committee got the county wheel from the municipality. 438.135 km of fencing is required.	
	Committee to fence grazing and ploughing areas	No progress	**Committee to fence grazing and ploughing areas**	No progress	
	Umvoto to provide criteria for fencing households	No funding available for households	**X**	X	
	Umvoto to provide information on funding for household fencing	No funding available for households	**X**	X	
Stock census and management	Committee to undertake stock census	Donkeys: 139 Sheep: 9847 Cattle: 2350 Horses 37 Goats: 471	**X**	X	
Donkey and Cattle Management	Committee to determine with community the maximum number of donkeys allowed per household	This was seen as too political so will be discussed first with the Headman and then at the next community meeting	**Committee to discuss the donkey management system at the next community meeting and determine how**	Maximum number of donkeys allowed per household has not been determined. People who own donkeys don't want to reduce the	

Animal Grazing Management	Plan Details	Progress August 2013	Updated Plan August 2013	Progress January 2014	Challenges
			maximum number of donkeys per household	number of donkeys. The committee raised the issue of donkey ownership in a meeting that was held at the Headman's place on September 23rd 2013 but no solution was reached. In the next meeting the committee will raise the issue again and try to reach a solution. No date has been set for this meeting. The Agriculture and Crop Cultivation M&E group said that no action was taken at the community meeting on September 10th, 2013 because donkey owners were not present at that meeting.	
Umvoto Resources	Umvoto to provide contact with DRDAR, Community greening books and D. Versfeld Training Guides	Provided	**Committee to review this information**	Not reviewed	

Table 6: School Greening

School Greening	Plan Details	Progress August 2013	Updated Plan August 2013	Progress January 2014	Challenges
Comprehensive Greening Plan for Pakamani and Tsengiwe Junior Secondary Schools	Committee to initiate a discussion with the school principal and School Governing Board (SGB) of both Junior Secondary Schools	Discussion initiated with Principal Gongoga (Pakamani) on 5 June 2013; Principal Ndelen (Tsengiwe) – wrote letters on visit to Three Crowns and shared the costs of a tour on 18 June 2013 with principals and teacher in charge of project, one SGB member, two girls and two boys – they were very surprised	X	X	A challenge with the School Greening M&E was that Sibusiso (M&E surveyor) got sick and the surveys were with him
	Committee to work with principal and SGB to write a plan for school greening	The Committee will write plans on 20 August. The Committee has not yet contacted the department of Health and Education, but this is the next planned step	**Committee to work with principal and SGB to write a plan for school greening**	Committee worked with Pakamani and Tsengiwe Junior Secondary to write a plan for school greening but the M&E team did not present the plans or dates of meeting	
	Committee to identify potential of: • Getting rain water tanks working • Getting toilets • Initiating discussion with Department of Public Health and Department of Education • Building greenhouses • Snake pipes for hot	• The Committee has discussed the tanks and recycling with the schools but both say there is no funding • Collecting bottles is underway at Pakamani – will build greenhouses when there is enough • Boys from Pakamani have collected plastic bottles to take to the	**Committee to make progress in:** **• Getting rain water tanks working** **• Getting toilets** **• Initiating discussion with Department of Public Health and Department of Education** **• Building**	Committee identified progress in: • Initiating discussion with Department of Education (not Department of Health) • Building greenhouses • Bottle project with children (recycling) • Planting trees or hedges at school • Vegetable gardens	

	water • Made contact with Mbeula and Three Crowns (invite to Tsengiwe and source materials for resource centre) • Bottle project with children (recycling) • Planting trees or hedges at school • Vegetable gardens • Make compost	committee in exchange for oranges • Planting trees or hedges at schools has been discussed with Mr. Malgas – have to buy or have donated (Land Care Project) • There is a vegetable garden but it needs to be fenced • There is no material to make compost but will do it when there is grass	**greenhouses** **• Snake pipes for hot water** **• Made contact with Mbeula and Three Crowns (invite to Tsengiwe and source materials for resource centre)** **• Bottle project with children (recycling)** **• Planting trees or hedges at school** **• Vegetable gardens** **• Make compost**	• Make compost Progress not made in following areas: • Getting rain water tanks working • Getting toilets • Snake pipes for hot water • Made contact with Mbeula and Three Crowns (invite to Tsengiwe and source materials for resource centre)	
	Committee to develop a funding plan for the purification of water, cleaning and maintenance	X	**Committee to develop a funding plan for the purification of water, cleaning and maintenance**	No progress identified	
	Umvoto to send materials on school greening	Materials brought during Workshop 3	**Committee to review**	The committee followed up with contact made with Three Crowns and Mbewula (visit July 18) and took three students from each of two schools. The committee plans to build a greenhouse for both schools with the help of the children. The committee has used Umvoto's information on school greening to encourage and assist both schools with vegetable gardens; planting trees as	

				windbreaks and making compost.	
	Committee to initiate training for the school gardener	Committee to train gardener on 31 August 2013	**Committee to initiate training for the school gardener**	Sibusiso the school gardener has been trained (19-24 August) in making compost with six boys from the school assisting him; laying out of plots and paths' and how to grow seedlings and protect them against frost	
	x		**Committee to make contact with Three Crowns, Mbewula, Department of Education and Department of Health regarding School Greening**	The committee met with Three Crowns on July 18 and discussed water recycling, how to make compost, how to build a greenhouse and how to grow seedlings. The contact person at the school (no name provided) is prepared to assist both schools with any challenges they have. Tsengiwe Junior Secondary has followed by supplying oranges to students who collect empty bottles and compost has been made at Pakamani school. Both schools have collected plastic bottles under leadership of Mrs. L.S. Dokolwana. The committee plans to assist both schools to build greenhouses with the plastic bottles.	

				Tsengiwe Junior Secondary has established a vegetable garden. The committee has also made contact with the Department of Education which informed them where the committee can apply for funding. No follow up specified in M&E survey.	
	x	Three Crowns has three funders – Committee to get in touch with the funders and notify principals	**Committee to identify Mbewula and Three Crowns funding sources and develop funding plan for School Greening of Tsengiwe and Pakamani Schools**	No progress identified	

APPENDIX 7

STUDY TEAM CAPACITY BUILDING

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APPENDIX 7A: CAPACITY BUILDING

CAPACITY BUILDING STUDENTS AND JUNIOR STAFF

Table 1: Student and Recent Graduates Involved in Project

Forename(s)	Surname	Gender	Race (White, Indian, Coloured or Black)	Qualification	Institution	Country of Origin	ID or Passport number	Proof of Registration Submitted	Tasks
Jessica	Lee	F	W	B Soc Sci (student)	University of Cape Town	South Africa	8809220146084	Yes	Chief videographer
Vakanai	Shoko	M	B	BSc (Hons) (student)	University of Stellenbosch	Zimbabwe	BN049090	Yes	Weather data analysis and GIS mapping
Willem Stefan	Conradie	M	W	BSc (Hons) (student)	University of Cape Town	South African	8810045244088	Yes	Proofreading, revision and development of indices
Paula	Hay	F	W	MA (student)	University of Cape Town	South Africa	8705310501081	Yes	Social anthropology researcher, report writing, and video supervisor
Olivia	Davis	F	W	B Soc Sci (student)	University of Cape Town	South African	8809290108089	Yes	Field work, reporting and processing of information
Amy	McConaghy	F	C	BA (Hons) (recent graduate)	University of Cape Town	Britain/ South Africa	706833102	Yes	Graphics
Greg	Dor	M	W	BSc (Hons) (recent graduate)	University of Cape Town	South Africa	9006185289087	Yes	Data analysis, reporting and Risk Assessment

Forename(s)	Surname	Gender	Race (White, Indian, Coloured or Black)	Qualification	Institution	Country of Origin	ID or Passport number	Proof of Registration Submitted	Tasks
Sinawo	Jack	M	B	BSc (Hons) (recent graduate)	University of Fort Hare	South Africa	8910165800089	Yes	Hydrocensus
Bosenberg	Erin	F	W	MFA (student)	University of Witwatersrand	South Africa		Yes	Workshop 1 video production
Naledi	Maponopono	F	B	BSocSci (student)	University of Cape Town	South Africa	9210050541081	No	Translation of surveys and film script English into isiXhosa
Danielle	Sher	F	W	Television Production (Hons) (recent graduate)	University of Cape Town	South Africa	9011190033082	No	Project video production

Jessica Lee was an intern at Umvoto Africa during June and July 2012 as well as December and January 2012 and 2013. She was an undergraduate student in Environmental Science and Philosophy at the University of Cape Town (UCT). She was involved on the WRC project: Capacity Building for Climate Change Adaptation and Disaster Risk Reduction in Rural South African Communities: Tsengiwe, Eastern Cape. as chief videographer during initial stages on the project and undertook field work in the Eastern Cape.

Olivia Davis was an intern working at Umvoto Africa, also completing a postgraduate course in Environmental Economics part time. She assisted with field work relating to Monitoring and Evaluation in the Tsengiwe community and helps with the reporting and processing of information on this project.

Amy McConaghy is a recent graduate from UCT. She completed her BA(Hons) in history and has assisted with the graphics in the report.

Greg Dor recently graduated from UCT with a BSc(Hons) in Environmental Geographical Science (EGS). He has worked on data analysis, reporting on water policy and legislation at the national and provincial level, and the Risk Assessment in this project.

Paula Hay is a Masters student at University of Cape Town, studying social anthropology. She was involved in the first Umvoto WRC project 188/1/11as an intern. She assisted with the case study research and development of indicators for social vulnerability and coping capacity at the community level. She has joined the project team as a social anthropology researcher and is supervising the production of the final video.

Vakanai Shoko is completing his Master's degree in Geoinformatics and is a full time employee at Umvoto. He completed the weather data analysis for Tsengiwe and has developed many of the maps used for the project on GIS.

Willem Stefan Conradie developed and adapted simple, applicable and easily comparable indices for risks of weather-related extreme events, based roughly on measures that have been applied in similar contexts. He then helped compute the values of the indices for the broader region around Tsengiwe. For the relevant sections of the report, he did proofreading and revision.

Sinawo Jack is a junior Hydrogeologist who assisted with the data collection and analysis for the hydrocensus.

Erin Bosenberg is a Masters student at Wits University. She was involved as an intern in the production of the Disaster Risk Reduction video produced for the 2012 workshop doing editing and voice over work.

Naledi Maponopono is completing her Bachelor of Social Sciences in Public Policy and Administration, Sociology and IsiXhosa Language and Literature Studies. She will graduate in December 2014. Naledi translated all project Monitoring and Evaluation surveys and worked with the video producer to develop an IsiXhosa version of the Project Video, including translating the script and doing the voice over.

Danielle Sher received her Honours degree in Television Production in December 2013. She assisted with the Project Video script and edited and produced the final video.