THE ROLE OF KNOWLEDGE IN A DEMOCRATIC SOCIETY: INVESTIGATIONS INTO MEDIATION AND CHANGE-ORIENTED LEARNING IN WATER MANAGEMENT PRACTICES

Report to the
Water Research Commission

by

Jane Burt, Heila Lotz-Sisitka, Nina Rivers, Robert Berold, Monde Ntshudu, Tim Wigley, Mindy Stanford, Treve Jenkin, Mangaliso Buzani & Ewald Kruger

Environmental Learning Research Centre
Rhodes University

WRC Report No. 2074/1/13
ISBN 978-1-4312-0519-6

March 2014

Obtainable from

Water Research Commission
Private Bag X03
Gezina, 0031

orders@wrc.org.za or download from www.wrc.org.za

Executive Summary / Mapping of the Research Project

Name of the project:

Change Orientated Learning and Water Management Practices

Key objectives of the research project:

1. Identify and support the skills that are needed to mediate learning about water management practices in an Eastern Cape community. For this project, the practice of rainwater harvesting will be used as an example.

2. Research the development of a knowledge resource that could be used to develop the capacity of community-based mediators of water knowledge. The resource will be developed in response to and in support of an existing community-based water management practice in the Eastern Cape: for this project, the practice of rainwater harvesting in the Cata area near Keiskammashoek.

Type of research: Interdisciplinary *educational research*

Starting points of the research project: This project emerged from two previous Water Research Commission (WRC) research projects. In 2006 Heila Lotz-Sisitka and Jane Burt (Lotz-Sisitka, 2006) undertook research on participation in the establishment of integrated water resources management (IWRM) structures. They found that while much emphasis had gone into the establishment of water resources management structures, very little attention was being given to building people's capacity to participate effectively in these structures. Access to and the ability to make use of knowledge resources about water resources management is a key aspect of such capacity building.

Burt and Robert Berold (2012) undertook a study on the use of knowledge and learning resources about water and its management and of how such resources were being used. They found that while many useful knowledge and learning resources were being produced, both within and on behalf of the water sector, not many people were consulting or using them. A clear finding of the study was therefore that more attention should be given to the mediation of knowledge about water and its management, with the aim of reaching a better understanding about how such knowledge is used and what makes it meaningful to people on the ground.

Mediation of knowledge: Mediation of knowledge involves a process of interaction between people and learning resources so as to enhance the learning process. The process of mediation has socio-cultural and historical dimensions and involves language as well as the creation of meaning. To inform the research programme, the researchers drew on learning theories that

support democratic participation in learning, and that can help to explain how mediation takes place within a learning process. Such theories are known as social-cultural or social learning theories. The theories helped explain how to link everyday knowledge and experience with new knowledge, which is often contained in the knowledge resources produced by institutions such as the WRC.

Assumptions: The research programme assumes that there is a need to engage more critically with the assumptions (underlying and otherwise) that inform traditional approaches to the dissemination of knowledge within large-scale scientific institutions. The core assumption of the programme is that knowledge dissemination is not just a one-way process, but a two-way interaction, in which all parties involved in the interaction have to "make connections" between people's everyday experiences and practices and new knowledge; and that this takes place via mediation.

The research process and outcomes: The research process was framed within a 3-phase process (illustrated in Figure 1 below). The overall project (this is captured in Deliverable 2: Project Design) has the broad objective of enhancing democratic participation in water management practices at community level through learning and improved mediation and uptake of water management knowledge (as outlined in Paper 1). Each phase of the research project produced outcomes that were used to frame and inform the next phase.

Phase 1: **Exploring social learning in the context of water resource management and the contextual profiling to identify community-based water management practices and learning processes.** This phase focused on reviewing social learning and mediation in the context of water resource management. It also included the initial contextual profiling in one site, namely, Cata in the Eastern Cape. The purpose was to identify a range of four community-based water management practices that communities were engaging in.

The core interest was not to document a detailed rendition of the water management practices, but to explore *how these practices were being learned in a social context*. Thus, the core focus of the research was on how communities were learning these water management practices, and what questions or concerns were arising in relation to the practices and the learning processes. However, after the initial focus on four community-based water management practices and the associated learning processes, the research team was advised to focus in more depth on just *one water management practice*. The one selected was *rainwater harvesting practices using rainwater tanks*.

This provided further focus to the research, and allowed the researchers to deepen their contextual profiling and understanding of this practice and how communities were learning it. It also allowed the researchers to identify a set of key issues or questions that were emerging from the practice in order to inform a *question-based learning resource*. The development and pilot testing of this resource was in turn the key focus of Phase 2 of the research.

The **key outcomes** of this phase of the research were therefore: 1) how a change in the practice of water resource management calls for learning as a core interdisciplinary and democratic process; 2) insight into four community-based water resource management practices and how they are learned; and 3) further in-depth insight into one of these practices (rainwater harvesting using tanks) and the learning and mediation associated with this practice, as well as initial identification of issues and community questions associated with the practice.

The details of the first phase of the research are captured in the following documents:

- Paper 1 of the final research report, which sets out the broad interest of the research programme (i.e. in how learning can potentially facilitate democratic water resource management.
- Deliverable 1: *A review of social learning in water resource management* which explores the emergence of social learning in response to changes in our understanding of natural resource management with a particular focus on water.
- Deliverable 3: *Fieldwork report* which tracks the contextual profiling of water management practices in Cata.
- M. Ed. thesis by Charles Phiri entitled "An investigation of community learning through participation in integrated water resource management practices."
- Contextual profiling report in the forthcoming PhD thesis of Nina Rivers.
- Progress report 1.

Phase 2: **Designing and pilot testing a model learning resource based on questions emerging from the practice of community-based rainwater harvesting tanks.** This phase drew on the contextual profiling insights from phase 1, consolidating these into the design and development of a **practice-centred learning resource that has potential for mediation of water knowledge in ways that connect community experiences of practice with new knowledge developed by the scientific community**.

In this phase an expert with extensive experience of working with rainwater harvesting tanks in community contexts, was asked to use his experience to pinpoint key issues within the data generated in community context.

Careful attention was given to the "melding" of community-based everyday knowledge and experience with the new knowledge offered by the expert and associated knowledge resources in the construction of a **question-based learning resource on rainwater harvesting tanks and their use at community level**.

The learning resource was pilot tested in two sites – Cata, and the Sundays River Valley (Glenconnor and Kleinpoort) – to see how communities responded, and to test the scope and nature of the questions contained in the learning resource and their applicability in

different contexts. Careful attention was also given to language issues, and to the mediation process, using the question-based learning resource. The learning resource was translated into Afrikaans and isiXhosa, and home language facilitators were involved in the mediation processes. Different mediation approaches and styles were documented.

The **key outcome** of this phase of the research was further in-depth understandings of a practice-centred approach to learning, and of how this can be mediated using a carefully designed learning resource that is explicitly developed and contextualised to ensure connections between everyday experience and practice, and new knowledge.

The details of Phase 2 of the research process are captured in:

- Paper 2 in this final report.
- In the forthcoming PhD thesis of Nina Rivers.
- Deliverable 4: Question-driven resource (which is included in the Appendix of the final report) and report on the development of the question-driven resource.
- Deliverable 5: Catalogue and report on the development of the catalogue.
- Progress report 1.
- Progress report 2.

Phase 3: **Pilot testing a "Changing Practice" course for water knowledge mediators working in NGO and extension training contexts.** This phase of the research built on the previous two phases and the key lessons learnt and insights gained in Phase 1 and 2 were used to design a course for water knowledge mediators working in NGO and extension training contexts. Thus, the course first encouraged water knowledge mediators to undertake local contextual profiling to identify community-based water management practices, and the issues or concerns (questions) that local communities have about these practices.

From here, course participants were encouraged to clarify the issues or questions associated with the practice that they were focusing on, and to identify new knowledge resources that could be helpful to mediating responses to the questions or issues experienced in the social context. Such knowledge resources were found in knowledge networks, hence participants were encouraged to scope and identify these local knowledge networks; and in knowledge resources published by the WRC and other bodies: these were made more accessible via the catalogue that was developed as part of the research programme. Course participants were supported in their efforts to find ways of accessing water knowledge (e.g. via the Internet, WRC website, Share-Net).

Course participants were then encouraged to develop their own customized question-based learning resource (drawing on the model learning resource developed in Phase 2) which linked the everyday experiences and questions of people and their practices with new knowledge found in knowledge networks and knowledge resources. This resource was

designed for them to use in the context of their knowledge mediation work. Course participants then pilot tested their knowledge resource and reported on its use.

The course was therefore framed to support **improved mediation practices**, in ways that contribute to **changing practices** in the social contexts in which they work. Course evaluation research showed this to be a valuable process, and various further insights were gained into practice-centred knowledge mediation in Phase 3. Recommendations for improving the course were made from these.

The **key outcome** of this phase of the research is a piloted course that supports practitioners in NGOs, CBOs and extension services to improve the way in which they mediate water knowledge. The model developed is not a "transfer" extension and learning model, but **a situated, practice-centred learning model** in which mediation processes respond to emerging questions and issues in social contexts. Knowledge mediators need skills to identify contextual concerns at community level and to then identify new and relevant sources of knowledge that can respond to these, and then to "bring this in" in ways that connect with people's experiences and practices.

The details of Phase 3 of the research are captured in further detail in:

- Paper 3 of the final report.
- Deliverable 6 which captures the course design and curriculum framework.
- Deliverable 7 which reports on the course evaluation.
- The course materials used to guide mediators learning in the course.
- Appendix B of the final report which contains some examples of the question driven learning resources produced by course participants.

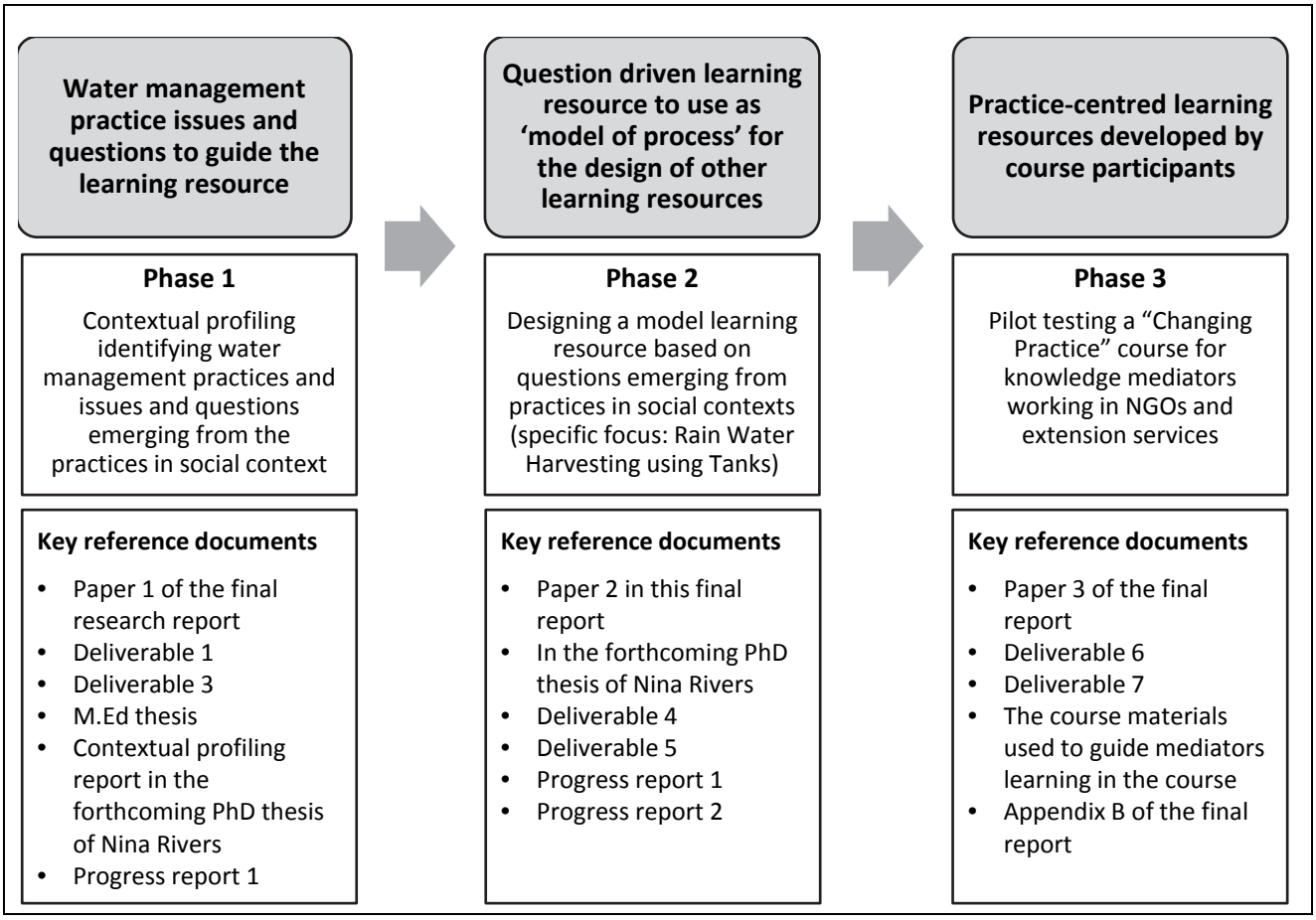


Figure 1: The 3-phase research process

Conclusion – value of the research

A key outcome of all three phases of the research is **a transformational model of learning that adopts a situated, practice-centred approach to the mediation of new knowledge**. This model overcomes some of the weaknesses and assumptions of transfer model approaches to learning and extension where new knowledge is simply "transferred" with little regard for contextual meaning-making and uptake / use of knowledge. The proposed model draws on social-cultural learning theory, and is guided by an interest in the democratisation of water management practices through the access and use of knowledge in changing social practices.

The research shows that knowledge mediation requires that careful attention is given to a range of contextual factors that are social-ecological (or socio-material), historical-educational, linguistic and cultural. The research also shows that it is possible to strengthen support for NGOs and extension service agents that have responsibility for the mediation of water knowledge at community level in ways that ensure that the learning processes contribute to meaning-making in social contexts of practice; thus contributing to changes in practice.

PROJECT TEAM: WRC project K5/2074/1

Change Orientated Learning and Water Resource Management

Project Manager:	Inga Jacobs
Project Leader:	Heila Lotz-Sisitka
Lead Researcher & Project Coordinator:	Jane Burt
Course Coordinator:	Jane Burt
Logistics Coordinator:	Monde Ntshudu
Evaluation:	Nina Rivers
Mentors:	Jane Burt
	Treve Jenkin
	Mangaliso Buzani
Researchers:	Nina Rivers
	Monde Ntshudu
	Tim Wigley
	Ewald Kruger
Writers of resource:	Tim Wigley
	Robert Berold
Editors:	Mindy Stanford
	Robert Berold
Materials rewriter for target readership:	Mindy Stanford
Designer:	Liz Gowans
Reference Group:	Mr MP Nepfumbada
	Ms S Blignaut
	Dr G Raven
	Dr SJC Slabbert
	Dr D Roux
	Dr T Palmer
	Ms S Nienaber
	Mr DR du Toit

CONTENTS

Acronyms and abbreviations

BRC	Border Rural Committee
CBO	community-based organisation
CF	catchment forum
DWAF	Department of Water Affairs & Forestry
EETDP	Environmental Education, Training and Development Practices Learnership
ELRC	Environmental Learning Research Centre (a unit of Rhodes University)
GDP	gross domestic product
GW	grey water
IWRM	Integrated Water Resource Management
NGO	non-governmental organisation
NQF	national qualifications framework
PhD	Doctor of Philosophy
UNESCO	United Nations Educational, Scientific and Cultural Organisation
WESSA	Wildlife and Environment Society of South Africa

Paper 1: Learning as a Core Transformative Process for the Democratic Management of Water

Jane Burt, Heila Lotz-Sisitka, Nina Rivers & Robert Berold

Introduction

This is Paper 1 in a three-part series of papers for the Water Research Commission, all of which investigate aspects of knowledge mediation within the water sector. These research papers respond both to the general problem of scientific knowledge mediation and also to the fact that the knowledge products produced by scientists for the WRC are not being adequately used. This challenge is not confined to the South African context as mediation of scientific knowledge has been identified internationally as problematic and is the subject of intense deliberation (Shaxson & Bielak et al., 2012; Bielak et al., 2008).

In these papers the research interest is to discuss why a focus on knowledge mediation is important for the democratic management of water resources. The researchers believe that in order for people to participate meaningfully in democratic processes, such as those required to manage water resources, knowledge must be mediated. In other words *knowledge mediation is central to processes of participation,* and it is as important to *building people's capacity so that they have sufficient agency to take part in social practices*, such as those required in the democratic management of water resources. It is necessary that participant communities are sufficiently well informed to make sound decisions about both the long term sustainability of the water resource and their immediate water needs.

In an earlier WRC research programme we concluded that while there was a strong emphasis on building participatory water management structures, this was not supported by a complementary development of human capacity: in other words people lacked the agency to make use of the participatory structures (Lotz-Sisitka & Burt, 2006). In response to this finding, Burt and Berold (2011) looked into the matter of how knowledge about the practices of water resources management was being used. They found that plenty of technical information was being generated but that very little of it was being used to make informed decisions about water management. This disjuncture was most apparent at community level.

Thus, the central problem that our research programme addresses is the fact that while much information is produced within the water sector, there is a need to investigate *how such information and knowledge can be effectively mediated.* As the first in the series, Paper 1 seeks to open up a discussion on this topic at a broad theoretical level.

Papers 2 and 3 describe how the research programme began to give insight into such mediation processes. Appendix A provides a learning resource that was produced for mediating practice-centred knowledge acquisition and internalization at community level.

Learning as important as technology

> *It is widely assumed that environmental problems will be solved by technology of one sort or another. Better technology can certainly help, but the crisis is not first and foremost one of technology. Rather it is a crisis within the minds that develop technology. The disordering of ecological systems and of the great biogeochemical cycles of the earth reflect a prior disorder in the thought, perception, imagination, intellectual priorities and loyalties inherent in the industrial mind. Ultimately then, the ecological crisis concerns how we think and the institutions that purport to shape and refine the capacity to think (Orr, 2004, p2).*

How do we know our world? How do we know how to act in it? How do we know right from wrong? How do we know that when we fill up our glass of water from the tap that water will nourish us? How do we know we need water for nourishment?

Knowing *how we know* and *what this means for how we act in the world* is vital. The relationship between the internal mind and the external world is what moulds and shapes what we influence, hurt and love (Daniels, 2008). Just as in any relationship, the internal vision or image of the external object, be it mother, child, lover or enemy, is defined by how we know it. This two-way dynamic form of knowing is the relationship that creates us. It is the core of learning, as explained by Vygotsky (1978) in his cultural historical theory of learning: he shows how mediation is necessary for internalizing that which is produced externally and which becomes available to us via language and cultural artefacts.

Learning occurs regardless of whether we are aware of the mechanisms by which it happens, or of the fact that it happens at all. An engineer or technician might not necessarily consider that what they know of the world has a direct impact on their relationship with the world, or how their knowledge affects others.

This absence of awareness does not reduce the influence of the social practices of the engineer on others. For example, an engineer may design a new water harvesting technology that benefits communities, but without learning and mediation and deliberation on how this technology relates to a community's existing social practices and well-being, the technology might remain unused or under-used. We found, for example, that communities were being supplied with rainwater tanks, but that many socio-cultural and material aspects of using the tanks, security of the tanks being one example, had not been considered. This affected successful uptake and use of the technology. In some cases tanks placed in communal areas were stolen and vandalised.

Changes in educational thinking

Neglect of social dynamics in development thinking and more specifically in water management practice is nothing new. For the past century or so, the world's powerful nations have ridden the wave of scientific progress. Tools and technologies have improved many lives but have, ironically, also contributed to the current environmental problems we now face and, the ongoing marginalisation and exclusion of people. People's exclusion from effective participation in water management practices (such as the successful use of rainwater harvesting tanks) is part of this general exclusion.

In response, concepts such as "sustainable development" have pushed their way into everyday usage. There is a growing fear that the very way of knowing that has propelled humans to the top of the pile may also be responsible for human decay. The concept of sustainable development is itself debated, with many economists and politicians still believing that technology and science will somehow save the day (Beder, 2006). The idea of using our resources in a way that preserves the world for future generations is debunked as a sweet but romantic notion. Some economists question whether in fact it matters at all that we are changing the ecology of the world (Beder, 2006). They make the point that if we give future generations sound technology to replace what we have destroyed, then aren't the laments over loss of biodiversity and resource depletion just the bleating of old fashioned traditionalists? Narratives along this line of thinking tend to turn people's attention away from social awareness, including social participation in water management practices.

Other economists, such as J. Schuitema, recognise that the institution of economics is facing a crisis.

> After decades of sipping at the cup of experience, observations and reflection, old men become perplexed when they witness the ailing demise of a very old friend; one that generally could be trusted to do the right thing; that ensured a balance of power and that spread enablement and empowerment by providing us with sustenance both in means and meaning and whose unwritten but clearly understood intention was to serve, reflected in behaviour that constantly wooed the approval and loyalty of those whom they served.
>
> That friend is business. It now ranks as the second least trusted institution in society, second only to government. It has been afflicted with one of the most virulent behavioural diseases known to man: the demise of long term thinking, or short-termism. In the process, corporates have become larger, more pervasive, global and influential and have adopted a risk averse survival mode, accumulating, concentrating and growing capital delinked from creating tangible wealth; discouraging the trickling down of wider distribution of employment, wealth and opportunity. At the same time it has trampled on the principles of empathy, generosity and compassion, marginalising other constituents such as labour and customers (Schuitema, 2014).

Whichever side of the track we stand on, the picture is not rosy, especially when it comes to water use and management in South Africa. A quarter of South Africans have no job at all.

Eighty per cent of our fellow humans across the world live on less than US$ 1 per day (just over ZAR 10 a day) (Global Issues, 2014). Where is the enlightened age of science in this scenario?

Global statistics on water draw attention to the relationship between water and human well-being. For instance 1.1 billion people in developing countries do not have adequate access to water, and 2.6 billion lack basic sanitation. Access to piped water within the household averages about 85 per cent for the wealthiest 20 per cent of the population, compared with 25 per cent for the poorest 20 per cent. There are some 1.8 million child deaths each year as a result of diarrhoea and close to half of all people in developing countries at any given time suffer from a health problem caused by water and sanitation deficits (Global Issues, 2014).

To these human costs can be added the massive economic waste associated with the water and sanitation deficit. The costs associated with health spending, productivity losses and labour diversions are greatest in some of the poorest countries. Sub-Saharan Africa loses about 5 per cent of GDP, or some US$ 28.4 billion annually, a figure that exceeds total aid flows and debt relief to the region in 2003 (Global Issues, 2014).

Education for sustainability

This year, 2014, we are in the last year of UNESCO's decade of education for sustainable development. Education, as an important element in the environmental movement (UNESCO, 22 March 2014), is acknowledged as a critical component of change, but what kind of education are we talking about?

David Orr, in his book, *With Earth in Mind*, asks us to consider what we are educating for. His critique is mostly of formal education systems, but it applies also to the informal education systems and capacity building processes that have become popular in almost every institutional setting. Education and training have become a multi-billion-rand business with the assumption that all this education will better our capabilities and make us more efficient. Orr argues that the aim of education is mostly to prepare the young to function in a global economic system. Much of adult training and capacity building has the same aim. People are paid to train employees to become better at their job. Orr laments that we are still educating our children as if there is no planetary emergency: it is business as usual (Orr, 2004).

What Orr is challenging us to consider is that the very way in which we think and know is part of the current ecological crisis. If education is to be an answer to dealing with ecological devastation, then how we educate and for what purpose become vital questions. To gain more insight into how one may avoid business-as-usual type thinking in the development of water mediation programmes, it is helpful to examine literature from the education for democracy tradition.

Education for democracy

> *There is no such thing as a neutral education process. Education either functions as an instrument which is used to facilitate the integration of the younger generation into the logic of the present system and bring about conformity to it, or it becomes "the practice of freedom", the means by which men and women deal critically and creatively with reality and discover how to participate in the transformation of their world. (Shaull, in Freire, 2014, p16)*

It is assumed that education leads to betterment. A child must attend school. It is assumed that what children get from school and what all of us get from educational interventions is knowledge (in the form of information) and that this knowledge will automatically lead to a better life for all. It is a lack of education that is often blamed for "the way things are". Orr (2004) calls this assumption into question:

> The truth is that many things on which our future health and prosperity depend are in dire jeopardy: climate stability, the resilience and productivity of natural systems, the beauty of the natural world, and biological diversity… It is worth noting that this is not the work of ignorant people. Rather it is largely the result of work by people with BAs, BSCs, LLBs, MBAs and PhDs (Orr, 2004, 7).

Both Freire and Orr ask us to reflect on what education is for. For Freire, education can be used either to perpetuate a status quo of inequality, or to challenge it. Similarly, Orr asks whether education is helping us solve the environmental problems in our world, or is actually perpetuating them. Weisel, in Orr (2004) says it is because "it [education] emphasised theories rather than values, concepts rather than human beings, abstraction rather than consciousness, answers instead of questions, ideology and efficiency rather than conscience."

"Education" in Orr's words "can be a dangerous thing, and it is dangerous for more reasons than Weisel gives." Weisel states that it emphasises theories rather than values. While this may be the case, values are nonetheless present, since nothing is free from values, whether they are explicit or assumed. Often it is the hidden curriculum (Eisner, 1985) that remains unquestioned, yet is imparted to learners and directly affects how they understand themselves in relation to the world. Orr argues that the values held within the hidden curriculum, such as the values of economic growth or materialism, are embedded within education and the structures of education and prepare learners to serve an economic system that does not value the environment, as has been the case in South Africa and many other countries around the world. In pre-democracy South Africa, not only were people poorly educated, but their education and the way it was taught and structured also served to exclude them from participation in the kinds of social practices necessary to ensure their well-being.

Education and mediation processes usually reflect the dominant values of the society. This begs the question "Can education and mediation really bring about environmental and social justice if the dominant reason for education is economic growth?"

Paulo Freire (1996), the Brazilian educator, politician and revolutionary who wrote in the 1970s, believed it could. He called for a revolution within education. Instead of using education and learning as a tool for perpetuating the status quo he argued that it could be used as a tool for transformation and that this transformation can only happen through dialogue and reflection. He argued that education could be a democratic process and thus a process through which people learnt to value and work for democracy. This could only be done if "the word" (meaning knowledge and concepts) contained two dimensions: reflection and action. He criticized the traditional knowledge-transfer mode of teaching as static, where the teacher narrates the subject to the listening object (the student). In Freire's view a one-way process rendered the content "lifeless and petrified" whether it was "values or empirical dimensions of reality" (Freire, 1996, p52). Content transferred in this manner becomes "detached from reality…emptied of their concreteness and becomes a hollow, alienated and alienating verbosity" (ibid, p52).

The work of Freire, undertaken in community education contexts, provides some guidance for thinking about the mediation of water knowledge. From him we learn that the mediation of water knowledge cannot simply be a transfer process but needs to be linked to practice and action. Freire's work also alerts us to the possibility that such mediation work can also be transformative. He suggested that education that transforms cannot be an act of transference, but rather that such education involves processes of dialogue. "Dialogue" he argued "is the encounter between men [and women], mediated by the world in order to name the world" (Freire, 1996, p70). It is not "an act of one person's depositing ideas in another nor can it become a simple exchange of ideas to be 'consumed' by the discussants" (ibid, p70). He saw it is an act of love.

> The naming of the world, which is an act of creation and re-creation, is not possible if it is not infused with love. Love is at the same time the foundation of dialogue and dialogue itself. It is thus necessarily the task of responsible subjects and cannot exist in a relation of domination. Domination reveals the pathology of love: sadism in the dominator and masochism in the dominated. Because love is an act of courage, not of fear, love is commitment to others. No matter where the oppressed are found, the act of love is a commitment to their cause – the cause of liberation. And this commitment, because it is loving, is dialogical. As an act of bravery, love cannot be sentimental, as an act of freedom, it must not serve as a pretext for manipulation. It must generate other acts of freedom; otherwise it is not love. Only by abolishing the situation of oppression is it possible to restore love which that situation made impossible. If I do not love the world – if I do not love life – if I do not love people – I cannot enter into dialogue.(Freire, 1996, pp70-71).

In a postscript Freire writes that he does not believe revolution is possible without love, and thus democracy and education-for-democracy carries with it a fundamentally different set of values to what Orr relates and to what all South Africans have experienced. Freire's ideal is one of education as a force of collective action and change. From this, it is possible to suggest

that mediation of water knowledge is not just a matter of technical transfer, nor is it devoid of ethical commitments to public good and the well-being of all humans and non-humans.

Understanding how we learn

While so far we have given a broad review of thoughts on education and learning, there is a need for a deeper understanding of how people learn, and particularly of the processes of mediating water knowledge. In our earlier research we argued that: “Even if they do not consider it their field, water communicators and mediators need some understanding of theories of learning. Whether consciously or unconsciously, we all draw on theories” (Burt & Berold, 2012, p9).

Along with the often-dominant approaches to education and learning that are based on transmission metaphors there are misconceptions about how learning happens. This is partly because such processes are complex, and require knowledge of the historical development of educational theory, including epistemology (ways of knowing) in order to be fully grasped.

Some often observed conceptions and *therefore also misconceptions* about learning have to do with two related things: how we understand ourselves as a “human in the world”, and how we know about ourselves and our world (epistemology).

Freire and Orr have critiqued particular ways of being and knowing and suggested alternatives. The different perspectives that they describe depict particular epistemological positions.

The epistemology of Cartesian science has, over the last few centuries, dominated how we view learning and knowledge. The often unquestioned epistemological position is that the object (in this case the environment or water) can be known objectively by the subject observing it. Another way of saying this, is that the subject is understood to be separate from what it is observing and that this separateness allows for objectivity. To ensure objectivity, values and value judgements are equated with bias and need to be controlled. The scientific method aims to remove all value bias and even to contextual bias by isolating phenomena in what is perceived to be a neutral context, such as the laboratory. Thus we get technologies that are assumed to be equally workable for all people in all contexts. This assumption leads to a neglect of mediation and learning associated with the technologies or scientific outcomes.

The learning theory that draws on these assumptions of Cartesian science is known as positivism. The outcome of a positivist epistemological position is to see learning as a process of *transferring* to the learner what is in this perspective assumed to be *objective* and *value free* information about the world. The context out of which this knowledge has been generated is seen as inconsequential, as is the learner’s own context. This perspective has led

to what Freire calls the “banker’s model” of education where facts are seen as knowledge and an educated learner is one that has banked a lot of knowledge (Peters et al., 2013).

The process of learning is affected by this epistemological position. The learner’s internal environment (what they know) and their external environment (the context within which they know it) is ignored. This is why schools teach a set syllabus, use textbooks, and conduct the teaching in a classroom where children sit and absorb the knowledge presented to them by the teacher.

This epistemological position has also affected the practice of managing water resources and the role of learning within that process. This can be clearly seen in the way in which the Water Research Commission has in the past understood its role as a knowledge producer for the water sector. Research is funded. The results are published in technical reports and transferred to water practitioners who then use the information to change the way they do things.

However turning this knowledge into practical wisdom (Peters et al., 2013), which is integrated and applied, is a different process. This has significance for the way in which we conceptualise water-mediation processes and develop materials and courses to support learning. The primary element missing in the “banking” model of learning is an understanding of how learning occurs in practice. In other words, an understanding that learning is contextually embedded, physically, socially and culturally.

Conceptualising learning in ways that take account of mediation and integration of knowledge and practice

Constructivist and situated learning approaches

In a recent WRC report (Burt & Berold, 2012) on knowledge flow to communities it was explained: “Constructivist theories propose that knowledge is constructed through language and cultural experiences.” As such, learners construct knowledge that “fits their own experience of reality” (Vygotsky, 1978; Berger et al., 1967). This means that we learn through our interaction with others in response to changing situations. We also learn by applying what we know and responding to what happens. Situated learning theory, which builds on constructivist learning theory, emphasizes that we learn through social practices, for example, through managing our use of water in particular ways (Burt et al., 2011, p11). In these processes Vygotsky’s work alerts us to the importance of mediation between everyday experiences and new forms of (often more abstract) knowledge or “scientific concepts”. This is often what training programmes try to do, i.e. introduce more abstract or new forms of knowledge. The crucial aspect of Vygotsky’s work is that it reminds us that doing so requires a form of pedagogy in which the scientific concepts should connect with people’s everyday

knowledge so that the concepts make sense and can therefore become internalized. This brings the processes of mediation to the fore.

Constructivist notions of learning have gained general acceptance, along with notions of participatory learning. This has happened mainly because people are disillusioned with "the 'banking' model of education in which one 'pours' knowledge into someone as if they were a bank" (Mukute, 2010, p68). As indicated above, Freire called for an education approach that focused on developing self-awareness and empowered people – a transformative process that happened between people rather than as a one-way flow from the informed to the ignorant (Freire, 1996). This type of approach places learning at the centre of social life, inseparable from culture, language, values and beliefs. It also views the production of knowledge and the understanding of what knowledge is as both context-specific and culture-specific.

Those involved in education are often faced with complex problems that are not within the power of an educator or a community to solve. Yet it is often the case that educational projects have unrealistic ideals about what a school class or community can do to address a big environmental problem (Cook et al., 2001). Playing into this absence of realism is the fact that poor people are often asked to take on complex environmental problems in their area, which even the most educated and well-resourced person would not be able to solve. The process of learning therefore needs to incorporate a sense of perspective about what can and can't be done within a particular context.

Social learning approaches

Another way of understanding learning as a mediated social process comes from Wals (2009) (as quoted in Mukutu, 2010), who talks about the transition from an industrial society to a risk society – one characterised by uncertainty, unpredictability and insecurity. In a risk society the aim of learning is not just to know, but also to be able to organise (as individuals, and as organisations, communities and networks) in order to be "more reflexive, adaptive, and more sustainable" in a world where human actions have consequences that are far more complicated than we can foresee. Social learning is cited as a possible approach to respond to the risks humanity currently faces.

Social learning is not just learning in a formal context, it is an activity that we are engaged in all the time simply by participating in the collective activities and social practices that make up our daily lives. Unlike classroom learning, the learning that happens through the act of doing and engaging with the task of living is not given much attention. This type of learning requires more than facts, it involves engagement with practice: "how people learn from each other as they participate in water practices can transform the way that knowledge is thought about in the water sector. This is because the focus of these theories is on not only providing information, but also on collectively transforming practice" (Burt & Berold, 2012 et al., p9).

While social learning is linked to almost every form of human activity and also to animal activity [see a paper by Heyes entitled “Social Learning in Animals” (Heyes et al., 1996)], our focus in the WRC project is on the mediation of water knowledge for democratic engagement with water management. So the social learning we are referring to is closely associated with education for sustainability and environmental education, with the focus of learning being on the transformation of social practices. Social learning, as defined by Reed et al. (2010) refers to: 1) changes in cognition amongst individuals; 2) changes in social practices; and 3) changes in the activities and actions of social units.

In this research, our interest in mediation of water knowledge is linked to changes in individual cognition and changes in social practices, as these together are likely to inform changes in the practices of social units. The expected outcome of a social learning process is an improvement in decision making, which is said to be achieved by: a) developing resilient social relationships which are key for collective action; and b) developing new understanding and meaning (Cundill & Rodela, 2012).

Water management approach affects attitudes to learning

In the field of water resource management, changes in the management approach have in turn led to changes in people’s understanding of the role of learning. In some contexts learning is now seen as integral to water resource management.

When the management approach to water was focused on infrastructure and demand, learning was understood to be a formal process of accumulating the required technical knowledge of the system in order to get the job done. With the change towards understanding water management as an integrated process that needs to take into consideration demand management, resource conservation and society (which includes issues that arise from the democratisation of water management), the water sector has had to question its understanding of learning and of how we learn to manage a complex socio-ecological system (Munnik & Burt, 2014; Wals, 2007). Part of this process is helping the water sector to understand that learning is a social process that happens through doing by focusing on a water practice, and that learning is done collectively rather than individually, and that it is ongoing rather than being confined to specific compartments (such as an isolated training programme). This approach to learning is referred to as “social learning” or “change-orientated learning” and is core to developing sound water resource management practice (Munnik & Burt, 2014; Burt & Berold 2012; Lotz-Sisitka & O’Donoghue, 2008)

Table 1: Table of shifting practice in natural resource management and parallel changes in an understanding of what we learn and how we learn (adapted from Cundill et al., 2012).

Management practice	Influential discourses	Who learns?	What we learn?	How we learn?
Command and Control	Engineering	Managers	How to engineer the system towards meeting demands and protecting the resource.	Formal education, receiving information and research results from scientists.
Adaptive Management	Systems Ecology	Managers, policy makers and scientists	Ecosystems change under high levels of uncertainty.	Experimentation, monitoring and reflection.
Collaborative Management	Participatory Democracy	Everyone who has a stake in the resource.	How to work together, and how to build relationships.	Deliberation, sustained interaction, exposure of values, knowledge and sharing.

This shift towards a more integrated practice of water management has led to an interest in social learning as a key process. Cundill and Rodela's review of the concept of social learning showed that the water sector has seen a huge increase in the number of research papers referring to social learning. Of all natural resource management sectors, the water sector is by far the most engaged in exploring and applying social learning research (Cundill & Rodela, 2012). Cundill and Rodela's study also shows that much of the work on social learning in the water sector is focused on models and approaches to guide social learning, adoption of learning theory concepts such as community of practice, or Bateson's three levels of learning (1979), and/or documenting evidence of learning outcomes and how these contribute to water management practices.

Lotz-Sisitka, Belay and Mukute (2012) documented this problem more widely in social learning research, noting that very little empirical research on how the learning and mediation processes unfold is taking place, leading to an "ontological collapse" in social learning research. A reading of the Lotz-Sisitka et al. (2012) paper shows that this has consequences for democratic participation in social practices (e.g. water resources management or land management). This is because it is in the detailed mediation interactions that real participation occurs as people engage with each other and more experienced others, to form new knowledge and capabilities for action in relation to their existing contexts and practices. It is here where the democracy in learning emerges (Lotz-Sisitka & O'Donoghue, 2008). This WRC project seeks to address this problem in water-oriented social learning research, in community contexts.

Mediated learning to transform social practice at the nexus of democratic participation in water management

This paper has presented a "broad framework" for beginning to tease out and understand the processes of mediation in learning, and how these processes can be considered to be contributing (or not) to democratic participation in water management practices. It has taken us from the broad and dominating traditions in scientific practice, which have shaped certain views of learning. From there the paper has deliberated alternative ways of thinking about learning, as outlined by Orr and Freire, whose work challenges us to re-think basic assumptions about knowledge transfer as it has been traditionally practiced in and through education and training. We then went on to consider some of the more recent thinking about education and learning, especially constructivist forms of learning and pedagogy, situated learning and social learning. We suggest that it is in the mediation processes – which allow for internalization of externally available knowledge and concepts (embedded in language and artefacts) – that democracy in the learning process begins to emerge, as this is where participation and empowerment emerge from (the formation of new ideas and the internalization of ideas and cultural processes and artefacts in relation to existing practice, experience, circumstances and being).

However, democratic management of water resources that embraces learning as a core process is a nice ideal, but how does this play out in practice? Until recently the assumption in South Africa's water sector has been that once decentralised and democratic institutions were developed and established, they would be able to manage water resources on their own and work with local stakeholders. In practice, however, the focus on institutional structures has not led to efficient, equitable or sustainable management of water. Nor has participation by citizens been adequately supported – more often than not participation is a token gesture aimed at filling representation quotas (Du Toit, Burt, & Pollard, 2006).

As mentioned above, earlier research by Lotz-Sisitka and Burt (2006) showed that this was due to too much emphasis being placed on the structures of participation, and not enough emphasis being placed on the agents and the development of people's agency for participation. Learning is core to the emergence of new forms of agency, most often exhibited in the context of new or changing social practices. This earlier work called for more emphasis on such processes of agency formation (Lotz-Sisitka & Burt, 2006). Work by du Toit and Pollard (DWAF, 2007) calls for more focus on the practice of water resource management rather than on institutional development or formulaic participation. This emphasis on particular tasks and practices makes social learning a central activity in ensuring the success of Integrated Water Resource Management.

In this Water Research Commission project we explored what it meant to develop contextually relevant learning resources, both as a tool to support ongoing learning, and for improved participation in water management practices in community contexts. We also explored the processes of learning for NGO and CBO staff who engage in mediating such

practices; thus the issues of mediation of knowledge were at the core of the research project at two levels. The detail of these processes is communicated in Papers 2 and 3 in this series. Paper 2 describes the focus on mediation of water knowledge at community social practice level, and Paper 3 describes the focus on mediation practices of the water knowledge mediators who work with communities.

Our previous research project (Burt & Berold, 2012) showed that knowledge is most effectively absorbed if it is generated from practice and fed back into practice in ways that challenge, question and inform. The emphasis of this research project therefore was not so much on dissemination of knowledge as on its **mediation**. Mediation is usually thought of as a person facilitating knowledge with a group of people. Actually mediation can be both explicit (through people, resources, training programmes) and implicit (through culture, history, values, morals, beliefs). This means an understanding of practice (what are we trying to achieve?), the history of practice (how have we done things in the past and how does this influence the way we are doing things now?), and how knowledge is generated and shared in relation to a given practice (how did we learn to do what we are doing now, and what do we need to learn in order for it to be sustainable?).

What we learnt in this WRC project by attempting to practice a democratic and socially embedded form of education and learning, was that a development process for producing a learning resource which is contextually relevant and responds to what people are already doing (their practice), must be built on a dialogue between what people were doing (their water practice) and the questions that were generated from what they were doing and what research knowledge was saying (see Paper 2). The objective was not only to produce a final polished product (such as a generic learning resource) but to see the process of developing the resource as a *learning journey* for everyone, in which each product can become the next *iterative platform* for further learning and questioning either in the same context or in a different one.

For community-based water management practices this means one needs to consider the following: ***who*** is mediating (NGO workers, extension officers, Water Affairs officials, teachers, ordinary community members, others who may be interpreting and explaining scientific information to communities), ***what*** is being used in the mediating, i.e. what tools (knowledge resources, learning materials, schemas, scripts, representations of scientific information, media and media formats, environmental policies) and ***how*** is mediation taking place (see Paper 2 and Paper 3).

Conclusion

If the water sector is serious about supporting the democratic management of water and about supporting the empowerment of citizens to better their water practices so that they are more sustainable, then learning and giving attention to learning must be a central consideration and must become a core process on an ongoing basis.

This does not mean simply investing in the transference of knowledge via generic resources and generic training programmes, it means understanding the mediation of water knowledge in and through learning processes that contribute to changes in social practices for water management. It means responding to context-specific problems and challenges that relate directly to a particular water practice and linking research knowledge to these contextually specific problems. It does not mean transferring research knowledge as "the answer to a problem", rather it means developing a process where research knowledge enters into dialogue with practice. This means paying attention to what mediates learning both explicitly and implicitly and how this is historically constituted. It means entering into a dialogue with people and their practices with humility. As Paulo Freire (1993) so aptly states:

> At the point of encounter there are neither utter ignoramus or perfect sages, there are only [wo]men who are attempting, together, to learn more than they now know.

To learn means paying attention to learning theory and to the values embedded within a particular attitude towards learning. It also means accepting that learning is not a simple process of handing out information, but an engaged, dynamic process that is directly influenced by the way we view ourselves in relation to our world. As Orr says, at the core of learning are the values and beliefs we hold as a society. If this is the case, how are the institutions within the water sector purporting "to shape and refine the capacity to think" (Orr, 2004) and act for a more sustainable, just world.

REFERENCES

Bateson, G. (1979). *Mind and nature: A necessary unity* (pp98-100). New York: Dutton.

Beder, S. (2006). *Environmental principles and policies*. Earthscan: London

Berger, P. & Luckmann, T. (1967). *The social construction of reality: A treatise in the sociology of knowledge*. New York: Anchor.

Bielak, A., Ahmed, I., Brien, D., Conant, B., Fisher, C., Gwyn, E., & Klerk, L. (2012). Expanding our understanding of K*(Kt, KE, Ktt, KMb, KB, KM, etc.): A concept paper emerging from the K* conference held in Hamilton, Ontario, Canada, April 2012. United Nations University, Institute for Water, Environment and Health.

Bielak, A.T,. Campbell, A., Pope, S. , Schaefer, K. & Shaxson, L. (2008). From science communication to knowledge brokering: The shift from "science push" to "policy pull". In D. Cheng, M. Claessens, T. Gascoigne, J. Metcalfe, B l Schiele, & S. Shi (Eds.), *Communicating science in social contexts: New models, new practices*. (pp201-226) Amsterdam: Springer.

Burt, J. & Berold, R. (2012). *Investigating water knowledge flow to communities most at risk*. Water Research Commission Report K8/813. in press.

Cooke, B & Kothari, U. (Eds.) (2001). *Participation: The new tyranny?* London: Zed Books.

Cundill, G., & Rodela, R. (2012). *A review of assertions about the processes and outcomes of social learning in natural resource management*. Journal of environmental management, 113, 7-14.

Daniels, H. (2008). *Vygotsky and research*. New York: Routledge.

Du Toit D., Burt, J., & Pollard, S. (2005). A task-oriented approach to participation in IWRM (No. K5/1434). WRC Report.

DWAF, AWARD, Zinkwazi Consulting & Water for Africa (2007). *Guidelines for catchment management strategies: Towards equity, sustainability and efficiency*. Department of Water Affairs: Pretoria

Eisner, E. W. (1985). *The educational imagination* (p176). New York: Macmillan.

Engeström, Y. (2011). From design experiments to formative interventions. In *Theory & Psychology*, 21(5), 598-628.

Freire, P. (1996). *Pedagogy of the oppressed*. London: Penguin Books.

Heyes, M.C. & Galef, B.G. (1996). *Social learning in animals: The roots of culture*. London: Academic Press.

Kincheloe, J. L., & McLaren, P. (2002). Rethinking critical theory and qualitative research. In *Ethnography and schools: Qualitative approaches to the study of education*, 87-138.

Lotz-Sisitka, H., & O'Donoghue, R. (2008). Participation, situated culture, and practical reason. In *Participation and Learning* (pp111-127). Springer Netherlands.

Lotz-Sisitka, H. & Burt, J. (2006). *A critical review of participatory practice in integrated water resource management*. Water Resource Commission report 1434/1/06. Water Resource Commission: Pretoria.

Mukutu, M. (2010). *Exploring and expanding learning processes in sustainable agriculture workplace contexts*. Doctoral thesis. Rhodes University: Grahamstown.

Munnik, V. & Burt, J., (2014). Need and Potential for social research in WRC and the SA water sector. Water Research Commission K8/1024/1, In Press.

Orr, D. W. (2004). Earth in mind: On education, environment, and the human prospect. Island Press.

Peters, S. & Wals, E.J. (2013). Learning and knowing in pursuit of sustainability: Concepts and tools for transdisciplinary environmental research. In *Concepts and tools for trans-disciplinary environmental research*. [add publisher details]

Reed, M. S., Evely, A. C., Cundill, G., Fazey, I., Glass, J., Laing, A. & Stringer, L. C. (2010). What is social learning? In *Ecology & Society*, 15(4)

Wals, A. E. (Ed.). (2007). *Social learning towards a sustainable world: Principles, perspectives, and praxis*. Wageningen Academic Pub.

Vygotsky, L. (1978). *Interaction between learning and development: Mind and society*. Cambridge, M.A: Harvard University Press.

Internet sites consulted

Global Issues. *Poverty facts and stats*. February 2014. http://www.globalissues.org/article/26/poverty-facts-and-stats

Trading Economics February 2014. http://www.tradingeconomics.com/south-africa/unemployment-rate

Education for Sustainable Development. February 2014. http://www.unesco.org/new/en/education/themes/leading-the-international-agenda/education-for-sustainable-development/

Moneyweb. Accessed 19 January 2014. http://www.moneyweb.co.za/moneyweb-the-human-touch/an-old-mans-melancholy

Statistics South Africa, 2010. *Monthly Earnings of South Africans*, 2010. Statistics South Africa. http://beta2.statssa.gov.za/ February 2014

Paper 2: Learning Resources for Changing Practice: The Importance of Understanding the Socio-Cultural Context in Designing Learning Resources

Jane Burt, Robert Berold, Nina Rivers, Tim Wigley, Heila Lotz-Sisitka, Monde Ntshudu, Ewald Kruger & Charles Phiri

Introduction

This is the second in a set of three papers reporting on a Water Research Commission research programme on Knowledge Mediation in the water sector. It responds to the general problem of scientific knowledge mediation and a more specific problem identified in the water research community in South Africa, which is a lack of uptake and use of the knowledge products produced for the Water Research Commission by scientists. The problem of inadequate mediation of scientific knowledge has been identified internationally (Bielak et al., 2012; Bielak et al., 2008) and is the subject of much deliberation (Bielak et al., 2008). The focus is on how one might develop learning resources that mediate learning in community contexts. The purpose was to model a process that could be used by other water knowledge mediators (reported on in Paper 3) and that could actualise the "democratic moment" in learning and knowledge mediation within the water sector (referred to at the end of Paper 1). This paper, via *mediation of learning*, creates the link between the intention to support democratic water management practice (Paper 1) and the practice of water knowledge mediators (Paper 3).

Community-level learning resources based on research knowledge are often produced without attention given to key factors: *socio-cultural and socio-ecological contexts; learning theory;* and *the design and dissemination of the resource*. The paper describes the development of a *question-based knowledge resource* for use in the *mediation of change-oriented learning*, thus offering a bridge for dialogue between research knowledge and local contextually-specific knowledge. It explores how the research team developed and piloted a process that can be used by practitioners working at the interface of local water management practice and more formal knowledge structures to design contextually-situated learning resources that draw on and bring in new knowledge. The lessons learnt from this process led to a social learning short course for NGOs and CBOs (described in Paper 3). This paper then looks at what was learnt from the piloting process and how the process of developing a question-based resource can support the development of appropriate learning resources by water practitioners, researchers, NGOs and CBOs to support local water management practices.

Background to the research project

In 2010 the Water Research Commission started funding a research team in the rural Eastern Cape to design and pilot a process to develop learning resources that support change-oriented learning. The intention was to design a process that would be sensitive to the interface between, on the one hand, local water management practices and levels of knowledge, and on the other, more formalised water knowledge as represented in research and formal knowledge structures. In their 2011 WRC consultancy two team members found that research about water knowledge often fails to reach the relevant audiences, specifically those who are most vulnerable. This brings into question the relevance of the research that has up until now been produced: it also suggests that there is a need to make knowledge and information about water and its management more accessible. The need for improved accessibility applies to the *content and its relevance to specific communities*, and to the *manner in which the knowledge is both generated and shared* (Burt & Berold, 2012, p10). The researchers found that resources are not disseminated effectively; that they are "inappropriately technicist"; and that potential readers of written resources are hampered by low educational levels (Burt & Berold, 2012, p1).

While there are plenty of resources about water management, very little is known about which ones work best and why (Burt & Berold, 2012, p1). In a critical review of participation in Integrated Water Resource Management (IWRM), Lotz-Sisitka and Burt (2006, p5) argue that in order for best practice to emerge in IWRM, contextual factors and social processes need to be carefully accounted for: this is borne out in the 2012 findings of Burt and Berold. Factors such as history, resources, knowledge, empowerment, experience, political enfranchisement, language, attitudes, individual agency and educational experience play out differently in different contexts and act as mediators of both learning and participation (Lotz-Sisitka & Burt, 2006, p6). Activities associated with the management of water take place within specific cultural landscapes, each marked by its own social, economic, knowledge and material culture (Strang, 2004, p5).

What follows is a discussion on the importance of understanding the socio-cultural context when developing and sharing learning resources to support change-oriented learning. This is followed by a case study of a piloting a process in which a question-based resource was developed which takes into consideration the socio-cultural context of learning.

The importance of context

The word "context" in Latin means "to weave, to interweave, to join together, or to compose" (Dilley, 1993, p4). A more general definition is "the circumstances relevant to something under consideration" or "in this connection" (Dilley 1993, p4). Context can be understood as "that which environs the object of interest and helps by its relevance to explain it" (Dilley, 1998, p3).

It may seem obvious that context is important when developing knowledge tools to support learning and change, yet it is frequently overlooked. Although anyone on the street would respond to the question “Do you think context is important?” with a resounding “yes”, education and research practice tends to assume that knowledge, once produced by experts, can be applicable to all contexts. This is apparent in such terms as “knowledge transfer” and in debates about objective knowledge. The scientific method of knowledge production bases claims of “true knowledge” on the fact that the knowledge that is generated is value-free and contextually neutral. While this may be true at a conceptual level, in the sense that concepts and certain forms of knowledge can be produced and then transferred across contextual boundaries, these epistemological processes present particular difficulties for community learning.

In a community situation there is a need for more universal or abstract forms of knowledge to connect with everyday knowledge. Vygotsky’s (1978) suggested that expansion of human learning involves the coming together of abstract forms of knowledge and everyday or localized / contextualized forms of knowledge, and that this essentially constitutes the learning process. This process occurs via mediation, which is the focus of this research programme. In the Burt and Berold research (2012) there were visible attempts at participatory materials development for water practices, as is the case in the broader environmental education context in which this research is located, but still it was found that there was a need to give attention to the mediation processes associated with the use of learning materials. In this research programme the coming together of everyday knowledge with more abstract forms of knowledge was embedded *in the design of the learning resource itself*. This was done in order to seek ways of strengthening and enabling epistemological access (access to powerful forms of knowledge) and enhanced learning.

Sayer (2000, p58) problematises the idea that objective knowledge needs be value free and contextually neutral. He says:

> Why should true or adequate statements about the world need to be value-neutral? While having strong feelings about some state of affairs might distort our beliefs about what is the case, it needn’t do so necessarily, for although there is indeed a danger that we may believe what we want to believe, we demean ourselves if we imagine we can’t possibly accept factual statements about circumstances we find unpalatable.

Sayer further argues that this need to conflate objectivity with a value-neutral situation assumes that values are beyond reason.

Another argument against the transfer of what is considered to be contextually-neutral knowledge is that the issues and problems that we face as a species can’t be contained within a closed system but exist in relationship with all the facets of the world (Sayer, 2000). We live, breathe and act in open systems. And we act upon and thus change our surroundings. The particular context of our surroundings restricts how and what we can act upon. We are enabled and limited not only by our external environment but also by the cultural and

historical context into which we are born (Vygotsky, 1978). Hence the cultural and historical context also shapes how we approach, engage with and internalise knowledge.

How then do we teach and also develop learning tools that respond to the particular context of communities that are involved in water management practice in ways that takes this key point of Vygotsky's into account?

The importance of considering socio-cultural context

Vygotsky, writing in the 1920s, problematised the idea that knowledge was transferred from one person to another and that the way in which this knowledge was understood and applied would be in the exact same way by everyone who was given access to this information. He argued that cognitive development is a process, which is socially and culturally interlinked as people internalise whatever is represented in cultural forms (e.g. language, symbols, signs, and artefacts) and integrate this into their practice. This means that the matter of *what we know* and *how we know it* cannot be separated out from the culture into which we are born and the social life we live.

Therefore, when developing learning tools we need to respond to the cultural and historical contexts we are working in. A very basic example of this is considering the language that people speak and the kind of access they have had to any form of education.

Importance of socio-ecological context

Until the 1970s, water resource management was the domain of the engineer. Managing water was a structural issue: How do we get water from here to there? How do we make sure it is clean? It has since become clear that this kind of water management did not adequately support the environment and animal species, including humans, that rely on water systems for their survival. Early environmentalists, such as Rachel Carson in the 1960s, drew attention to the fact that environmental concerns are also social concerns and involve socio-cultural habits and practices and involve people's participation (Carson, 2002). Ison et al. (2007) more recently argued that we need to make the shift from understanding catchments as defined biophysically to looking at what constitutes a "catchment system" given that it is both socially and biophysically constructed (i.e. a social-ecological systems perspective). The fact that a system to manage a catchment is socially and ecologically constructed and constituted has implications for policy makers, water managers and researchers, and for communities that participate in managing and using the water.

This incorporation of the human community aspect when considering how we understand and manage the natural world affects how we view knowledge production and learning. Two contrasting ways to view learning are *as a way of imparting knowledge about the environment*, or *as a social process of changing practice in a social-ecological context.*

Learning theory and change-oriented learning

In Paper 1 we discuss the roots of the approach to learning theory for the democratic management of water (Burt et al.). Here we briefly highlight key aspects of change-oriented learning – social constructivism, learning as transformative, and learning as practice based – as these form the primary theoretical ideas that shaped the development of the question-based learning resource, which is described later.

Social constructivist learning theory: This learning theory is based on an understanding that meaning is constructed in cultural historical contexts. This kind of learning happens through social interactions where everyday knowledge and experience is expanded via engagement with new knowledge, concepts and ideas. What makes this possible is a process of mediation where learners synthesise existing experience and knowledge with new knowledge in the context of their everyday practices. Mediation processes are central to this view of learning. Vygotsky and his colleagues Leon'tev and Luria, and post-Vygotskian theorists such as Wertsch and Engeström are most closely associated with this understanding of learning (Vygotsky, 1978; Daniels, 2008; Wertsch, 1991; Engeström, 1999). For the mediation of water knowledge at community level, we have found this set of theories of learning to be helpful.

Learning as transformative: As mentioned above, learning can be seen as a way of assimilating knowledge, or it can be seen as a social process of changing practice which involves making meaning and internalisation of ideas. This can lead to a transformation both in terms of cognitive understanding and social practice. When values are included that support learning towards the common good, such learning can also be socially transformative. Learning processes of this nature are often associated with the concept of social learning although not all social learning is necessarily transformative. What distinguishes social learning in environmental education from other forms of social learning (e. g. social learning for consumerist outcomes) is that the aim is to transform and change practice towards sustainability and the benefit of the common good. Social learning views "knowing" as more than simply having information and "knowledge" as something that is dynamic rather than static. It is a continual process of making meaning in response to context and changes in that context and which has the explicit aim of bringing about change, which means it is imbued with values (as explained in Paper 1). The process of making meaning also influences context, as it changes the way that people respond and act.

Learning as practice based: If learning is a social process of change, what are we changing? The focus of learning is on changing the activities that people do in their socio-cultural contexts. This means that learning happens and is designed around practices that already exist within communities and involves the "doings", "sayings" and "relatings" (Schatzki et al., 2001) that occur in and around the practices that people are engaged in. Knowledge resources used for learning (i.e. learning resources) may therefore be more effective in supporting change-oriented learning if they are embedded within the context of local practices and

respond to the tensions and contradictions within local practices, while also offering new knowledge and ideas of how to change such practices.

Together these three related concepts of learning help to frame an approach to learning that is change-oriented.

Change-oriented approach to developing learning resource

The original aim of writing a user-friendly learning resource was to make research knowledge more accessible to communities outside the research fold, particularly economically at-risk communities. We realised that this was more than a matter of repackaging research information into a more readable format. We wanted to link research knowledge to local knowledge, practice and experience (Burt & Berold, 2012). Local knowledge includes not only people living in a particular area in a particular context, but also people who have worked in the area.

We decided that the way to do this was to develop the learning resource guided by questions and remarks that arose from people engaged in a particular practice (in the case of this research we focused specifically on the practice of rainwater harvesting, using water tanks at household level). We also had to consider the ways in which knowledge is mediated and what the current tools are for mediating knowledge around a particular practice. We wanted our learning resource to be a tool that would enhance the way in which learning was happening in the community. It would be written to support ongoing learning in context rather than as a stand-alone learning tool.

As mentioned above and in Paper 1, we are assuming an understanding of learning that is broader than what is usually called “knowledge transfer”. Knowledge and learning are constructed based on a group’s particular context (previous experience, social, political, economic) which includes the activities that people are engaged with. All these are what we call “practices”. With this in mind learning is not just a process of knowledge being shared from one group to another, it is an interactive and engaged process. Practically, this means that holding generic training workshops (although sometimes appropriate if held within a broader context of social learning) and handing out generic resource material (again useful if mediated within an understanding of social learning) will not necessarily lead to learning that will result in changed practice.

This research project set out to test a process that can potentially lead to change-oriented learning. If we understand knowledge to be constructed and learning to be a contextually-specific, engaged process around practice (as outlined above), then how exactly do we go about understanding and supporting the flow of knowledge? How do we develop mediation tools to support learning in context?

The WRC project that proposed to investigate these questions had two aims. The first was to research and develop a water knowledge resource in direct response to and in support of an existing community-based water practice. This was intended to provide a "demonstration context" for making scientific knowledge accessible and responsive to community-based water practices.

The second aim was to identify and support the skills that are needed in order to develop and mediate such a resource (see Paper 3). Based on what we learned from the recent WRC consultancy K8/813 on knowledge flow in rural communities (Burt & Berold, 2012) (see summary of findings below) it was clear that we needed to support mediators of water knowledge to understand how their mediation influences successful learning and change practice.

In this paper we will report on what we learnt from piloting the development of a water knowledge resource that can assist other water practitioners in developing relevant water knowledge tools to support community based water practices. What was learnt from this pilot process also fed into the development of a course to support mediators[1] of water knowledge (the development and piloting of the "Changing Practice" short course is reported on in the third paper of this series by Lotz-Sisitka et al.).

As mentioned above, a previous WRC consultancy, which involved two of the research team members, looked into how water communication was happening in the water sector in South Africa and identified reasons why current water resources were not being used (Burt & Berold, 2012). The four main findings to emerge from this research were:

1. *Base resources on practice*: Most resources tend to impart knowledge without considering existing knowledge. Learning resources work more effectively when they engage people with expanding or changing practices that they already know about. This requires understanding the practices concerned and the questions that arise in these practices.

2. *Give attention to accessibility and dissemination*: Although there are many water knowledge resources produced in South Africa, few are presented in a way that is understandable to non-specialists. But even when resources are designed and written with local communities in mind, most do not reach their target audience. Written resources can be found lying in piles in many local government offices and school storerooms. Compared to the funds and time spent on producing knowledge products, much more thought and funding needs to go into ensuring that they are accessible and available.

[1] In this context, "mediators" refers to people who interpret and explain written resource information and available scientific information to communities directly, and usually orally. According to the water practitioners interviewed in project K8/813, mediators are key in research communication, even when the audience is literate. Mediators may be NGOs, extension officers, Water Affairs officials, teachers, or ordinary community members. Unfortunately their role is often taken for granted and they are seldom given any training, so they tend to be poorly equipped for the mediation task.

3. *Mediate knowledge*: Practitioner experience shows that even when resources are accessible and available, this is no guarantee that they are used. Resources are only one part of the larger learning picture, and it seems that, to be effective, a local organization or individual who understands what is needed at a local level should mediate them. According to water practitioners, mediation is more effective when it is organically part of a water management practice, an activist movement, a process of institutional development, or a community movement.

4. *Knowing how we know*: Most human actions are based on deeply entrenched patterns and structures. With this in mind, resources should be developed in a way that encourages people to ask questions, challenge and build on their current practice. This requires a view of knowledge as an interactive and situated social process through which people construct their understanding of a given situation from a range of factors: information, values, morals, beliefs, cultures, personal gain, or community benefit, amongst others. For those developing resources, it means adjusting to an audience whose understanding may be quite different from the context of researchers. It requires in-depth understanding of how learning actually happens in such contexts of practice.

Based on this learning Burt and Berold proposed to the WRC that a further study be undertaken through the Environmental Learning and Research Centre (ELRC) at Rhodes University. The intention of the study would be to pilot a question-based learning resource which took context into consideration in the development of learning support tools for practice-based learning. The aim was to develop a learning resource that was responsive to learning that was already happening in context. And also to extend this learning by introducing local knowledge and expert-based research knowledge around questions that have emerged around a particular water practice in a particular context (Burt, Berold, 2012).

We were also interested in whether the learning resource could be more than a carrier of information and also act as a platform for dialogue between research knowledge and local knowledge[2].

[2] By local knowledge we mean knowledge that exists in the particular context where the water practice is happening. This includes any knowledge that specialists living in the area may have.

Demonstration case study site[3]

The site chosen to pilot the study is in the rural Eastern Cape community of Cata. It is a village of three settlements (Skafu, Ndela and Nyanga). Cata was chosen as a study site because there are a number of Integrated Water Resource Management practices already in place in which community members participate. Cata is located in the upper catchment of the Cata River (Phiri, 2011a).

Biophysical characteristics

The Eastern Cape is one of the poorest provinces in South Africa with up to 68.4 per cent of the population living in poverty in 2002, and an increase of 14 per cent in those living in poverty since 1996 (BRC, 2008). Cata, formerly within the Ciskei *bantustan*, falls under the Amathlathi Municipality, which is part of the Amatole District Municipality. It is located approximately 58 km north of King Williams Town (see Figure 1). The village nestles against the slopes of the Amatole Mountains, which form an important catchment for the whole area. The river is the main source of water for both people and livestock, running through the middle of the settlements to the Cata Dam in the south (BRC, 2007). The people of this village were resettled there under the Betterment Planning scheme of the apartheid government (Phiri, 2011a).

Land use activities in the upper catchment include commercial agriculture production, community-based or small-scale agriculture through garden plots (up to 500 m² in size), livestock rearing, and commercial forestry. Another land use activity is trout fishing tourism in the Cata River.

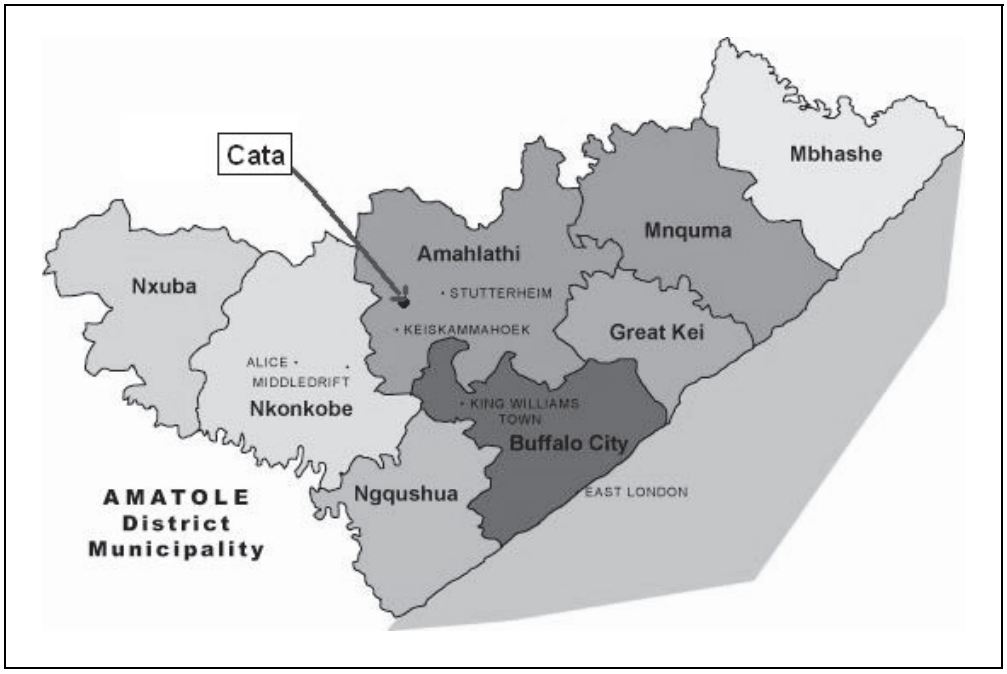
The grazing vegetation in the area is a mixture of highland sourveld and dome sourveld. The highland sourveld is situated on the mountain areas, while the dome sourveld is located in the lower lying areas (Anderson & Axelsson, 2005).

The mean annual precipitation at Cata is 632 mm with 431.6 mm (68.2 per cent) falling during the standard crop production period (October to March). Rainfall can vary widely, between 153 mm and 710 mm during the crop production period. Such erratic rainfall can be a limitation on crop production (Anderson & Axelsson, 2005).

[3] This section draws from Phiri, 2011

Socio-economic characteristics of Cata

The village surveys conducted in 2001 found that there were 422 households in Cata, each with an average of 6.7 people, making up a population of about 2 800 (BRC, 2007). From 1996 to 2001 the percentage of households with no income rose from 16 per cent to 43 per cent (BRC, 2007) due to, amongst other reasons, a decline in economic activity in the village. One of the pre-requisites for local economic development is adequate available local skills, and although there had been modest improvements in overall levels of education in Cata since democracy, only 100 people had a matriculation certificate in 2001 (BRC, 2007).



Source: BRC, 2007

Figure 1: Location of Cata

Historical background

Betterment Planning started in South Africa in the 1930s, aiming to restructure the scattered settlements occupied by black people in the black rural areas and bring them together into larger blocks for more efficient agriculture. Under the scheme land was divided into residential, arable and grazing land, and people were relocated from scattered homesteads to more concentrated "betterment villages". The number of livestock that could be owned by families was reduced, and residential and grazing areas were fenced off in order to introduce rotational grazing. From 1948 to 1950, the government carried out a research project in Ciskei to test whether Betterment Planning would have an impact (Anderson & Axelsson, 2005). This project was carried out in six villages in Ciskei, Cata village being one of them.

However, it was not until the 1960s that the apartheid regime introduced Betterment as a widespread policy. Its official justification was that people would be better off if they moved together into a village – closer to schools, medical services and roads. In practice, however, the effect was an increase in poverty and unemployment (BRC, 2007). The small plots of arable land were located far away from people's homes and were too small to sustain subsistence farming (Hoffman & Ashwell, 2001). This forced people into becoming migrant labourers working in South African industries, mines and agriculture (Anderson & Axelsson, 2005). Families were broken up and support networks destroyed.

One old man in Cata village said that a family was permitted to have about 300 sheep and 100 cattle before the reform, but when their land was reduced it was hard to feed that many animals. He said that after three years they could only feed 20 sheep and 10 cattle – the rest were sold, stolen, slaughtered, or died (Anderson & Axelsson, 2005).

Process for developing a question-based resource

The process we piloted in Cata village consisted of four distinct phases that fed into each other:

1. Understanding context and practice
2. Identifying issues and contextual knowledge
3. Developing a knowledge network
4. Developing contextually relevant tools (in this case a question-based resource) for learning.

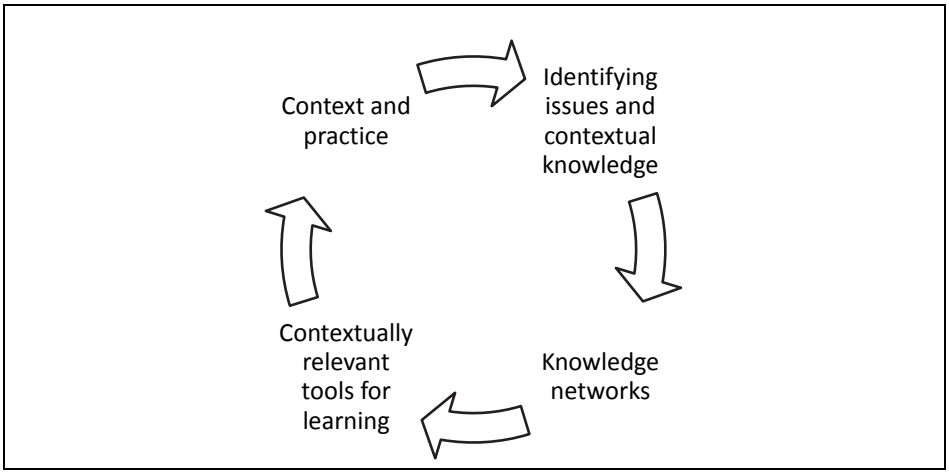


Figure 2: Diagram of four phases for developing a question-based resource

Below we will briefly summarise these four phases and then reflect on what we learnt about developing contextually relevant learning tools for practice-based learning.

Phase 1: Understanding context, practice and learning

Understanding how people learn

As mentioned above this project emerged out of research done for the WRC on knowledge flow to people most at risk. One of the outcomes as explained earlier, of that study was the importance of understanding how we know what we know, in other words how we learn (Burt & Berold, 2012). We wanted to apply this understanding of learning to the development of a question-based resource. The first step in doing this was to understand how people learn in the context of a particular water practice.

What we mean by "water practices" are actions that people carry out in their everyday life that involve water and the management of water. Most educational processes or capacity-building processes start with what a group of people need to know to fit into existing systems of water resource management. This has often led to generic training programmes or resources.

We took a different approach. Rather than think about what people needed to know about IWRM, we wanted to identify practices that are already part of people's everyday management of water, and see whether we could support these practices.

How communities learn through participating in IWRM practices

Charles Phiri, in his master's thesis, took up the challenge of helping us understand how learning actually happens in the context of local water management practices. He found that learning was most effective when it was incorporated into and supported practices that communities are already involved in (Phiri, 2011). The existing practice becomes the centre of a wheel around which many different learning opportunities can emerge.

Phiri reported that learning happens mostly through sharing, conversations and storytelling, rather than through resource material (Phiri, 2011). We realised that if resource material was to contribute to the shared space of learning, it would have to be woven into the story or stories already being told around a specific practice, to ensure that it became part of the ongoing conversation of learning.

Phiri's study also highlighted the role that workshops or training programmes can play. They often seem to fast track learning if they are appropriately designed and respond to people's needs (Phiri, 2011). Heila Lotz-Sisitka commented that an important research question would be to consider when and how this happens within training programmes.

As already mentioned Phiri's study highlighted that any research knowledge that we wished to incorporate in a resource needed to support the practices that communities were already

involved in (Phiri, 2011). One way of doing this is to present research knowledge around questions and choices that have emerged from people's practice.

Phiri's findings also pointed to the way in which conversation and story are the ways in which people share information and learn from each other. Stories place knowledge in a local context as part of the everyday lives of people (Phiri, 2011). The main claim for the use of narrative in educational research is that humans are storytelling organisms who, individually and socially, lead "storied" lives. The study of narrative, therefore, is the study of "the ways humans experience the world" (Clandinin & Connelly, 2000). We wanted our resource to reflect this experience and to work with the knowledge, questions and choices introduced by people's stories.

Phase 2: Identifying questions (issues) and contextual knowledge

Phiri's research did not directly elicit questions about the water practices he was investigating. Nina Rivers, at the time a master's student (now doctoral candidate) adopted a narrative approach (Rivers, 2014 in press) to gain a deeper understanding into the communities' rainwater harvesting and food gardening practices, and the factors that affect and mediate learning. Through a better understanding of practice, facilitators or mediators of water knowledge will hopefully have a deeper capacity to know how to incorporate the most relevant knowledge in order to bring about sustainable practices (Rivers, 2014).

Rivers articulates the use of narrative for developing accounts of practice in her PhD thesis:

> The relevance of narrative enquiry as a methodology for this particular study is articulated by Connelly and Clandinin's (1990:8) in that they argue, "stories stand between the general and the particular, mediating between the generic demands of sciences with the personal, practical, concrete demands of living"…one needs to find on a very practical and concrete level what people are learning, why they are learning this, what they want to learn and why they want to learn it. (Rivers, 2014, in press).

At the time that Rivers was collecting narratives of practice, we had informal conversations with colleagues about their experiences with rainwater harvesting. We followed up on research that had already been done and collected resources, reports and pamphlets on rainwater harvesting practices.

From the stories, conversations and reading material we were able to draw up a series of questions about rainwater harvesting. The people that Rivers and Ntshudu interviewed did not identify questions or articulate their choices directly, but in reading their stories we could see where they had made choices and the kind of information they needed to make these choices, and what problems or issues they were encountering in the use of rainwater harvesting using tanks. This allowed us to isolate questions from the problems that they

expressed, or the solutions that they had given. It also highlighted any contradictions in their practice and gaps in their knowledge, thus helping us to identify the *knowledge flow*[4] needs.

Phase 3: Building a knowledge network

Originally we thought that the way to draw on research-based knowledge in order to tease out the questions that were emerging from the stories of the Cata residents' practice of rainwater harvesting would be to develop a catalogue of useful research, learning resources and other relevant materials. We thought that this catalogue would act as a supplement for the question-based resource by leading readers to more information. What we discovered was that finding useful information that was relevant to the context of Cata was far more difficult to do than we thought. We realised that gathering information is not as important as seeing oneself as situated within a broad knowledge network and proactively cultivating this network based on one's own context and available resources. Below is a brief description of what we learnt:

The initial aim of the catalogue was to provide a short summary of each document that the researchers came across, and then to rate each resource using criteria such as language level, proven value and current use of the resource.

Rivers started developing the catalogue by doing an Internet search. Even though she is an experienced researcher, she found it very difficult to find documents that would help. There were hundreds of Internet sites and research reports on rainwater harvesting: it was difficult to know which ones were relevant to the rural Eastern Cape, which was the target area.

It appears that use of the Internet to find local and contextually relevant knowledge that relates in particular to African contexts has a long way to go. In first world countries, easy and affordable Internet access has made it possible for local organisations and movements to document practices. This is yet to happen in South Africa (Gorburdhan, *pers comm*, 2013).

Rivers realized that she needed help from someone who knew more about the water sector, so she asked Jane Burt to help her. Burt drew on the knowledge network she had developed from working in the water sector. To help with the Internet search she gave Rivers a list of organisations that she had come across in her work. She also gave Rivers names of people working in the area of rainwater harvesting and water resource management.

[4] This is a nice phrase as it brings to mind the flow of a river or the flow of an electric current through a cable. What it says to us is that knowledge is not something static, it flows between people and it flows out of their practices. In the past people used to think that if you had knowledge you would "transfer" this knowledge to someone that didn't know. In this scenario, knowledge would only flow one way – from the person who knew to the person who didn't know. Now we realise that this is not completely accurate. We are part of a great big network of knowledge. People may tell us something that we don't know, but we also have knowledge of something they don't know – knowledge of our own context and our own practice. Sometimes there is a block in knowledge flow mostly because we haven't considered how people access knowledge and use it in their particular context. An example of this is how a lot of knowledge that is generated from universities ends up in academic papers which very few people can understand. In the story in the appendix to this module we discovered a straightforward reason for a block in knowledge flow, which was that learning resources were not being distributed. People we spoke to reported finding piles and piles of learning resources stuck in offices.

The researchers also realized that they needed information from a specialist in rainwater harvesting. They asked Tim Wigley of Earth Harmony Innovators to help them select which reports and resources would be most useful. Wigley has worked in the Cata area of Eastern Cape and has experience in rainwater harvesting as a water management practice. They asked him to identify which reports or resources would help them to answer questions that came from the stories the researchers had gathered about rainwater harvesting.

The research team also relied on their *research reference group* to lead them to further resources and to help them assess whether the information they were using was reliable or not. The members of this reference team were all experts in the field of water resource management. In one of their reference group meetings Jonathan Denison, a researcher and consultant who has worked in the Eastern Cape for a long time, pointed out that some of the information they had gathered was not accurate. He helped them to check all their information by drawing on his own knowledge and directing them to relevant and reliable documents and reports.

From this experience the research team learnt that they were not just gathering information from other sources, they were building a knowledge network of people, organisations and institutions which, in turn where part of broader networks of knowledge.

Phase 4: Developing contextually relevant learning tools – the question-based resource[5]

This process of developing the question-based resource consisted of the following steps:

1. Developing a draft question-based resource

The first step in writing the draft question-based resource was to identify the questions related to practice. As the research team, we were able to identify the questions in the narratives, but we realised that we did not have enough knowledge of rainwater harvesting to identify how the residents of Cata could improve their rainwater harvesting practice. For this we turned again to Wigley for guidance. Wigley had worked in Cata and other areas, teaching rural communities how to grow food and harvest rainwater. He helped us to identify questions about the practice in context and he was able to link some of these questions to broader socio-ecological processes.

Wigley was then tasked to respond to these questions by drawing on his own experience of working in Cata and on research-based knowledge.

[5] This section is described in more detail in the thesis of Nina Rivers and in various project reports produced along the way which informed the write-up of this section in the Rivers thesis. Here we draw on selected sections of this to share the process for the purposes of this paper (see Rivers 2014, in press).

Wigley's text was then edited by a professional editor, Robert Berold, and passed on to Jane Burt who retraced the questions back to the narratives of practice developed by Rivers. These narratives were then used as examples of local knowledge or tensions in the rainwater harvesting practice.

The resource was then formatted in MS Word with cellphone pictures used to illustrate the text. In other words it was not a glossy, well-designed booklet. The intention of the piloting was simply to develop a context-specific resource that could be easily formatted, photocopied and distributed, so that others could replicate the process.

2. Review of the draft resource

The purpose of this review, which was done by researchers and rainwater harvest expert practitioners, was to see whether we had clearly represented research-based knowledge and to find out whether local knowledge held up against research-based knowledge. Specialists from the reference group, practitioners and several university students involved in rainwater harvesting were asked to review the booklet. Comments mainly focused on the need for greater clarity about the target audience, some issues of style and illustration and a need to link the topic of the question-based resource to deeper socio-economic questions (Rivers, 2014, draft PhD thesis).

3. Translation of the resource

The knowledge resources were translated into isiXhosa (the local language in Cata) and Afrikaans (the local language of Glenconnor). Monde Ntshudu, the isiXhosa translator, commented that concerns that had been voiced about the difficulty of certain concepts in the English version would not be a problem once the material had been translated into the vernacular as he would use everyday language and examples.

4. Residents' review of the resource

The question-based resource was reviewed by the people of Cata and also by the residents of Glenconnor and Kleinpoort within the Sunday's River catchment.

The purpose of the Cata review was to understand how people would respond to a question-based resource developed out of their particular context and in response to their particular challenges. The purpose of the review by the communities of Glenconnor and Kleinpoort was to find out if the same resource could be used to mediate learning in other contexts.

The reviews were conducted in the form of focus groups with people in the area, some of whom had contributed narrative accounts of their practice to the development of the question-based resource.

This review phase was carried out by Rivers and research assistants, Monde Ntshudu and Ewald Kruger. Below is a summary of some of the findings:

Cata: No one read the booklets before coming to the focus group meeting. This supports research done by Burt and Berold (2012) that people are more prone to engage with a resource if it is mediated. The resource mediates both prior and new knowledge. In other words, people realised they already knew certain things that were in the learning resource, however they had not realised that they knew these things until they engaged with the resource.

They realised the impact and value the information in the booklet has in terms of managing their own gardens.

The learning resource generated discussion about social issues, which demonstrated that it works as a catalyst to start a dialogue about water and wider social issues.

In most cases inability to read the learning resource was found to be due to poor eyesight rather than literacy levels. Those that could read usually initiated the discussions but those that could not soon joined in. This is because the resource is context specific and everyone, regardless of literacy levels, could relate to the material.

Residents made some suggestions on how to structure the resource better so that they would find it easier to use in their daily lives. Some suggestions were to list the sections according to questions in the contents list and to divide the resource into sub-sections that deal with a particular issue. Some of the more technical information was difficult for people to understand, especially if it included measurements in square meters, or terms which were unfamiliar such as "humus"[6].

Glenconnor and Kleinpoort: Kruger, as an experienced teacher, worked very creatively with the book, trying different methods to engage people in their learning, such as self-reflection, small group discussions, plenary discussions, learning by doing and humour. What this highlights is how facilitation skills can mediate learning.

The Afrikaans presentation gave the participants the freedom to open up and express themselves in a language they were comfortable with. They commented that they had been to many workshops run in English, which limited their participation. Individuals who would usually say very little in these contexts became vocal in these group sessions.

In their 2012 WRC consultancy report Burt and Berold (p10) argue that "people need knowledge that is directly relevant to their context that leads them to question their own behaviour, and that of their families, communities, institutions and societal structures such as government." While working with this resource in Glenconnor and Kleinpoort, the

[6] The Xhosa translator found it difficult to translate English words like "humus" into isiXhosa. After the feedback from the workshops, the translator added an isiXhosa description of the English words to help people understand.

fieldworkers observed how this learning resource invited people into a questioning dialogue around their water practices.

Residents felt that the learning resource was on the whole easy to understand, although they found certain sections difficult, such as the one on swales. This section needed to be mediated by the facilitator.

The reviews with the residents of Cata and Glenconnor show that people ask different questions according to their own context. An example of this is the questions posed by residents of Glenconnor about dealing with flooding, something that is not experienced by Cata residents whose village is on a gradient. In Cata people face problems of soil erosion and run off. Participants suggested that the resource should include methods of harvesting water on level terrain. This point demonstrates how different contexts need different information to apply the same practice.

The learning resource was seen as empowering. One participant said that the resource empowered him to be able to assess the work of service providers. For example, he will be able to ensure that the erection of new water tanks is done correctly. Another participant added that the focus group sessions on the resource built her confidence to change her circumstances without having to wait for government to do that. Another said that the sessions alerted her to detail, for example, for the first time, she noticed tiny holes in her gutters that need fixing.

5. Reflecting on reviews and adapting the question-based resource

Based on the results of the reviews, the team interrogated how the learning resource mediated learning by looking at:

1. *What questions in the booklet interested people and why.*
2. *What other questions people had which the booklet did not address.*

To do this the research team compiled a list of categories of questions contained in the resource. These were:

- systems/deep knowledge questions (broader questions beyond the specific context).
- technical/practical questions (practice-based questions).
- personal well-being/safety questions (context specific social questions).

This process identified the kinds of questions that residents were interested in and the kinds of questions that were missing from the resource. It helped researchers understand how the resource mediates learning and how different questions are linked to people's practices and experiences.

6. Final write up

The writers and editors of the question-based resource included reviewers' comments in the final draft of the resource. In particular, writers included a section called "mediators' notes" which could be used by people who wanted to use the resource for basic training purposes. They also included the questions generated from the review process in Cata. The inclusion of the Cata review questions shows how a knowledge resource could be continually redeveloped for different contexts. For example, someone working for an NGO or CBO could continually update their knowledge resource as they learnt to understand more about the context, moved to a different context or learnt something new.

What we learnt from the different phases of the 'demonstration case' that will assist other water practitioners to mediate learning.

The importance of context in supporting learning (Phiri & Rivers)

The importance of understanding context cannot be over emphasised. If we are to support extension officers, and NGO workers to become better mediators of water practices they need to understand contexts of practice and how people are learning in these contexts of practice. Knowledge tools (like the question-based knowledge resource) need to be designed in ways that support the practices that people are already involved in, and especially to address questions that they have about their practices. Knowledge tools also need to contribute to an ongoing, emerging process of learning where new knowledge can help to shape and inform existing practices in new ways. To do this, mediation tools need to relate to, draw on, and weave into the narratives that are reflected in water practice, and are being told about a water practice.

Using questions that emerge from practice to integrate local and specialist knowledge

By listening to people's accounts of their practice we can identify local knowledge as well as generate questions about a particular water practice. Mediators can then examine available specialist knowledge of a particular water practice and relate it to people's accounts of their practice. It is important to do both of these processes, i.e. examine knowledge practices in actual contexts of practice, and examine what is known about practices (i.e. the knowledge held by specialists). Local knowledge alone can become self-referential (and so not lead to new learning) and too contextually inscribed. Similarly, knowledge of practices produced elsewhere (e.g. in scientific institutions) can be too abstract, or represented in ways that do not connect with practice. Using a question-based approach to learning mediation, based in and always related to (but not limited to) actual contexts of practice, can facilitate this double "knowledge flow" process.

The skills needed to build a knowledge network

There is a process involved and skill that is needed to develop a knowledge network for the purposes of expanding learning. This needs to be taken into consideration when training people to be mediators of learning. The skills required to develop a knowledge network include being able to identify, access and select relevant local specialists to assist in verifying knowledge. The knowledge in question is not only about a particular practice, but also about the practice *within a particular context* and *how this local practice is situated within broader socio-ecological questions and concerns*. The practitioners should have the capacity to extend local questions, and expand learning based on a wider knowledge of practices in responsive ways.

Learning requires different kinds of knowledge and attention to how to represent such knowledge

The knowledge contained in practice-centred learning resources should not be limited to technical aspects of practice (how to do things) but should be extended to knowledge of socio-cultural aspects of practice, as well as knowledge of how the practice links to wider systems and structures. Care should be taken not to simplistically interpret the notion of practice as "technical action". There is much more to practice-centred learning than this.

Mediators also need to pay attention to design, writing style and language, all of which should be accessible to the people for whom the knowledge resource is intended. Resources should be developed in ways that make them easy to reproduce and adapt. This often means writing in a more direct and perhaps less formal style than most water practitioners usually do. In fact, writing a clear but easily accessible knowledge resource is harder than it seems. What we discovered through running the "Changing Practice" short course, is that people who are involved at a local level with the particular water practice in a specific context are in some cases better equipped than professionals and specialists to write an accessible knowledge resource for the people with whom they work (see Paper 3). This is because they understand how people communicate and are not bound by formal writing conventions. If they can be encouraged to have confidence in their own voice they are more than likely able to write in a way that is not intimidating and is recognisable to the people they work with.

Conclusion

The question-based knowledge resource arose out of a careful consideration of one specific water practice (rainwater harvesting using tanks – see Appendix A) in context. People recognised their stories and their knowledge in the booklet and how their own stories were being used as examples of local knowledge and to highlight problems. This means that the knowledge resource both mediated prior knowledge and provided a familiar context for new

knowledge to be introduced. Integrating specialist knowledge in this way also allowed for local questions to be situated in broader socio-ecological contexts.

Residents who lived in different contexts to that of Cata, such as those in Glenconnor, were able to recognise and relate to the stories from Cata and identify how the Cata stories differed from what they experienced in their own lives. Engaging with the knowledge resource in a different context generated a new set of questions for discussion, as people reflected on how Cata "is not like this here".

The process highlighted the different kinds of knowledge that mediate learning. This is not only technical knowledge about how to do things (although technical knowledge is vital) but includes systems/deep knowledge questions that relate local questions to broader questions and knowledge. It also includes knowledge about personal well-being and safety. These are often social questions which are linked to broader social problems for which there is no straightforward answer.

For example, one of the narratives in the question-based resource was about how the younger generation are no longer interested in gardening. The resource could not provide an answer of how to deal with this problem, but by simply reporting it as a problem, it generated a dialogue in the focus groups and suggestions emerged on how to deal with this problem. The question of funding rainwater tanks was also mentioned in the knowledge resource. Again there is no easy solution to this problem. The resource includes narratives of how other communities have managed to fund rainwater tanks, but at the same time it acknowledges that this is a problem that may not be easily solved in other communities. So it is worth noting that resources do not necessarily need to provide all the answers. In fact, if they are to mediate change-oriented learning, mirroring back tensions and contradictions is one way of catalysing a process of reflection on practice. In turn such reflection has the potential for social learning and change.

A knowledge resource can be more than a medium to transfer new knowledge. The process of developing the resource with a community can in itself be a learning process for all involved. The final written product can document learning that has taken place, as well as serve as a platform for sharing that learning. One of the participants of the "Changing Practice" short course (that was developed out of this research process), who worked for a local NGO, developed a knowledge resource that documented how she and participants from the community reflected on the project that they were all involved in. She then used this knowledge resource to report back to her NGO and to open further dialogue on how things could be done differently within the organization.

(See Paper 3 for how the process of developing this learning resource informed the training of NGOs to develop similar contextually-framed learning resources that helped to bridge the mediation space between everyday knowledge and new knowledge, which is at the heart of socio-cultural learning and the democratisation of water management, as noted in Paper 1).

REFERENCES

Anderson J, & Axelsom, L. (2005). *Cata – A former homeland village affected by betterment, Eastern Cape, South Africa*. Kristianstad University, Sweden.

Bielak, A., Ahmed, I., Brien, D., Conant, B., Fisher, C., Gwyn, E., & Klerk, L. (2012). Expanding our understanding of K*(Kt, KE, Ktt, KMb, KB, KM, etc.): A concept paper emerging from the K* conference held in Hamilton, Ontario, Canada, April 2012. United Nations University, Institute for Water, Environment and Health.

Bielak, A.T,. Campbell, A., Pope, S. , Schaefer, K. & Shaxson, L. (2008). From science communication to knowledge brokering: The shift from "science push" to "policy pull". In D. Cheng, M., Claessens, T., Gascoigne, J., Metcalfe, B., Schiele, & S. Shi (Eds.), *Communicating science in social contexts: new models, new practices.* (pp201-226) Amsterdam: Springer.

Border Rural Committee. (2007). *The Cata story*. East London, South Africa.

Burt, J. & Berold, R. (2012). *Investigating water knowledge flow to communities most at risk. K8/813*.

Carson, R. (2002). *Silent spring*. Houghton Mifflin Harcourt.

Chailkin, S. & Lave, J. (1993). *Understanding practice: Perspectives on activity and context*. Cambridge: Cambridge University Press.

Clandinin, D. J., & Connelly, F. M. (2000). *Experience and story in qualitative research*. San Francisco: Jossey-Bass.

Daniels, H. (2008). *Vygotsky and Research*. New York: Routledge.

Dilley, R. (Ed.). (1999). *The problem of context*. New York: Berghahn Books.

Engeström, Y. (1999). Activity theory and individual and social transformation. Perspectives on activity theory, (pp19-38) [add publisher].

Hoffman, T. & Ashwell, A. (2001). "The water crisis in South Africa". Sourced on 01/04/11 from C:\Documents and Settings\02569\My Documents\Articles\Institutional\water *Crisis in SA 708-paper C*

Ison, R., Röling, N., & Watson, D. (2007). Challenges to science and society in the sustainable management and use of water: investigating the role of social learning. Environmental Science & Policy, 10(6), 499-511.

Lave, J. & Chaiklin, S. (Eds.). (1993). *Understanding practice: Perspectives on activity and context*. Cambridge: Cambridge University Press.

Lotz-Sisitka, H. & Burt, J. (2006). *A critical review of participatory practice in integrated water resource management*. WRC report No 1434/1/06.

Phiri C. (2011a.) “Working for Water Programme: An integrated community-based approach to water resources management in Cata, Eastern Cape, South Africa”. Unpublished Master’s Contextual Profiling Assignment, Rhodes University, Grahamstown.

Phiri, C. (2011b.) An investigation of community learning through participation in integrated water resource management practices. M. Ed Thesis, Rhodes University: Grahamstown

Rivers, N. (2014) (in press). “The mediation processes within social learning: Women’s food and water security practices in the rural Eastern Cape”. Draft PhD study (still in progress) Rhodes University Environmental Learning Research Centre, South Africa.

Sayer, A. (2000). *Realism and social science*. Sage: London.

Schatzki, T. R., Knorr, C. K., & Savigny, E. (2001) *The practice turn in contemporary theory*. London: Routledge.

Strang, V. (2004). *The meaning of water*. Oxford: Berg.

Vygotsky, L. (1978). *Interaction between learning and development*: *Mind and society*. Cambridge, M.A: Harvard University Press.

Wertsch, J. V. (1991). *Voices of the mind*. Harvard University Press.

Personal Communication

Gorburdhan, P2013. Presentation for “Change Orientated” short course Module 2: Searching the internet. Rhodes University: Grahamstown.

Paper 3: 'Changing Practice': Designing and Testing a Professional Development Course for Water Knowledge Mediators Who Support Community Learning and Practice

Heila Lotz-Sisitka, Jane Burt, Robert Berold, Nina Rivers, Monde Ntshudu,
Treve Jenkin, Mindy Stanford & Mangaliso Buzani

Background and context

This is the third in a series of papers reporting on a Water Research Commission Research programme about "Knowledge Mediation" in the water sector. It responds to the general problem of scientific knowledge mediation and the more specific problem of a lack of uptake and use of knowledge products produced by scientists for the Water Research Commission. The problem of mediating scientific knowledge is an international one, as identified by both Shaxson and Bielak et al. (Shaxson et al., 2012; Bielak et al., 2008), and has been the subject of much deliberation on how knowledge could and should be mediated (ibid). It has led, in recent years to a strong international move towards knowledge co-production approaches, in which scientists work more closely with stakeholders *before, during and after* the knowledge production process (ibid). A significant number of programmes have emerged that focus on the public understanding of science (many of which are media based, and increasingly also support more interactive and user-focused use of the Web (Sometimes known as Web 2.0).

However, neither of these massive international trends dealing with "the knowledge flow problem" gives adequate attention to the *capacity development of knowledge mediators*; especially those who work at the interface of *produced knowledge* (normally produced by scientists and scientific organisations) and *communities*. In South Africa such "knowledge mediators" are often found in grassroots community-based organisations, non-governmental organisations, extension services and faith-based organisations. When it comes to the mediation of environmental knowledge, such persons are often referred to as "environmental educators" or "community learning facilitators" or "community extension agents / development officers".

In the South African context this group of knowledge mediators are generally under-supported and neglected in the system of knowledge mediation, education and training. Some efforts have been made to provide formal training support to such groups, for example via the Environmental Education, Training and Development Practices Learnership (EETDP) (at level 5 on the National Qualifications Framework) and the Environmental Education, Training and Development Practices Advanced Certificate Programmes (previously at level 6 on the NQF), although this qualification is being phased out, and the EETDP learnership may also be under threat due to changes in the NQF.

The research project reported on here gives *renewed attention* to the professional development of such knowledge mediators. This is important, given the changing knowledge contexts in which they operate, and also the restructuring of education and training systems. These systems should continue to prioritise support for knowledge mediation, since these mediators are the agents who work most consistently with rural communities and marginalized urban communities in helping them adapt to environment and development challenges, among which are climate change, environmental health and poverty related water challenges.

The key questions informing this study are: How can scientific knowledge, produced by scientific organisations such as the WRC, be better used and accessed by knowledge mediators? And how best can they be supported in their objectives, which are often to support change in community-based natural resource management practices (in our study the focus was on water with a particular focus on the practice of rainwater harvesting).

Research informing design of a curriculum framework for change-oriented environmental learning

The development of a curriculum framework for this professional development course for water mediators (referred to as the "Changing Practice" course) is based on the findings of research undertaken over a three-year period within a Water Research Commission Funded research programme. This programme did the following: 1) it began by investigating water use practices and community learning; 2) it then drew on these insights to develop resource materials to test a practice-centred approach to water knowledge mediation in two community contexts[7]; and 3) it then drew on the insights gained in phase 1 and 2 to design and support mediators to use a practice-centred approach to knowledge mediation. These three phases generally cover the three-year framework of the WRC research programme. This paper focuses more on the third process within this research programme.

However, this WRC project also draws on 20 years of professional development and implementation research by the Rhodes University Environmental Learning Research Centre which is captured in a review by Lotz-Sisitka (2009).

The 20-year review (2009) pointed to the need for a "radical break" from traditional course design (which focused on what knowledge needed in order to be assimilated), to the exploration and understanding of learning in social contexts of practice. This is necessary if change-oriented learning is to be understood and if course designs are to address the demands of *changing social practices*. Supporting changing social practice is at the heart of much environmental education, since the objectives of environmental education are *change-*

[7] Phases 1 and 2 of this process are captured in more detail in Paper 1 and 2 as well as in a set of project reports and student studies (See the Executive Summary for project reports linked to these papers). Similarly the process of Phase 3 is captured in various project reports and this paper.

oriented. They involve changes in knowledge, values and skills *in the context of* emergent and changing social practices.

The Lotz-Sisitka (2009) review led to the launch of a research programme focussing on *change-oriented social learning and sustainability practices* (Lotz-Sisitka, 2008).[8] The "Changing Practice" research programme, which focuses on water knowledge mediation, forms part of larger research programme. Paper 3 shares the processes and results of the "Changing Practice" course.

This research programme, and the associated "Changing Practice" course design and development research, works with innovations in social-learning research, particularly with cultural-historical and socio-material orientations to learning and change, in which *practice theory, cultural-historical learning theory* and *cultural-historical activity theory* are core (Lotz-Sisitka, Mukute & Belay, 2012; see also the research deliverables and student studies of this project that are linked to this report). These approaches focus on individual and collective agents and their involvement in changing activities and practices (Mukute, 2010). They also focus on how agents' practices are mediated in implicit and explicit ways both in and through cultural-historical, and materially influenced social-learning interactions (Rivers, 2014 in press). Mukute (2010) for example showed that in taking steps to change practices, individuals often engage with those around them to garner support and/or social acceptance for their actions, and that this influences how they go about changing their practices. The work of Rivers (2014 in press) is showing the confluence of implicit and explicit social-cultural and social-material mediation processes in the construction of changing social practices.

These approaches, and their relevance to change-oriented learning, are briefly introduced below:

- ***Cultural-historical*** approaches to learning and change are associated with the work of Vygotsky, who proposed a non-dualist cultural-historical conception of mind "climates" that inter-mental (social) experience shapes intra-mental (psychological) development. This is understood as a *mediated* process in which culturally produced artefacts (such as forms of talk, representations in the form of ideas and beliefs, signs and symbols) shape and are shaped by human engagement with the world (Vygotsky, 1978; Daniels, 2008; Daniels, 2012). From a practical perspective for our research programme, this means that all human learning is mediated via culturally produced artefacts (e.g. the words used to mediate water resources management; and the tools that we have to do it with, e.g. rainwater tanks) and that this needs to be taken into account in learning processes, i.e. in how these external artefacts are internalised by people via mediation.

[8] This WRC research programme is therefore supported and extended by this wider research programme.

- ***Cultural-historical activity theory*** is a post-Vygotskian theory that focuses on activity. Leont'ev (1978, p10), who developed this theory out of Vygotsky's earlier work, argued that

  > Activity is the minimum meaningful context for understanding individual actions … In all its varied forms, the activity of the human individual is a system set within a system of social relations … The activity of individual people thus depends on their social position, the conditions that fall to their lot, and an accumulation of idiosyncratic, individual factors.

  As developed later by Engeström (1999), cultural-historical activity theory includes a focus on the rules, division of labour, tools and subjects that influence the object of activity. Engeström's work also suggests that the object of activity (i.e. practices of people) can be expanded through learning interactions. From a practical perspective for our research programme, this means that the activities that people are engaged in are influenced by various factors that are culturally-historically shaped, but that they can also be expanded and changed through learning.

- ***Practice theory***: "Practices", as described by Schatzki (1996, p89, as cited in Green, 2009, pp42-43) are:
  - learning how or improving one's ability to do something by repeatedly working at it and carrying it out;
  - a temporally unfolding (time dependent) and spatially dispersed (site-located) nexus of doings, sayings and relatings; and
  - performing an action or carrying out a practice of the second sort.

  Practices are organised bundles of "sayings", "doings" and "relatings" that "hang together" (Schatzki et al., 2001) in the project of a practice: the "project" of the practice being the overall purpose that gives it some coherence (even if it also contains contradictions). The three dimensions of practice are 1) the semantic dimension (in which it is possible to say things and be understood); 2) the dimension of physical space-time (in which it is possible to do relevant activities); and 3) the social-political dimension (in which it is possible to relate appropriately to others in the practice). According to Kemmis and Heikkinen (2011) practices are cultural-historical, and materially and socio-politically shaped. They say:

  > A practice does not come into existence by producing sayings, doings and relatings out of thin air. It draws upon existing possibilities in each of these dimensions: it is composed from existing cultural-discursive arrangements like the languages and specialist discourses that describe and justify the sayings that occur in particular practices; existing material-economic arrangements that make possible the doings – the activities – that compose the practice; and existing social-political arrangements that make possible the relatings that compose the practice (Kemmis & Heikkinen, 2011, p3).

For practical purposes in our research programme this would mean that there is a need to understand water management practices from the point of view of: 1) how they are described (language and semantics); 2) what is being done by whom, where and when (physical time-space); and 3) who is enabling or constraining who to do what (the socio-political relational dimension).

- ***Socio-material*** approaches to learning and change emphasise not just the cultural-historical aspect of practices, but also the material influences on practice. Fenwick et al. (2011) describe the materiality of professional practice as being

  > the entanglements of the social and personal with the material elements of bodies, tools, technologies and spaces. This "sociomaterial" approach to understanding practice adopts a "relational ontology": capacities for action, as well as knowledge and phenomena, are performed into existence in emergent and precarious assemblages of "intensities" both human and nonhuman.

  From a practical perspective in our research project this would mean that human practices are influenced by various material realities (e.g. landscape slope, soil type, availability of water).

These theoretical perspectives on learning and change have been helpful in designing the "Changing Practice" course for water knowledge mediators, because they have allowed the course design to be practice, activity, socio-culturally and socio-materially centred (i.e. strongly contextualised) and to take account of the water use and management practices that are currently going on in communities where water knowledge is being mediated. However, this does not mean that the course fell into the trap of being "over contextualised", or "context delineated".

The pitfall of over contextualization was avoided because course participants and water knowledge mediators investigated and discussed the practices in order to establish what new knowledge is *needed* in the context of practice to inform, shape, improve or change the practice/s in ways that are desirable to the communities, but also for wider national goals for improved / more sustainable water management. This allowed for a dialectic between tradition and innovation to emerge.

In turn, this has allowed water knowledge mediators to seek out and identify relevant knowledge networks that exist in and around the areas where new knowledge is needed, and to consult or seek out available knowledge resources for the purposes of improved water use mediation. These networks and resources were tried out in practice, and then reported on via the professional development programme.

Via this process, the knowledge mediators were able to develop their contextual and professional capacities to mediate and use water knowledge produced by scientists and other professional organisations in contexts of changing practice, thereby building capacity for closing the knowledge-into-practice gap.

A practice-centred social learning approach as starting point: Four phases of research informing the WRC 'Changing Practice' course design

The course was designed to clarify a particular learning approach, namely practice-centred learning, and sought to develop key skills to mediate practice-centred learning, using learning support materials such as the question-based resource that was pilot tested in the context of this project. The process followed in developing the course is as follows:

A. Understanding how people learn community-based water management practices in their contexts of practice.

B. Raising questions based on people's accounts of their practice to establish knowledge flow needs and interests.

C. Developing a learning resource based on these questions and based on a social understanding of practice-centred learning.

D. Documenting and reflecting on this process with the aim of developing a curriculum framework for mediation training and practice for organisations that support the use of new water management knowledge in contexts of practice.

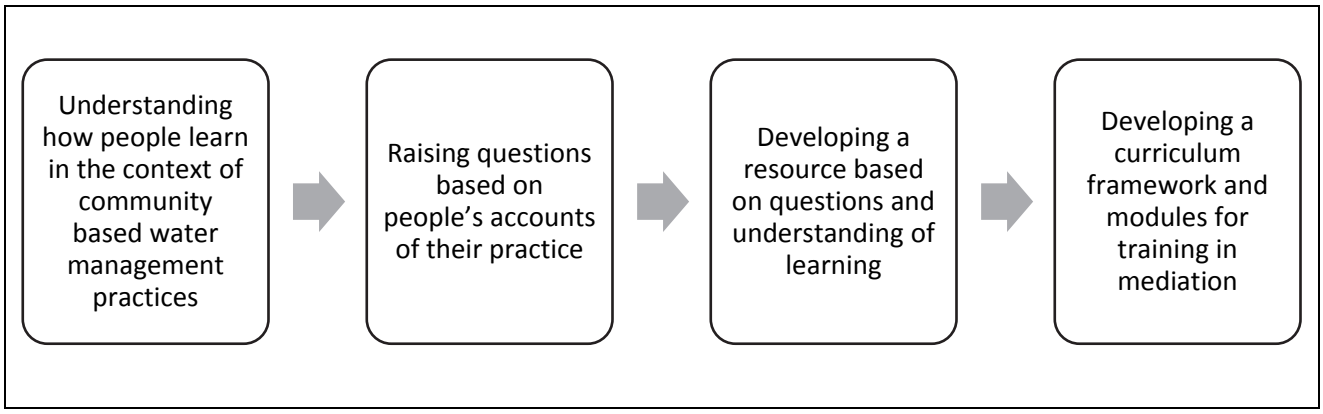


Figure 1: The process of piloting the development of a practice-centred, question-based learning resource

As already stated in various ways, the focus of this research was to understand how knowledge flow is mediated in the context of local practices, based on the understanding that knowledge is actively constructed in contexts of practice rather than something that can be neutrally received.

Phase 1 of the research looked at understanding how people learn in the context of local water management practices in one community context (Cata) focussing on a number of practices for water management and use (Phiri, 2011 and WRC project reports). Research showed that learning is most effective when it is incorporated into and supports practices that communities are already involved in (ibid). As mentioned in Part 2, (see page 42) the existing

practice becomes the centre of a wheel around which many different learning opportunities can emerge, and where new knowledge needs arise (see WRC project reports).

Research also showed that learning in contexts of community practice happens mostly through sharing, conversations, and storytelling (Phiri, 2011 and WRC project reports). It showed too that the introduction of new knowledge via extension services and/or training programmes was important for changes in practice to occur. At the same time the research indicated that in order for the research to hold meaning and be useful to people such "new knowledge" needs to be carefully linked to existing cultures of practice, and to existing knowledge flows and knowledge needs in the context of community-based practice (Phiri, 2011). Insights from this research led to the use of the following "lessons" in the design of the course:

- It is important for knowledge-practice mediators (extension officers, NGO workers etc.) to understand both contexts of practice, and how people are learning within these contexts of practice.
- Mediation tools need to be designed in ways that support the practices that people are already involved in, and especially they need to address the questions that people have about their practices (or the issues they are struggling with).
- Mediation tools need to contribute to an ongoing, emerging process of learning where new knowledge can help to shape and inform existing practices in new ways. To do this, mediation tools need to relate to, draw on, and weave into the knowledge-practice narratives that are reflected in, and being told about a particular water management practice.

Phase 2 of the research process focussed in depth on a single water management practice in order to develop a deeper understanding of the implicit and explicit mediation processes. The researchers therefore collected detailed narrative accounts of rainwater harvesting practice in Cata (Rivers, 2014 in press). Listening to people's accounts of their practice helped the researchers to understand the choices they had made in relation to their water needs, and what knowledge they needed in order to make those choices. It also highlighted any contradictions in their water management practice and gaps in their knowledge, thus helping to identify the knowledge flow needs in context.

Expanding the local narratives was necessary as these can often be "context bound", and it was necessary therefore to also investigate technical specialist practices through conversations with specialists and consulting written material (these reflections are documenting in WRC project reports). From these accounts a series of questions about rainwater harvesting practices were articulated, which had emerged out of current practice and reflections thereon. The *combination* of examining the experiential knowledge of community-based water management practitioners and of specialist water knowledge mediators gave us a fuller understanding of knowledge flow needs. From this phase of the research, the following further lessons for the course design were also extracted:

- Generate questions from practice by listening to people's accounts of their practice.
- In order to revise and refine the knowledge-practice questions associated with a particular water management practice, examine the available knowledge of such practices and relate it to people's accounts of their practice.
- It is important to do BOTH of these processes (i.e. examine knowledge-practices in actual contexts of practice and examine what is known about such practices, i.e. the knowledge held by specialists)[9]. If we look at local knowledge alone, it is not always possible to expand learning, as local knowledge can become self-referential and too contextually inscribed. Similarly knowledge of practices produced elsewhere (e.g. in scientific institutions) can be too abstract or might be represented in ways that do not connect with practice. Using a question-based approach to learning mediation, based in and always related to (but not limited to) actual contexts of practice, can facilitate this dialectical mediation or "knowledge flow" process.

Phase 3 of the research therefore involved turning to the literature on rainwater harvesting to help answer the questions generated from practice and to work with a specialist in rainwater harvesting from the area (as documented in the deliverables of this research project). An attempt was also made to develop a catalogue of relevant resources and research to support the question-based learning resource that documented key questions associated with the practice of rainwater harvesting as found in community-based learning settings. A lesson here (from a contextual and access perspective) was to engage with and develop knowledge networks, rather than simply relying on Internet searches for constructing access tools to new knowledge that can respond to field-based questions. Developing knowledge networks led to a process of identifying available experts and institutions who could then help guide knowledge mediators in terms of what reports to read and what Internet based knowledge to explore. We found it very useful to work with a specialist who has the requisite broader knowledge and mediation expertise. He situated questions within a broader socio-ecological perspective to which people responded positively during focus group feedbacks. His input was therefore really important for the process of *expanding learning* (Rivers, 2014, in press). From this we learned the following for our course design work:

- There is a process and skill in developing a knowledge network for the purposes of expanding learning.
- This includes being able to identify, access and select relevant local specialists to assist in verifying knowledge, not only of a particular practice but also of a practice within a particular context and how this local practice is situated within broader socio-ecological and social-material concerns. They should have the capacity to extend local questions and expand learning based on a wider knowledge of practices in responsive ways.

[9] This process lies at the heart of cultural-historical learning as articulated by Vygotsky (1978) who differentiated between scientific and everyday concepts. Hedegaard (1998) suggested that there is a distance between understood knowledge (as provided by instruction), and active knowledge, as owned by individuals.

Phase 4 of the research consolidated the writing of a learning resource based on questions that were generated from a local practice. It wove in stories of practice from the particular context, as well as from other knowledge sources, which could potentially help with the mediation of learning for a number of reasons, among which were:

- People could recognise the context of the learning resource as their own, and they could identify with the practice-centred questions that were contained in the learning resource.
- The resource contained knowledge of practice that came from the local context. People could recognise this and they could also recognise that they knew this. The resource mediated prior knowledge and provided pathways for accessing new knowledge.
- People responded to different types of questions:
  - Practical questions
  - Socio-cultural questions
  - Questions around earth systems

The experience of the Phase 4 research revealed that question-based learning resources should not only be focussed on "direct practical issues" and a simplistic interpretation of practices as "doing things", but should also be socio-culturally situated and expand knowledge of how local practices are situated in and linked to other systems and processes. This phase also documented what needed to be done in terms of writing, editing and design to make a practice-centred, question-based learning resource accessible. The learning resource was written, edited and designed by people experienced in these areas, but during the process they reflected on the needs and skills of knowledge mediators who might need to produce their own support materials for facilitating learning. From this learning, further insights were gained for course design:

- The knowledge contained in practice-centred learning resources should not be limited to technical aspects of practice ("how to do things"), but should be extended with knowledge of socio-cultural aspects of the practice, as well as knowledge of how the practice links to wider systems and structures. Care should be taken not to simplistically interpret the notion of practice as "technical action". There is much more to practice-centred learning than this.
- Attention should be given to the skills that are needed in order to develop accessible practice-centred, question-based learning mediation tools – skills such as design, writing and pedagogical approach.

The course and its design

As indicated above, this WRC research project is concerned with knowledge mediation and knowledge flows. It seeks to understand the complexities of knowledge-use-in-practice. The objective of the course was therefore to support knowledge mediators and facilitators of community-based social learning to understand how knowledge is mediated in contexts of practice so that changes in social practices can be supported via learning and knowledge mediation.

The course was structured to allow for knowledge flows related to situations where people are already engaged with practice, for example, an NGO working with access to water for small scale farmers. The intention was to invite course participants who were practising knowledge mediators (NGO workers, extension officers, community-based organisations, community leaders). The aim was also to research the implementation of the course, and to test the concepts and tools that had been developed for the course as outlined in the four phases described in the previous section.

The course was structured to provide a platform where knowledge mediators (working in NGOs, extension services, CBOs and other organisations) can engage with concerns associated with their practices and consider how to support learning. For this a particular curriculum framework was needed that allowed for learning to take place both within the context of a structured course and in the context of the particular social practice.

The course curriculum is informed by the research results discussed above as well as the wider ELRC research findings in the change-oriented learning and sustainability practices research programme. The course curriculum framework is based on the following curriculum framework principles (adapted from Lotz-Sisitka & Hlengwa, 2012):

1) ***Practice-centred and situated***: Learning on the course is situated within the contexts of a water management practice that is of relevance to the workplace of the participant. For this to happen, course participants must audit and review existing water management practices in their work or community context, or in some other context of their choice. They address questions such as: What practices are the people here using to manage water? How is this being done? Who is involved? What issues, questions or problems are people facing? And: What questions do they have? This formed the focus of their first course assignment.

2) ***Responsive, emergent and expansive***: The course allowed knowledge mediators to respond to questions and issues that were identified from water management practice in social-ecological contexts. For their first assignment, course participants were encouraged to identify issues that were emerging in the contexts of water management practice that they were engaging in. Following this, they identified relevant knowledge sources and resources that respond to these issues through accessing knowledge networks, thus

allowing for an expansion of learning in water management practices. This formed the focus of their second course assignment.

3) ***Change-oriented and reflexive***: The course encouraged practitioners to consider how learning can be expanded through the introduction of new knowledge that is relevant to issues and questions arising in their contexts of practice, so as to support change-oriented learning and practice. For this they developed a learning resource that they could use in their context of practice, which incorporated the new knowledge that they had identified as being necessary in the context of practice. Through this, participants were encouraged to reflexively review their own practice as mediators, and to improve this practice through trying out new approaches to the mediation of water knowledge in practice. For this to be possible, the course adopted a "work together, work away" model over four sessions so that ideas and learning processes could be conceptualised, tried out and reflected on over a period of time. The production of a new knowledge resource was a key outcome of the course, which captured much of this reflexivity in the learning process. This was their final course assignment.

In summary:

- The first assignment involved course participants in contextual profiling and practice analysis, this included the identification of issues and problems or questions associated with the practice that they were observing and analysing.
- The second assignment concentrated on the sourcing of new knowledge that could be used to address the issues and questions arising from the context of practice. Such knowledge was to be sourced from both local knowledge networks, and scientific knowledge sources.
- The third assignment was to develop a learning resource that was relevant to their work, and in doing this, to internalise and engage with a practice-centred, contextual approach to designing learning support materials and mediation processes. The third assignment supported them to learn the skills needed to do this.
- The fourth assignment involved reflexive review of their learning throughout the course.

Throughout the course the participants were supported to engage with the communities they work with, drawing on an understanding of how new knowledge can be mediated and brought into use within the context of each participant's practice. Participants learned the skills of how to mediate knowledge in response to questions of practice; and how to facilitate change-oriented social learning and more sustainable water management practices.

Course participants and teaching processes

For the first implementation programme only a small group of knowledge mediators was selected. The course was designed so that people who work in different contexts can attend,

such as NGOs, CBOs, extension officers, journalists and activists. The minimum level of education needed in order to attend the course was set at a Matriculation certificate (level 4 on the NQF) however, this did not exclude people with higher levels of education such as diplomas or degrees who can also benefit from the course. Participants came from institutions such as local and regional government institutions, community-based organisations, NGOs, student bodies, schools, activist organisations and learning institutions.

The course is structured so that participants get an opportunity to attend interactive and participatory workshop sessions and then to apply what they have learnt to their own particular context in the form of "work-away" assignments. As indicated above, the assignments are important in that they serve as a step-by-step guide to applying and practicing what has been learnt during the workshop sessions. Course workshop sessions are structured to allow participants to reflect on their own practice by working with their own stories of practice, case stories (demonstration cases), practice sessions, fieldtrips and peer discussion and review. This includes developing social skills (such as working with diverse groups), listening skills, observation, and facilitation. Attention is given to issues of equity, tolerance and gender with the workshop sessions integrating reflection on these issues, since they cannot be ignored in the context of the South African social landscape. During work-away sessions participants received two telephonic contact sessions with mentors of the course. They could request more assistance from their mentors if they felt they needed it.

Course evaluation approach[10]

Two strategies were used to evaluate the "Changing Practice" short course:

Value creation: We drew on the conceptual framework of "value creation" by Etienne Wenger, Beverly Trayner and Maaren de Laat (2011) to evaluate the learning of the participants on the course.

Reflexive practice: Before and after each course all course facilitators and mentors met to reflect on the successes and challenges experienced in delivering the course. These experiences were documented in meeting minutes. All mentors were encouraged to keep notes of what it was like to work with participants and to document any questions they had about the course.

Wenger et al. (2011) developed a framework to promote and assess value creation via learning in communities and networks. By "value creation" the authors mean the value of the learning that is generated by community involvement and networking (Wenger et al., 2011, p7). The focus of analysis here is on the value created by *communities of practice* or *social*

[10] This section of the paper draws on the report of Nina Rivers (2013) who was sub-contracted to undertake this evaluation as part of the wider research programme's activities.

networks when they engage in social learning activities, such as learning from each other, sharing information and helping each other with challenges (Wenger et al., 2011).

This framework was useful for two reasons: it set out relevant indicators for data collection and it provided a structure for integrating these indicators into a meaningful account of value creation through people's accounts of their participation in the course. Wenger et al. (2011, p10) argue that "Over time, a joint history of learning also becomes a resource among the participants in the form of a shared practice – a shared repertoire of cases, tools, stories, concepts and perspectives." We witnessed this taking place in the "Changing Practice" course. One participant, when asked what aspect of the course had been most useful, responded:

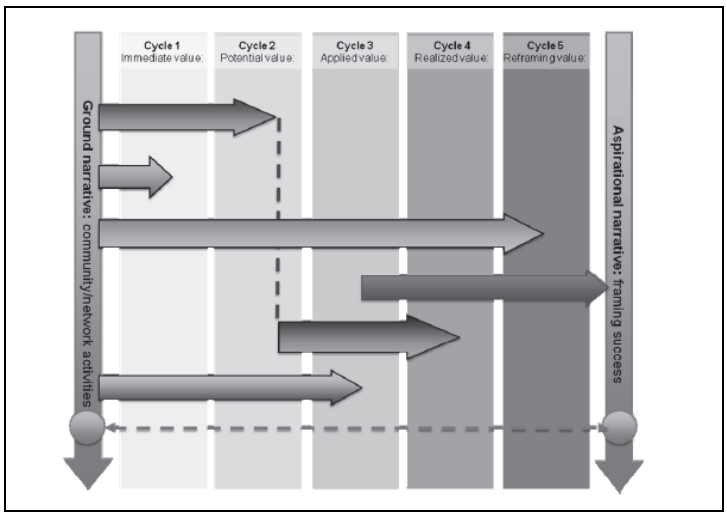
> The value of working with this process of developing questions helped me to see where I was going with the project, evaluating, then going back...The process is the most valuable thing to me; the way that the process links these with questioning and interviews and the structure those give you… (Value creation story 1, in this paper).

Wenger et al. (2011) chose to frame the outcomes of assessing value creation in the form of narratives for three primary reasons. The first is that communities and networks have stories of their experiences that evolve over time; how they started, what happened, what participants did or did not achieve, etc. By listening to individual narratives (experience of individual participants) or collective narratives (the experience of community or network) they argue that one is able to gain an understanding of the learning that took place (or that did not take place) and what value was created (or not created) (Wenger et al., 2011).

The second and third reason for choosing to frame assessment of value in narrative form is to allow for *audience* and *perspective*. The audience members are not only the participants themselves but also other stakeholders, such as funders and organisations such as the WRC that are interested to see if their invested activities have created value. Narratives also allow for perspective and are able to show both the short-term and long-term value of communities and networks over time. For example, the learning that takes place in a community or network can often be (and is often) applied at a later stage and in other situations, as was the intention of piloting and researching the processes of the "Changing Practice" course.

Wenger et al. (2011) suggest that in order to assess and promote value creation through social learning, two functions of narratives are considered: accounts and aspirations (Wenger et al., 2011). On one hand, narratives are *accounts* of what has taken place or what is happening in the life of a community or network in the everyday (Wenger et al., 2011, p16). Narratives that describe community or network activities are called "grounded narratives". Narratives can also represent the aspirations of communities and networks, such as what a person wants to achieve or how a community defines success (Wenger et al., 2011). Narratives that describe and represent how communities frame success are called "aspirational narratives". The space between what happens (grounded narratives) and what is hoped will happen (aspirational narratives) is where the assessment and promotion of value creation through social learning is

located. Wenger et al. (2011) clarify this space and conceptualise value creation as happening in five cycles: immediate value; potential value; applied value; realised value, and; reframing value (Wenger et al., 2011). These authors (2011) provide indicators as well as potential data sources for each cycle in order to identify, assess and promote value creation (see Figure 2).



Source: Wenger et al. (2011)

Figure 2: Value creation framework

To evaluate the Water Research Commission "Changing Practice" course, we worked with four of the seven course participants to track value creation over the four-month duration of the course. Participants included two NGO workers, a student working in a student-run organisation, and a participant working as a community level leader. Semi-structured interviews provided the primary source of data, but these were supplemented with participant observations and a questionnaire at the end of the course. As indicated above, the evaluation methodology and approach was framed by the value-creation framework developed by Wenger et al. (2011) using the five cycles that they suggest, applied as follows:

- Cycle 1(immediate value) in this framework is the most basic and considers the activities and interactions that take place as having value in and of themselves. For Cycle 1 one looks for indicators of activity and interactions. Typical questions asked when interviewing course participants and assessing for value creation in this cycle, are: "What were one or two activities that you really enjoyed?" and "Were they relevant to you and if so, how?"
- Cycle 2 (potential value) refers to the knowledge capital that activities and interactions can lead to, which may not necessarily be immediately realised (Wenger et al., 2011). Within this cycle one looks for value in the form of different types of capital, such as human capital (personal assets), social capital (relationships and connections), tangible capital (resources), reputational capital (collective intangible assets), and learning capital (transformed ability to learn). For Cycle 2 one looks for a range of indicators of

knowledge capital, such as the types of skills acquired and the intensity of social relationships. In order to generate data for this cycle participants were asked the following questions: “Did you acquire new skills or information?”, “Did you feel more inspired by your work?”, “Did you gain access to new people in your field?” and “Did you gain access to new tools or methods of doing things?”

- Cycle 3 (applied value) focuses on changes that occur in practice from the adaptation or application of knowledge capital in different contexts (Wenger et al., 2011). At this level one looks for indicators of changes in practice. To assess value creation at this level course participants were asked if they had applied their new found knowledge, such as skills or tools, in their work place and if so, where and how.
- Cycle 4 (realised value) looks at how performance has improved because of the activities of the community or network (Wenger et al., 2011). Because it cannot be assumed that the application of new knowledge (cycle 3) will lead to an improvement in performance or practice it is important to reflect on what effects the application of knowledge capital has on the achievement of what matters to stakeholders (Wenger et al., 2011). At this level one identifies indicators of improvement in performance in order to assess this cycle. To assess value creation at Cycle 4 course participants were asked questions such as: “Has your participation on this course affected your work?” “If so, how?” and “Has the organisation that you work for achieved anything from your participation on this course?” At times questions such as these were premature, as the value of knowledge products may only be realised at a later stage (as explained in Cycle 3) but because the course was set up in a such a way that participants chose change projects that were already part of their work environment, many course participants could see and experience the value of what they were learning quite early on. This became more evident towards the end of the course as participants understood what they were learning and how it could be applied in their work environments.
- The final cycle, Cycle 5 (reframing value) is achieved when social learning processes bring about a reconsideration or reframing of success within communities and networks. At this cycle one looks for indicators of changes in what the participant counts as success both on an individual level and for their environment. Here participants were asked questions about changes in how they approached their work and the people they work with, and if and how the values they place on what matters or counts in their work practice had changed as a result of their participation on the course.

When constructing the value-creation stories for each course participant, the framework of “telling the story of value creation” provided by Wenger et al. (2011, p35) was adapted. Value-creation stories do not have to cover all the cycles, and the five guiding questions provided by the authors were reworked into themes for each story. The stories begin by introducing each participant so as to provide some background on who the participant was, where they worked, what their change project was and what their motives were for participating in the course. Focussing on the motives of why they wanted to do the course

gave an indication of what they hoped would happen, pointing towards aspirational narratives. The first, second and third guiding questions, namely: “What meaningful activity did you participate in?”, “What specific insights did you gain?” and “How did this influence your practice?” were then used and adapted to the theme of “Meaningful activities and insights gained”. This was then extended to look at “Access to new and useful tools, materials and people”, after which questions 4, 5 and 6 (“What difference did it make to your performance?” “How did this contribute to the goal of the organisation you work for?” and “Has this changed your own or some other stakeholder’s understanding of what matters?”) were condensed into one theme of “Influence on work practice”. The theme of “challenges” was added in order to account for the things that participants found difficult or frustrating on the course, such as time constraints.

Value-creation stories give meaning to the value-creation cycles and their complimentary indicators described above. Wenger et al. (2011:37) articulate this well when they explain that, “…stories substantiate indicators, give them life, and make them more meaningful by connecting them into more extensive processes of value creation.” Stories and indicators thus point to one another and the data from each cycle needs to be combined with the cross-cycle stories in order to provide an integrated understanding of the value created in communities and networks. If this is not done then an indicator by itself is suggestive and a single story merely anecdotal. Wenger et al. (2011,p37) thus call for cumulative evidence when presenting stories. For example, across the four value-creation stories for the WRC Mediator’s course, one activity that all participants said they found helpful was the free-writing session. The cumulative stories about this activity thus indicate what they found relevant to their work practice, as well as what they consider good value for their time. Using this framework was very helpful in that monitoring indicators and collecting associated value-creation stories provides the tools to construct a holistic picture of the value created by communities and networks, such as the one created in and through the “Changing Practice” course.

Four value creation stories

Four value creation stories are shared here by way of illustration to show how this methodology works in practice. The stories also provide insight into the implementation processes of the course.

Value-creation story 1: Alhyrian Laue (Calabash Trust)

"The way I do my next permaculture course is going to be completely different"

Who he is and what he does

Alhyrian Laue is an artist and a permaculture and sustainable systems consultant working with Calabash Trust based in Port Elizabeth. In May 2012, two food security projects were designed and implemented at two schools (W.B. Tshume and Emzomncane) in Kawzakele, Port Elizabeth (using Permaculture Design methodology and principles. Under Calabash, Alhyrian installed a comprehensive water harvesting system (roof and earth catchment of rainfall) using gutters, rain-runners and tanks during the course of the previous year.

Change project identified

For his Change Project Alhyrian chose to work with grey water at the W.B. Tshume school. Commenting on his vision for the project he states: "I want to involve the teachers, students, community and myself in a process of grey water (GW) use discovery by uncovering old customs, stories and methods towards designing and implementing a simple cost-effective reed-bed-type GW system at W.B. Tshume. The long-term vision is that participation of the stakeholders in implementing a robust and effective GW system would encourage grey water use at the school and eventually in the surrounding community, while providing a working example for educating the children about how what is normally considered an undesirable waste can be transformed to support a productive food-security ecosystem."

Motives for participating in the course

When asked why he chose to participate in the Mediator's Course Alhyrian said, "I'm hoping to understand the context of what people know and how they know it – a better understanding of how to workshop what we are doing. Action-based practice." Speaking about the kinds of people he works with and how he hopes to learn how to work more effectively with them by understanding where they are coming from, Alhyrian observes, "I tend to want to push the theory too much in the beginning – we work with elderly ladies and they have not had complete education, so there is a communication barrier – so I've realised my mediation is not good enough. So I hope to learn how to bring the knowledge into a context that can be understood directly by the people I'm working with."

Alhyrian appreciated the contextual grounding of the course and commented: "This type of thinking is close to my heart – contextual thinking. My whole fine art degree was researching context. The best benefit is speaking to other people with similar experiences. This stuff is not new to me but to learn from people like you and Jane doing this stuff in the field is great." Regarding his expectations about how the course would benefit his work practice he said, "It's about being more skilful from an information and data collecting stage. And I'd like to learn about how to bring knowledge in – as a facilitator, how to know not to stuff too much information in, or be constrained by the structure of what I plan or teach."

Meaningful activities engaged in

Module 2 focused on surfacing questions out of practice which Alhyrian found challenging but immensely helpful. Commenting on this activity and working on this skill he said, "The method of thinking about questions has been honed, constantly engaging with questions and how to identify them and pull them out. That is important."

Through doing Assignment 2 Alhyrian found the structured process of hunting for knowledge very useful. "What I found helpful was the process of formally going out to find knowledge. It's given me a focus to go do something specific. It's like a channel I know how to use now. I also don't think I engaged enough – I had useful contacts, but because I knew where I was going to I got a bit lost[11] …I can see that's useful but I didn't give myself enough time for knowledge collection." One of the challenges he and many course participants experienced and expressed was that time constraints hindered them from doing assignments thoroughly.

Insights gained

Being taught how to be more sensitive to the context he works in caused Alhyrian to reflect on how he usually works. In Module 1 he commented, "What I started realising about myself is that I give advice too quickly – I tend to see solutions too quickly. So I need time to learn how to link my thinking to the local context. My thinking is practicality and efficiency and long term – I need to learn how to engage with people and I need to learn how to bring out the knowledge. I like what Rob said, about surfacing the knowledge."

Doing Assignment 1 and using the tools of observation and interviews continued Alhyrian's self-reflection journey in his work practice. He observed, "It's very important to integrate myself into the context. I assumed I had done enough observing, I realise now that I should have done observations more. I have a tendency to phrase things in my way of understanding…My agenda made me deaf to other things going on. In terms of interviewing I learnt how to follow leads in follow-up interviews which led me to so many unexpected threads."

The structure of the course helped Alhyrian to order his own thoughts and work. Commenting on his insights he says, "Again – the funnel – I have a tendency to think quite widely, but it's necessary to be specific. The tools we've been working with (contents list) to clarify what this is about and who it's for. What's relevant and what isn't. And things like the simple changing of a question by focusing it specifically to my context has been really helped. For example, 'Where does water come from?' to 'Where does water come from in X school?'"

Access to useful tools, materials and people

Tools

When asked what tools were most helpful to him Alhyrian said that the *whole process* of what the course taught and how it was structured was very useful for him. "The value of working with this process – developing questions, helped me to see where I was going with the project, evaluating,

[11] While this statement appears contradictory, what Alhyrian meant was that he had a very strong idea about what he was going to do and how he was going to do it and as a result he got lost because he didn't explore alternatives.

then going back...The process is the most valuable thing to me – the way that the process links these with questioning and interviews and the structure those give you and to work with photo mapping. And shifting the way of looking at things." Alhyrian used the metaphor of the pictures that look like one thing (an old woman) and then another thing (a young woman) when looked at with a different perspective to compare how the course has changed how he views his work practice and the contexts he works in.

Having to carry out *interviews* for Assignment 1 was a tool which aided Alhyrian to get started in his work. He observed, "I also have a tendency to think too much instead of just jumping in and doing something, so the interview process really helps you to just jump in there." Carrying out the interview process for Assignment 1 also taught Alhyrian the value of doing interviews, as he explains: "...seeing the value in interviewing – I don't have to be on a course to go and do it when I need to. It helped me to see that I don't need a structure to have to go out and do interviews and seek out knowledge. The Internet thing was also so helpful." Module 2 included a session on how to do Internet searches which most course participants found very valuable.

Working from *transcribed interviews* was another tool Alhyrian was introduced to which helped him in writing his narrative accounts. Commenting on writing from transcriptions he said, "I usually procrastinate writing because I have an aversion to it because I'm slightly dyslexic. I expect myself to write in a certain way – like [an] academic. But the transcriptions were great because I could work with this raw stuff which was a structure and then it also kept the natural language. It was liberating...and I found it rewarding because I already had that structure."

The *observation schedule* introduced in Module 1 was another useful tool that helped Alhyrian focus on his area of interest. Commenting on using his course materials he says, "I almost overlooked the observation part and then I went back to that part in the folder after doing my interviews and it helped me realise I need to look at stuff again. I annotated photos in my head. I found the observation schedule gave me boundaries because I have a tendency to go too broad and then make more work for myself."

The *free-writing workshop* offered in Module 3 was an immensely helpful and freeing tool for many of the course participants. When asked if he had acquired a new tool or knowledge in Module 3 Alhyrian commented, "The writing. I've always had a slight aversion to writing: this whole way of allowing your voice to come out really helped me. I've also started writing poetry again. I mean there are many reasons for that but one of the things I think is this free writing. It's about being genuine about your own voice and enjoying writing again."

Materials

Because of his participation on Module 2 with the "Amazing Knowledge Race" Alhyrian was also able to gain access to free WRC reports on his area of interest: "All those WRC reports – wow so amazing and free. I didn't know about the WRC before, but through this course and Jane I want to follow up on those."

People

Another tool built into the structure of the course was networking: the participants had the opportunity to learn how to network with experts and other people in their field of interest and work practice. The "Amazing Knowledge Race" was set up to give participants this opportunity and

Alhyrian was introduced to Rob O'Donoghue (Rhodes ELRC) which proved to be the beginnings of a fruitful knowledge exchange. Alhyrian also listed "the group, you guys, the people in my group – building up profiles" as very helpful.

Another important opportunity was through access to the mentors themselves, who listened to and guided course participants. Alhyrian and Treve Jenkins, his mentor, worked very well together. Alhyrian commented: "Treve really helped me lots. I bounced ideas off him, conversational feedback and then I took notes while we spoke, but not after it. He made notes for me and then sent them to me. So helpful!"

Influence on work practice

Being on this course and using tools such as interviews and observations made Alhyrian approach his work differently and with more focus and purpose. He explains: "I also kind of skipped the observation element. I was used to observing this practice so much and I've been working in this thing for so long that I had to have fresh eyes." When asked if this course has grown his confidence in his work abilities he answered: "Ja, the confidence of using the interview process. I didn't know how to use the interview process and there's a huge process of stakeholder analysis in permaculture, but this course has taught me the value of it and how to do it properly."

Alhyrian also identified new opportunities for learning which would influence how he carried out his work practice. He commented on the value of the course for his work: "The idea of expanding on what people already know. I can see how what Jane has been talking about is going to be such an asset to the way I teach. The way I do my next permaculture course is going to be completely different. This course is just that much more skilful. It's like hooks for more information."

Attending this course helped Alhyrian and Calabash to structure a process of forming contacts and building networks. Alhyrian explains that being on the course, "helped me see and get into the process about forming contacts and networks. It started a process that Carla and I had already started thinking about – forming a network and building a profile around different people – like an address book…You've given us a way of doing that."

Attending the course also changed Alhyrian's work practice in in respect of the way in which he interacts with the people he works with and plans his work: "…the way I've engaged and speak with people. Also, it's helped me a lot with future planning. The way I think about my process – it's added to my process. The way I go about doing things has been enriched."

Challenges

Time constraints were a major challenge for most people participating on the course. Alhyrian comments, "Time was a real issue. In one sense this course has been amazing, but it has also added to a work load that is already hectic. And to do it properly has been hard, to juggle it all, but it's worth it."

Value-creation story 2: Nontsikelelo Mpange (Upper Mnyameni Development Forum)

"The course is opening up our minds: from the course I have discovered that you can change your practice"

Who she is and what she does

Nontsikelelo Mpange or Ntsikie is the chairperson of the Upper Mnyameni Development Forum in Cata Village. She has been working as a supervisor since 2010 for one of the Forum's projects, the Amatola Wild Trout project, which is a rainbow trout fishing project aimed at tourists.

Change project identified

For her Change Project Ntsikie chose to work with the practices associated with management, resources and funding within the Amatola Wild Trout project: more specific issues she engaged with were gaining access to the Mnyameni Dam, and acquiring the correct fishing permits to run the project. There was much confusion about gaining access to the dam and getting support from government departments, so what she was interested in was taking stock of and understanding the context in which she was working.

Motives for participating in the course

One of the challenges Ntsikie identified for the project was the lack of support from the Mnyameni community for the Wild Trout project. "Lack of knowledge of the community of what we are doing is another problem." Although she did not at first understand the aim of the course, she later understood that what she was interested in was to better understand her work context and to gain knowledge about how to mediate knowledge associated with people's practices within the communities where she works.

Meaningful activities and insights gained

The most useful things Ntsikie learnt were how to identify knowledge networks, how to do observations, and how to draw questions out of peoples' practices. She also gained insight into what it meant to be a researcher, "…there is lots of work to do to understand the people you interview. You have to listen carefully to be able to report and to create a story."

Access to useful tools, materials and people

Tools

She found the *Internet search workshop* very helpful as well as being challenged in various contexts to communicate with different people. She commented, "This process about Internet and how to open it was very useful to attend this course. And the skill of knowing how to communicate with others." Ntsikie summarised the skills she had learnt on the course as: "Learning skill, listening skill and writing skill. Also the course itself is a skill."

Materials

Ntsikie found the course folder very useful, as well as new information pertaining to her area of work. As regards the helpfulness of the "interview schedule" in the folder she says, "Yes, the interview questions… to help me collect that information." As to the new information she was exposed to she explains, "I got a pamphlet on tourism – that person [referring to a contact given in the pamphlet], time was limited, so I couldn't meet with him now, but later I will call him on eco-tourism and guiding."

People

Participating on this course provided Ntsikie with the opportunity to network with experts and other stakeholders in her field of work: "I am linking with external people." She networked with experts from NGOs working in her village and with other fishing projects across the country doing the same kind of work.

Speaking about the relevance of the "Amazing Knowledge Race" Ntsikie commented, "When we speak to people at Rhodes they were helpful and they also supported us with pamphlets. So it was useful, the race…yes, people really tried to help."

Ntsikie's tutors were also important, as they played a major role in explaining concepts to her and guiding her. She comments, "I did not understand the course at first but with the use of the mentors I ended up understanding it."

Influence on work practice

Participating on the course helped Ntsikie's work gain momentum. In having to do the Change Project and interview people it helped to take the Wild Trout project forward. In terms of changing how her organisation does things, she explains that the way in which she searches for information has changed: "The course was very useful to me. It helps me in doing many things in the organisation, like looking for other people who can help me and writing of a booklet for my community is very useful."

In relation to doing things differently since attended the course, Ntsikie said she has learnt to cast her net wide and build knowledge networks in "looking for other information, external information." She has also saved time in her work "by looking for the information from different people." The idea of knowledge networks has helped her to pitch proposals for projects to different stakeholders.

The course has increased Ntsikie's confidence in her work practice in certain ways: "I am confident because some of the problems we were having, I now have an idea of how to solve them." The course opened up spaces for her to present her ideas and her project, which in turn challenged her in her presentation skills: "Presenting in English is my confidence because I usually just present to people in my community, but now I can do it in English – say what I did, especially of my change project."

Regarding meeting people in her field and the value of the course in general Ntsikie commented, "…they opened up my mind! It helped me, the course, I know the history now." Exploring the historical landscape of her work practice was thus very helpful.

Challenges

Initially Ntsikie struggled with understanding the aim of the course and the different concepts used, but with the help of her mentor she was able to negotiate the course successfully. She explains: "The pre-course assignment was difficult for me, I did not understand all the concepts – 'practice; and 'context'. But I spoke to Treve and he explained to me."

Unexpected expenses was also a challenge for Ntsikie: "I also had to interview over the phone, which was an added expense. Guides were here in Grahamstown so these were added expenses."

Value-creation story : Sithokozile Yalo (Wildlife and Environment Society of South Africa [WESSA])

"Assignments helped me do my job better"

Who she is and what she does

Sithokozile Yalo, or Thoko, works for WESSA's Border Kei branch. She is based in Luthengele village in Port St Johns where she has been an Environmental Educator for five months.

Change project identified

For her Change Project Thoko chose to work with water quality challenges in Luthengele village. While there are various sources of water, Thoko realised that the area was experiencing water shortages: "the sources of water are rain (tanks), the Umzimvubu River, a stream, runoff underground tanks, and sometimes when things are bad water from drains next to the road is used." Thoko was interested in the water quality of these different sources of water. She explains, "There is no fresh tap water within the village, so they rely on the mentioned sources which they are using with animals as well. [They are] not aware of other different ways they can use to purify their water. These could lead them to being able to clean water for themselves, thus lowering illnesses like cholera."

Motives for participating in the course

One of Thoko's primary motives for participating in the course was to "build a relationship with the community." She also pointed to the fact that she needed to understand the context in which she was working in terms of "harmful organisms in the water and the illnesses that they present." She made the point that Luthengele village's physical location within the catchment's human settlement patterns affects the water quality: "The community is situated lower in the catchment and the water they receive is influenced by villages on the upper catchment."

Meaningful activities and insights gained

One of the most meaningful activities Thoko participated in on the course was the writing workshop, which increased her confidence in her writing abilities. As she observed, "Narratives and free writing makes it all easier."

Learning how to do observations helped Thoko understand the context of where she works better, and in turn, understanding the context helped her to relate to people in her area of research and to integrate her understanding of the physical and social. She explains: "[I needed] to get information from people by observation because I was doing workshops. Now I look at the social aspects and now I understand their [workshop participants] answers more fully and where they are coming from because I understand the context. So my observation skills and listening skills …."

Teaching course participants the importance of understanding context brought to light the value of listening to people. Thoko emphasised the need to "Really understand where people are coming from and really listen to people." One of the things Thoko learnt about herself while doing Assignment 1 was that she tends to talk too much and not give enough space for respondents to

answer her questions. When asked what she learnt about herself as a researcher Thoko exclaimed: "I talk too much!"

The course challenged Thoko in areas that she was not very confident in. For example, having to interview people and chase down knowledge made her nervous at times: "Fear of communicating with people, calling people up or sending them an email. I'm overcoming this a little."

Learning how to network was another valuable activity Thoko engaged in. Commenting on doing Assignment 2, she explained how she had experienced knowledge networks unfolding, although the inroad she made into gathering information was fairly limited as she relied totally on leads from a single specialist: "It is easier when you use people as knowledge networks because they refer you to information. I didn't really go looking for reports. So I got everything from one person – I spoke to a professor from Tshwane University."

Access to useful tools, materials and people

Participating on the course exposed Thoko to useful tools, materials and people which were useful for her work practice.

Tools

One of the most helpful tools Thoko found was learning how to do Google searches on the Internet during the Internet Search workshop. Commenting on honing her Internet searching skill she said, "Google Scholar Internet searching, very helpful."

The course folder itself was a helpful tool for Thoko when doing her assignments as it gave her access to interview schedules and guided her thought processes, as she explains: "Yes for the interview questions I used the folder…Ja, that 'cloud' – that yellow pages-mind map where you fill in your stuff really helped me, so I went back to that."

Materials

During the "Amazing Knowledge Race" Thoko was exposed to research reports which used to be inaccessible to her, but after spending some time reading them she learnt that she could take away what was useful to her: "Ja, I've never used people's research before, like reports and stuff. Sometimes it's intimidating but you can use just what you need and what is relevant for you."

People

Participating on this course opened up spaces for Thoko to network with new people in her field. As mentioned above Thoko linked up with a professor from Tshwane University who was "doing water sampling in the area." This helpful experience had set her on a more confident path and she was planning also to consult other sources, among them the staff at a clinic: "I will speak to the local clinic there about the cases of cholera in the area." Talking about her experience of the "Amazing Knowledge Race" Thoko observed: "It saves time to just talk to people rather than read reports."

Thoko attended the course with another colleague from WESSA. Being on the course together made them want to work together and collaborate more in their work practice: "Lunga and I are also looking to work together."

Influence on work practice

Attending this course has added value to Thoko's work. Commenting on the usefulness of doing assignments where she had to explore the context of her work place she says: "There's a project that I'm working on where the person left and I was left alone…and the first assignment really helped me understand the context I was working in. Assignment 1 helped me do my job better. In my work I do a lot of mediating to find out how people use their resources. This helps me prepare the tools I use. I think Assignment 3 will be very helpful for me."

Learning how to draw out the questions or concerns that people have about their water practices helped Thoko to better understand what the underlying motives were for certain practices. When asked if she had, while still engaged in doing the course, managed to apply any of the new skills learnt on the course in her work practice she answered: "Yes, there are particular questions you need to draw out. As I speak to people then I can draw out problems and questions from what communities say."

Commenting on the relevance of making her own knowledge resource, Thoko explained this helped her directly in her work: "It's extra relevant! I use it for schools, not really for the projects I'm working on – it's difficult for me to get contextual information beforehand for the projects I work on. And also for my job description, I am supposed to be creating materials, and last year I didn't know how, [which] …lowered my performance rating for my job. But now this course has been very useful for me."

She commented further on the usefulness of being taught how to adjust a knowledge resource for different contexts: "We've got different clusters of areas we work in – so different problems, so using different materials for different clusters is useful. If I can put together materials then I can carry on researching relevant material, using other people's materials."

Challenges

Thoko found the interview process for Assignment 1 challenging as she had to gain people's trust and build on her relationships with people. She commented: "Interviewing was difficult – getting information out of people! I should have had more visits. People needed time to feel comfortable with me and to trust me. I need to grow relationships. Also [I need] to follow up on what people are saying – talking about war [conflict] in the area and how that affects people's water practices. So in this World Café:[12] I realised that I needed to listen more to what people are saying and follow up on those things. And writing up was difficult – I am not a good writer." Thoko realised thus, that she had to be patient in order to recognise and acknowledge the overarching narratives coming out of people's stories.

Getting people from organisations to respond to her questions was also a challenge, as many people were busy and her emails would often go unanswered. She said, "Getting hold of organisations was a challenge, they are so busy!"

[12] The World Cafe is a facilitation technique. It is a structured conversational process that gives space for participants to reflect on what they have learnt and/or formulate new ideas. See www.theworldcafe.com for more information.

Value-creation story four: Sibongile Mphuthing (Galela Amanzi)

"I'm more involved in my practice because of this course"

Who she is and what she does

Sibongile Mphuthing is a 3rd-year Environmental Science student at Rhodes University in Grahamstown. She is also a member of Galela Amanzi ("Pour the Water"), a student-run society at Rhodes University. Explaining what Galela does Sibongile says, "Galela Amanzi's main activity is working with local NGOs to install rainwater tanks in water scarce and historically disadvantaged locations." The Galela Amanzi project was formed in 2007 by students from Rhodes University and North Eastern University, in the United States via the GLOBAL PACT Programme. Sibongile acts as the site set-up organiser for the society. She is responsible for sourcing new beneficiary physical sites, organising the installation of tanks and being innovative with donations and materials in order to ensure the maximum numbers of tanks are erected.

Change project identified

As she was already working with rainwater harvesting, for her Change Project Sibongile chose to work with water quality in rainwater tanks including how to clean rainwater tanks. She explained that "quality of rainwater is also a challenge; many users do not use rainwater for consumption purposes due to the notion that it is unfit to drink." She further explained, "The challenge of water quality exists because of the lack of knowledge on how to keep the tank clean and also lack of skills on how to clean the water tanks. Even if some people do have knowledge on how to keep the tanks clean, there is the challenge of putting things into action."

Motives for participating in the course

Sibongile's reasons for participating in the Mediator's course was to gain a better understanding of the communities she works in and of where their knowledge and Galela's resources and skills can be brought together. When asked what her expectations of the course were, she responded: "To have a better understanding of action, how to implement the plans I have for the community and the plans Galela Amanzi has for the community. After giving a workshop on, for example, 'How to clean a tank': What steps do we take? Where do we start with practicing what was taught at the workshop? ... I also want to know how to work better with people around water issues – different levels and stakeholders, different approaches."

She said she wanted to know how to bring to the surface the knowledge that communities already have: "To draw out knowledge from the community and draw out plans they have for themselves. Not only go in with plans we have, but implement their plans first, help them by offering our skills, resources and time." She also hoped that the course would teach her how to be a skilful mediator of knowledge: "Skilful mediation, how to communicate clearly with the community. To listen carefully to what they are saying and not to wrongfully interpret what they are saying to us."

Meaningful activities and insights gained

One of the most enjoyable and helpful activities Sibongile participated in was the field trip on Module 1 and the "Amazing Knowledge Race" during Module 2 because they were practical activities and gave her scope to network. Commenting on the "Knowledge Race" she says, "It was helpful because I made contacts with people who could refer me to other people if they did not know too much about what I was doing. And one professor was helpful because she said, 'Don't forget to look for that', or 'This is how I would go about looking for this information…'." The "Knowledge Race" fell over World Water Week during which the Institute for Water Research (IWR) and Rhodes University had a display of water-related projects. This too provided Sibongile with a valuable opportunity to network with other students and organisations. The "Knowledge Race" introduced many course participants to organisations such as the IWR and the Water Research Commission (WRC).

Doing Assignment 1 gave Sibongile insights into the matter of researching style. She explained her challenges and how she navigated them in order to complete the assignment: "I can be a patient person because I had to redo Assignment 1. People are busy, so you need to go back a second time, but sometimes you don't know if you are building stronger relationships, or frustrating people. So I learnt to be patient and not push too hard."

Access to useful tools, materials and people

Tools

In terms of new tools Sibongile learnt much in the *Internet search workshop* on Module 2 and the *free-writing workshop*. When asked if she had acquired a new skill she said, "I think so, the 'How to use the internet' session was very helpful and also the writing workshop – I've been taught to write, not out of your head, but with references, so it was nice to free flow write." Explaining how helpful the approach taken in the writing workshop was, she said: "Ja, what Robert taught us – free writing – using my voice more when I'm writing, which is a great skill. She said that the free-writing approach had also helped her in her academic work.

Materials

Sibongile also gained access to *WRC materials* and used the *course materials* and drew heavily on the rainwater harvesting booklet written by the WRC team. She used the course folder and the supporting materials such as the *booklet*, as she explains, "…especially the booklets. It's very helpful, my favourite is page 16 and 26."

People

In terms of access to new people and knowledge networks, Sibongile was able to make contact the IWR and also Water for Dignity, an organisation which was used as a case study on the course. She networked with a fellow post-graduate student at Rhodes as well as making contact with a permaculture consultant skilled in rainwater knowledge. "I spoke to Karabou and she is working in Galela and she is doing her Honours on tank use and focusing on what I am looking at. I also used that resource book you guys made and the WRC stuff was very helpful – Jane also suggested it. I also went to the Internet."

When asked if she has expanded her knowledge network Sibongile responded: "Yes, everyone here. Alhyrian and rain runners and I was going to talk to our contractor, who installs our tanks, and Jane putting me in touch with Tim. It opened doors."

Influence on work practice

Participating on this course has added great value to Sibongile's personal work practice as well as to her organisation. Commenting on making her booklet she said: "It's very relevant because I was looking for a way to give back to Galela. We are thinking of setting aside funds for tank maintenance and the people can use this booklet, so it's really helpful for me to leave that for Galela."

Attending the course helped Sibongile become more involved in her work, including being better able to promote what Galela does: "I'm more involved with Galela I would say. Doing this course makes me more involved, then I go back for feedback to the places I'm looking at for this project and then I tell people about Galela because people are interested. So it's helped me promote Galela as well. I'm more involved in my practice because of this course."

Commenting on how the course has contributed to her work practice she said", "I have achieved new ways of thinking – how to take myself out of a context I'm working in and view it from the outside, so I can see things from a different perspective." When asked if she does things differently now Sibongile, explained that she had learnt to listen more, ask more questions and observe more.

The course has contributed to Sibongile being more confident in her work practice. She commented: "I know more about the people I'm working with and have strengthened the relationship I have with them." In being on the course, Sibongile found new sites for rainwater tanks. She also saw the course as a platform for preparation for her Honours degree in water research: "Yes I established contacts for Galela, for places to set up tanks and for my own research for Honours because I want to go into water research. I see this course as a stepping stone."

Wider reflections on the course and learning points to take forward

As indicated above, the second form of course evaluation was based on ongoing reflection amongst the course team. A number of "learning points" were noted, which can inform the ongoing design and implementation of the "Changing Practice" course.

1. The course materials

One of the most challenging tasks facing educators is developing course materials that will be useful and enhance the participants' learning. This course adopted an approach that sees learning happening around practices (i.e. practice-based learning, as outlined above). The course materials were developed to support this learning process and for participants to refer back to when they are working by themselves. The materials cover the basic principles of what is being taught, with examples and exercises that the participant can do to encourage reflection on what is covered in the course modules.

Although some of the participants found the materials very useful, others, particularly the participants from community based organisations, found the language too difficult to understand. In retrospect the research team realised that the materials were very useful for the facilitators and mentors for guiding the participants. Lessons learned from the development of the course materials include:

1. It is important to broaden participants' conceptual understanding: part of that is working with new concepts and learning to understand how these have emerged. Language or discourse is not neutral and language is historically imbued with meaning. New concepts can be overwhelming particularly when they are not linked to some form of experience or action. A key finding is that when *starting the course* it is best to use language and terms that participants will be familiar with, even though they may not be the terms that are being used in the current conceptual frameworks. It is better for participants to engage with a *situated learning process* and *then to relate this process to new concepts*. We also learnt that the mediation of new concepts needs to happen slowly and that the depth of understanding and use of concepts in practice is developed iteratively as participants' experience and understanding grows.

2. With the above in mind it became noticeable that the materials we had developed for the participants were probably more appropriate as facilitator and mentor guides. It was also noted that participants tend to become overwhelmed by lots of reading material. Support materials, such as the course materials, need to be carefully integrated into the running of the course with facilitators continually referring to the materials and using them to explain concepts and processes. In retrospect, we felt that, at the start of the process of developing the course, we could have given more thought to the relationship between the course and the course materials.

What we will do differently when we run the course again

We would not hand out course materials at the beginning of each module, but rather engage the participants in the learning experience, handing out shorter, more graphic course materials that respond directly to what we are exploring at a given time. The materials needs to be more carefully developed so they respond directly to the needs and experience of the current participants. We can draw on a generic template, but this should be adapted for each set of participants' level of education, experience and interests. This is similar to the process we used to develop the learning resource booklet on rainwater harvesting and how we teach the participants to engage in their own practices.

2. Different levels of education, different languages

As indicated above, the course is designed with the hope that different people with different levels of education and experience can benefit from it. The only criterion for attending the course is that participants have a Matric (level 4 NQF qualification) and that they work in an NGO, CBO, or a community learning or activist context, and that they are involved in a community project. For this pilot course the criteria also included being involved in an activity that is related to water.

For the pilot, we had seven participants from very diverse backgrounds and abilities. Language-wise they included first language speakers from three different languages: isiXhosa, English and Afrikaans. Accommodating participants' language needs was a challenge. Since the course was conducted primarily in English, it was quite apparent that those whose first language was English grasped the concepts and processes much faster than the others. We did not have enough funding to translate all materials into isiXhosa and Afrikaans. However, we were able to contract two more mentors, both of whom could speak isiXhosa and English. We reassigned participants who were struggling with the course to an isiXhosa mentor and also gave them the option of writing their learning resources and future assignments in isiXhosa.

Nonetheless some isiXhosa participants chose not to shift from English to isiXhosa because they felt that part of the skill they were learning was to be able to communicate and mediate in English. They believed that English was the language to use to get their ideas across more powerfully. Others on the course, would have liked to have their English learning resources translated into isiXhosa because they worked in Xhosa communities but did not have the skill to do so.

This is the reality of a multi-lingual, multi-cultural society and if we are to embrace learning within this context we need to come up with tools and processes that do not disadvantage second-language and sometimes third-language English speakers.

What we will do differently when we run the course again

- Ensure that there was enough funding to contract isiXhosa mentors who can both mentor participants in their first language and mark assignments in isiXhosa, if participants wish to present their assignments in isiXhosa.
- Translate all course material into isiXhosa and any other language indicated. Participants should have the option to receive the course materials in English and/or isiXhosa. There is also the opportunity to explore the possibility of developing multi-lingual texts where the main text is in English but explanations and descriptions of difficult terms are in more than one language.
- Support second-language English speakers to write in English if they wish to. The aim is not to turn the course into a course on language development, but rather to support participants to write and develop tools that are appropriate to the audience they wish to work with and which can be understood by that audience.

The importance of a mentor, and of one-on-one mentorship

The course was designed in a way that clarifies a particular learning approach, namely practice-centred learning. It sought to understand the complexities of knowledge-use-in-practice, as indicated above. Participants attended modules and then engaged in an activity that gave them the opportunity to apply what they had learnt during the module in practice in their work environment. Each participant was assigned a mentor who they could contact if they had any questions. The mentor would also contact the participant between modules to check up on their progress.

All participants felt that they benefitted from having a mentor. Some participants used their mentor more than others. Participants who worked for CBOs relied heavily on their mentor. Fortunately in these cases the mentor concerned happened to be doing his Master's research in the area were the participants lived and was able to have a few one-on-one discussions with them. This mentor comments: "I think mentorship or coaching is key in this course, and from my experience, this mentorship is more effective as a personal interaction rather than over the phone."

Site visits would also benefit the participants, as mentors would get more of a sense of the participants' change project and thus be more able to assist them in unravelling the challenges. Two participants were noticeably struggling with the course materials. What helped them was a visit to Rhodes University where they could sit with their mentor and go through their assignments and the difficulties they were experiencing with the assignments. This serves to highlight the approach to assignments that we adopted: assignments are not only ways of assessing participants, they are developed so as to give participants the opportunity to formalise their learning around a set activity related to the course material. The assignments give mentors and facilitators the opportunity to understand what participants are

struggling to understand and they serve as a tool to deepen learning. Participants are encouraged to rework their assignments both with their mentor and alone.

What we will do differently when we run the course again

- Develop a more structured mentor-participant interaction around key questions that the participant has or that the mentor identifies.
- Ensure that those who need assistance in the vernacular have a mentor who can speak their first language.
- If budget allows, have one-on-one mentorship at the physical site of the change project.

3. Effects of the history of the South African education system

Another key insight gained from the process is that we need to give more attention to the underlying mechanisms, histories and realities that shape a course and its learning. We found that one of the most important considerations when developing a course is the context within which the course will be taught. This does not only apply to the context of the participants but to the socio-historical context that they have been born into and lived through. It also refers to the historical context of the system of education itself. The South African education system is known for its long history of exclusion, marginalization and oppression. The effects of this are not only structural but also epistemological.

The way children were taught and assessed has influenced most South African's attitude to education and what it means to learn. For example, this was evident in the way in which participants engaged with and were extremely anxious about assignments. Instead of seeing assignments as an opportunity to engage with the course material and to then practice what was covered within their workplace context, the assignments were viewed as something to "get right". "Getting it right" usually means giving the facilitators of the course what they want. "Right" is often seen as information that comes from an expert source. Two examples of this follow. In one case a participant became very anxious about Assignment 2. The instructions asked participants to follow up on different sources of knowledge, and an approximate of sources was given: "Contact and speak to at least 3 local people and 2 national people that you think could provide you with useful information." The participant struggled to make contact with people to consult at national level. The fact that the experts he attempted to contact failed to come back to him caused him to very fearful about failing his assignment. It took quite a while to convince him that it was not the number of people that was important, or even the act of contacting them, but rather what he learnt in the process of trying to do the research and how he reflected on this learning.

For Assignment 3, developing a booklet, one participant copied and pasted information from a training course that she had done in the past. The information was generic and in no way related to her context. She did this because she felt she would fail if she relied on her own experience of the context, and in turn offered her own experience of her practice as valid

information. It took a long time for her to feel safe enough to draw on her own story of practice as a starting point, rather than to fall back on the generic training material she had received.

What we will do differently when we run the course again

Reflecting on this with other facilitators and mentors it was suggested that a way of dealing with this anxious, fearful attitude to learning would be to explore with the participants both the history of South African education as well as their individual history of what it was like to be educated. One mentor wrote in his notes:

> I think for all students, some time should be spent in course on breaking down previous conceptions of learning, what learning is and what constitutes valid knowledge, so as to open the space in the course for people to value their own stories, experience and thinking and those of the people from their context. This would in essence "empower" the students in their ability to feel they do know things, people in their contexts do know things and this knowing is valuable and it is safe and constructive for them to contribute with their own voice.

A facilitator commented:

> Often I hear people saying that those with a limited education cannot be critical thinkers. Every human being is constantly assessing their context and making choices according to their own context and the limitations of that context. A lack of critical thinking is not a sign of a lack of education, rather it is a sign of mis-education. The course should not attempt to teach people how to be critical, but to remove what inhibits their natural ability to question their world.

The process of participants writing their learning resources, particularly their learning to free write does contribute to their beginning to value their own learning process. In this respect it would be useful to explore and then begin to further articulate what it is about this process that allows people to place greater value on their own process of learning.

4. Assignments

As mentioned above, some participants found the assignments very challenging. This is probably the aspect of the course that needs the most thought and revision before it is re-run. It is difficult to know how much guidance to give participants and how best to assess them. One mentor commented that the step-by-step instructions that we thought would scaffold the assignment for participants may actually be clouding the core learning objective of the assignments and that more time should be spent on explaining and exploring what the core objective of each assignment is. This is a useful and valid criticism. Participants also struggled with the amount of time they had to do their assignments. One month appears to be too short for the practice-centred nature of the assignments.

The assessment of assignments is always challenging. Assessment sets a benchmark and yet even if some participants don't reach that benchmark they may, nevertheless, have developed exponentially from their individual starting point at the beginning of the course. This has implications for accreditation of the course. A model of using qualitative rather than quantitative assessment was used with a benchmark being qualitative contributions, rather than measuring a student's progress against set targets, or fixed external "levels". This aspect requires care and reflexivity in the assessment process.

What we will do differently when we run the course again

- Evaluate and re-work all assignments based on a core learning objective.
- Give participants more time between modules to do assignments. This will include submitting a draft assignment first so that mentors can evaluate what participants are struggling with and assist them to write their final assignment.
- Rethink and research the assessment process.
- Possibly consider two levels of assessment, or different assessment criteria that align with the entry levels of participants in the course.

5. Additional module and material, and design of course

The course consisted of four modules with each module building on the previous one. The pilot process highlighted a missing step in this iterative process. We underestimated the support that participants would need to identify questions from their narratives.

Team members suggested that it would be better if the course was designed in a way that gave participants time to pilot their learning resources and tools *in their context* and then to return to the course to review what they have learnt. This would be done by running four modules over a period of eight months, then giving participants three to four months to develop and implement a learning experience with the assistance of their mentors. They would then return for one final module where they would evaluate their experience and what they have learnt. This would require a longer period for the course.

6. Community of resource development

The purpose of the course was not to develop lots of little learning resources, it was to generate an engaged and reflexive learning experience for the participants through their interaction with the course materials, the facilitators and mentors, the co-participants, the on-course tasks, the research, and the assignments. One of the outcomes of this multi-faceted engagement was that each participant produced a written product in the form of a booklet. One of the skills they learned in the course of doing this was how to draw on knowledge that already exists and make it relevant for their context. Many participants drew on learning

resources that had already been developed and simply re-contextualised information so that it responded to questions that arose out of their context.

The question-based learning resource on rainwater harvesting that the research team developed in the earlier phases of the research was used by one of the participants to develop her own booklet on rainwater harvesting. But the focus in this person's case was on how to keep tanks clean, which shows the possibilities for adapting existing knowledge resources for contextualised use. The WRC resources developed by Denison et al. (2012) were also drawn on by some participants. Two participants cross-referenced each other's booklets.

As shown in the value creation stories, the participants were exposed to knowledge networks, and knowledge resources. They were also given opportunities to develop the skills to adapt and/or develop their own knowledge resources for use and application in contexts of practice. It would be worthwhile considering how learning resources that are developed out of this course can be made available for future course participants and the broader public.

Conclusion: Future development of the practice-centred social learning course

As outlined above, and via the case study of the "Changing Practice" course described above, the careful construction and researching of this course has shown that:

- A focus on socio-cultural and social-ecological contexts and practices provides a strong point of reference for mediation of learning, as this ensures that learning is situated, and that it emerges from contexts of practice. It reverses or substantively challenges traditional assumptions about knowledge flow, i.e. that the "knowledgeable other" simply has to share their knowledge in a uni-directional manner with those that are assumed to "not know".
- The case study (together with other similar research being conducted through the wider research programme on change-oriented learning and sustainability practices at the Environmental Learning Research Centre at Rhodes University) shows that a practice-centred approach to knowledge and learning requires a *critical realist dialectical approach to knowledge flow – from "what is and what is known" to "what could be" and back to "what is [emerging] and how"* (Lotz-Sisitka, 2013). This WRC research project case study of the "Changing Practice" course is showing what this means for the design and development of learning support materials, and how such a critical realist dialectical approach to knowledge mediation may be applied to the training of knowledge mediators in integrated water resource management contexts. Learning in the context of practice can be expanded in ways that lead to changes in practice.

This requires reflexive approaches to mediation in which local contexts are understood, where practice questions and issues are uncovered as sources for new learning, and where new knowledge and stimulation is "brought into context" so that it holds meaning, and expands current experiences and practices. Such changes in practice, when supported by

knowledgeable, context- and practice-sensitive mediators, show evidence of agency development at individual, collective and relational levels – a process which is necessary for changes to occur (as shown by the Value Creation stories). This results in social learning. Social learning does not just "occur" – it is intimately tied to the development of human agency – our capacity to act (Lotz-Sisitka, Belay & Mukute, 2012). As shown in this WRC project, a practice-centred approach to knowledge mediation can expand human capacity to act, as it has the capacity to change practices and contribute to social innovation.

The course was designed to be expanded to a range of wider educational and social learning contexts, and the intention was to develop a model of process that could be used to support a regular capacity-building programme in the ELRC in future; and potentially also to inform the redesign of formally accredited environmental education courses. Its construction and implementation can potentially also be expanded for use in other WRC knowledge flow and social learning research contexts.

A link has already been made between this research programme and the WRC research programme "Proposal No.1003153: Development of a strategy for knowledge dissemination and training for skills development of water use in homestead gardening and rain water harvesting for cropland food production" which started in May 2013 in the ELRC. In this programme, knowledge dissemination and use of WRC water harvesting and rain-fed agriculture materials will be tested in three different mediation contexts (one of which is likely to be an expanded version of this social learning course) to develop a stronger platform for knowledge dissemination for community-based agriculture water knowledge. There is therefore immediate application potential for the learning gained in this research programme, but also wider research potential to carry forward a cultural-historical and social-material orientation to knowledge mediation and capacity building in environmental education and integrated water resources management research in South Africa.

It is interesting to note that the recent "Post-Schooling Education and Training White Paper" (DHET 2013) is proposing a structural intervention to ensure more consistent provisioning of education, training and learning support to community learners, who up until now, have mostly been supported by informal knowledge mediators. The proposed institutional structure is that of community colleges. The outcomes of this research programme can potentially also inform the learning programme designs of these community colleges in future, especially with regard to water knowledge mediation, although the principles are relevant for wider environmental concerns too.

REFERENCES

Bielak, A .T., Campbell, A., Pope, S., Schaefer, K., and Shaxson, L. (2008). "From science communications to knowledge brokering: The shift from science push to policy pull". In D. Cheng, M. Claessens, T.; Gascoigne, J.; Metcalfe, B.; Schiele and S. Shi (eds.),

Communicating Science in Social Contexts: New models, new practices. Dordrecht: Springer. pp201-226.

Bhaskar, R. (1993). *Dialectic: The pulse of freedom*. Polity Press.

Daniels, H. (2008). *Vygotsky and Research*. London: Routledge.

Daniels, H. (2012). *Vygotsky and Sociology*. London: Routledge.

Denison et al. (2012). Development of a comprehensive learning package for education on the application of water harvesting and conservation. WRC. Pretoria.

Engelström, Y. (1999). Activity theory and individual and social transformation. In Y. Engelström, R. Miethen & R. Punamaki (Eds). *Perspectives on Activity Theory*. Cambridge; Oxford: Cambridge University Press.

Hedegaard, M. (1998). Situated learning and cognition: Theoretical learning of cognition. In *Mind, Culture and Activity*. 5, 2: (pp114-126).

Kemmis, S. & Heikkinen, H. (2011). Understanding professional development of teachers within the theory of practice architectures. Paper presented in European Conference of Educational Research ECER2011, Berlin, Germany, September 14th 2011.

Leont'ev, A. N. (1978). Activity, consciousness, and personality. Prentice-Hall, Englewood Cliffs, N.J.

Lotz-Sisitka, H.B. (2008). Change-oriented learning and sustainability practices. A research programme proposal submitted to the South African Qualifications Authority. April 2008, Rhodes University Environmental Learning Research Centre.

Lotz-Sisitka, H.B. (2009). Insights from an environmental education research programme in southern Africa. In Cooper, L. & Walters, S. (Eds). *Learning / Work. Turning work and lifelong learning inside out. Cape Town*: HSRC Press.

Lotz-Sisitka, H.B. (2013) (in press). Change-oriented learning and sustainability practices. A synthesis. Paper prepared for a book on Change-oriented learning and sustainability practices for the South African Qualifications Authority / RU research partnership programme.

Lotz-Sisitka, H.B. & Hlengwa, A. (2012). 'Seeding Change': The social-ecological condition and professional development of university teachers. Paper presented at the International Critical Realism Association Conference, Rhodes University, July 2012.

Lotz-Sisitka, H.B., Belay, M. & Mukute, M. (2012). In Lotz-Sisitka, H.B. 2012. (Ed) *(Re)Views on the social learning literature. A Monograph for Social Learning Researchers in Natural Resources Management and Environmental Education*. Howick: SADC REEP. ISBN: 978- 1- 919991-81-8.

Mukute, M. (2010). Exploring and expanding learning in sustainable agricultural practices in Southern Africa. Unpublished draft PhD, Rhodes University, Grahamstown, South Africa.

Fenwick, T., Edwards, R., & Sawchuk, P. (2011). *Emerging approaches to educational research: tracing the socio-material*. London: Routledge.

Green, B. (2009). (Ed.). *Understanding and researching professional practice*. Rotterdam: Sense Publishers.

Phiri, C. (2011). An investigation of community learning through participation in integrated water resource management practices. M. Ed Thesis, Rhodes University: Grahamstown.

Rivers, N. (2013). Value creation stories in the WRC Changing Practice course. Evaluation report. WRC project. Rhodes University, South Africa.

Rivers, N. (2014) (in press). The mediation processes within social learning: Women's food and water security practices in the rural Eastern Cape. Draft PhD study (still in progress), Rhodes University Environmental Learning Research Centre, South Africa.

Schatzki, T. R., Knorr, C. K., Savigny, E. (2001) *The practice turn in contemporary theory*. London: Routledge.

Shaxson, Louise with Alex T. Bielak et al. (2012) (Draft for Comment). Expanding our understanding of K*(KT, KE, KTT, KMb, KB, KM, etc.) A concept paper emerging from the K* conference held in Hamilton, Ontario, Canada, April 2012. UNU-INWEH, Hamilton, ON.

Vygotsky, L. 1987. *Mind in society: The development of higher psychological processes*. Cambridge, M.A. Harvard University Press.

Wenger, E., Trayner, B. & de Laat, M. (2011). *Promoting and assessing value creation in communities and networks: a conceptual framework.* Rud de Moor Centrum. Open Universiteit. The Netherlands.

APPENDIX A: Description of the Course

The course will consist of four contact sessions of two days each and four ‘work away’ assignments that will feed into work that the participant is already doing.

A set of aims and anticipated outcomes were defined for the course, based on this curriculum framework. These are:

Aim of the course:

To develop the competency of water practitioners to support the improvement of local water practices, through social learning processes, towards sustainability, health and the well being of people.

Outcomes of the course:

- Understand how people learn in different contexts and the importance of context for learning.
- Understand practice-centred learning and how learning in the context of a practice helps people question, reflect and change practice.
- To be able to identify and generate questions about a particular local practice both in terms of local knowledge and specialist knowledge.
- To be able to identify an build a knowledge network by drawing on local specialists, other resources and up-to-date research.
- To be able to develop contextually specific mediation tools that create a platform for a dialogue between local knowledge (in the form of local stories of practice) and specialist knowledge, and that mediates discussion, reflection and dialogue by local people engaged in a particular local practice.
- To be able to use mediation tools to facilitate social learning processes that lead to a reflection on and change in practice.

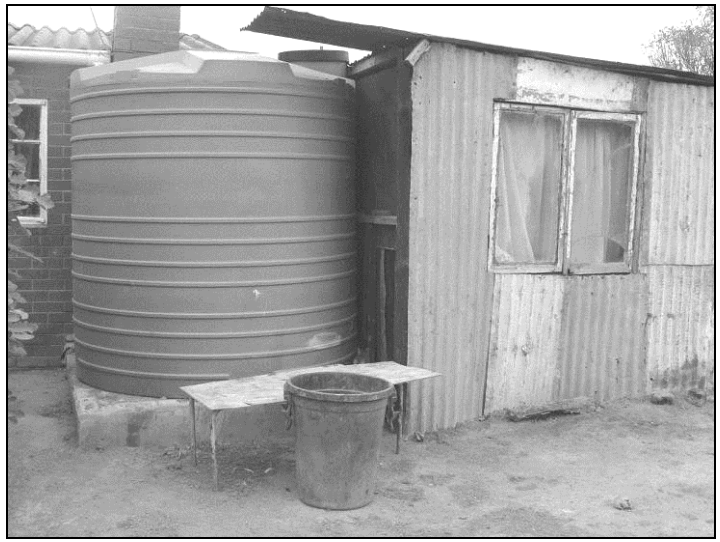
Units and Proposed Assignments

Unit	Focus	Learning	Assignment
1. Investigate Context and Practice	Understanding context – How do people learn? What water management practices are people involved in? How are they going about their practice? What are they doing? What are they struggling with? What questions are being generated from practice?	This unit will deal with the following aspects: • Developing an understanding of context: How to engage with local people so as to understand the context of their practice and how they learn. • Generating questions from practice: How to audit practices and how to collect local narratives of practice. How to identify questions of practice out of local narratives.	Description of context and practices and identifying key questions emerging from practice.
2. Identify knowledge needs and knowledge networks; and available mediation tools	Identify what knowledge exists in the community of practice, and what knowledge is needed in the context of practice Introduction to how one would source and identify new knowledge resources and establish knowledge networks.	This unit will deal with the following aspects: • A guide to developing a knowledge network. • How to start accessing relevant research knowledge and specialists?	A knowledge network resource.

3. Mediation of knowledge using mediation tools and learning resources: Pilot and Respond	Introduction to different approaches to mediating knowledge in relation to practice such as: • Written resource • Workshop • Poster • Community drama How to develop a mediation tool based on contextual questions and drawing on knowledge networks? How to link new knowledge to existing knowledge and practice?	This unit will deal with the following aspects: • An overview of the kinds of co-learning approaches one can use when mediating knowledge, and how to choose an approach. • Skills and techniques for developing a learning resource: writing, editing & design • Skills for using and testing out a learning resource	Design and develop a draft learning resource & plan for co-learning, and knowledge mediation using the learning resource
4. Review and Learn	How to expand/finalise/ improve mediation tools and approaches and use mediation tools for change-orientated learning.	This unit will deal with: • Learning to rework learning resource according to piloting process. • Reflecting on change-orientated learning in contexts of practice.	Final learning resource and reflection on the process of mediation and developing a mediation tool.

APPENDIX B: Question-based Resource

Rain Water Harvesting for Homes and Home Food Gardens



Tim Wigley & Robert Berold

Resource document for WRC project K5/2074/1

CONTENTS

WELCOME!

What is this book about? It is about different ways to harvest (catch or collect) and store water.

Here is an outline of each section.

Section 1: My Water Needs invites each one of us to think carefully about water in our own lives. It opens the way for us to bring our own knowledge and challenges into the book as we read it.

Section 2: Using Tanks to Harvest Water. This tells us about different kinds of tanks, how they work and how to get the best from them. We also hear from people who already have tanks.

Section 3: Working with Nature to Store Water. How to work closely with nature to harvest and store water in the soil.

Conclusion: Has this book been useful? What we have learnt from this book, and how to continue to improve our water harvesting systems.

Who is the book for? It is for people who help rural communities to use knowledge to improve their lives. Such people are often called mediators and sometimes they may be called Mediators.

Where does the information come from? The information was collected by *researchers* who spoke to people living in two places in the Eastern Cape – Cata near Keiskammahoek and Glenconnor near the Sundays River. Residents in these places told the

researchers about their experiences with water. The writers of the book used this information along with information from experts who know about methods for collecting and storing water.

word help: *researcher* – a person who gathers information (by talking to people, reading, observing, or doing experiments).

SECTION 1: OUR WATER NEEDS

[Mediator, please refer to Mediator Note 1]

Let us start by talking about our own water needs and looking carefully at the water that is in our own home and yard. To do this we will answer three important questions that will make this book useful for us.

Question 1: What do I need water for?

This is an easy question, but the answer is not the same for everyone. Some people already have water for drinking and washing but they need water for gardening. Some people have enough water, but it is too dirty to drink. Do you have enough water for the needs of your family? If the answer is no, then tell the group about your water needs.

Question 2: Where (in the yard) is the water flowing when it rains?

Look carefully at the way water runs in your yard when it rains. You will notice that it runs fast over hard earth or cement but slowly over grass.

Does your roof have gutters? Does it have downpipes?

Do you have a water tank next to your house?

Let us look at some examples.

- Mrs Jojozi's house has no gutters, so the rain water runs off the edges of the roof. When it falls on the ground it makes many small streams and pools around the yard.
- On Mr Mpofu's house the water runs from the roof into the roof gutters and then down the downpipes. But Mr Mpofu has no tank to collect all this water. In his yard you see rain water coming out of the downpipes and running over the ground. This water has made two channels across Mr Mpofu's yard and in one place it lies in a muddy pool.
- Mrs Tyatya has gutters and a short downpipe that takes all the roof water into a small storage tank.

Question 3: What is the best way to catch (harvest) rain water for our needs?

Now we need to look both at what we want and what we have already.

- Mrs Jojozi wants clean water at all times. Sometimes there is no water in her yard tap and sometimes the water from the tap is muddy. She says she would like gutters on her house and a down pipe and a storage tank.
- Mrs Tyatya already has a storage tank but it is very small. In the dry season she needs extra water for her vegetable garden. She says it is too expensive to get a bigger tank. She is looking for another way to store water.

There are a few different ways that we can catch and store water. These are:

- in a pond (this is simply a hollow in the ground that holds some water),
- in a dam
- in an above-ground tank (like a Jojo tank for example),
- in a below-ground tank, which is also called a reservoir.

(We will discuss these water storage methods in Section 2.)

Another way to meet our water needs is to *channel* water via a *furrow*.

word help: to *channel* water means to move water in the direction that we want it to run. A *furrow* is a ditch which is dug by somebody.

Another way to store water is to help the water to soak into the ground. (Section 3 tells us about different ways to get the soil to hold water.)

Now that we know what each person's water needs are, let us find out how we can use different kinds of water tanks.

SECTION 2: USING TANKS TO HARVEST RAIN WATER

[Mediator, please refer to Mediator Note 2]

In this section we look at different kinds of tanks and think about which kind of tank to use. We discuss collecting roof water in a tank and collecting ground water in a tank or *reservoir*.

word help: a *reservoir* is a large tank that is bigger than most plastic or metal water tanks. It is usually built with cement. It can be built above or under the ground. Municipalities build very large reservoirs to store water for towns. Smaller reservoirs are used by farmers and rural communities.

Why are rain water tanks important?

Rain water tanks give us water security for our homes. They store water for use in our houses or gardens. If the water from the municipal tap runs dry we can use the water in our tank. The water in tanks can be used for drinking because it comes straight off the roof into the tank.

A Cata resident says: "With a tank you are able to store water for future use. Even if there is no rain, you still have access to water – this is all because of water tanks."

Another resident says tanks save time and labour because they are able to harvest water even when you are absent: "To collect rain water you don't have to be at home when it is raining."

People in the Cata area say they cannot rely on the municipal water supply and sometimes the local taps break.

Mrs Bolekwa Ntusi describes how people in Nyanga near Cata cannot rely on tap water: “There will be a call from one community member that the water in the taps is available. We all go and line up for that water, but the water usually runs out before all of us actually get to it.”

Mr Elliot, who is from the Glenconnor area, says he is glad to have a water tank because the water from the municipal taps is sometimes dirty. A Cata resident says, “Tank water tastes far better than river water, and you don’t have to spend time cleaning the water before drinking. It is healthier than our river water.”

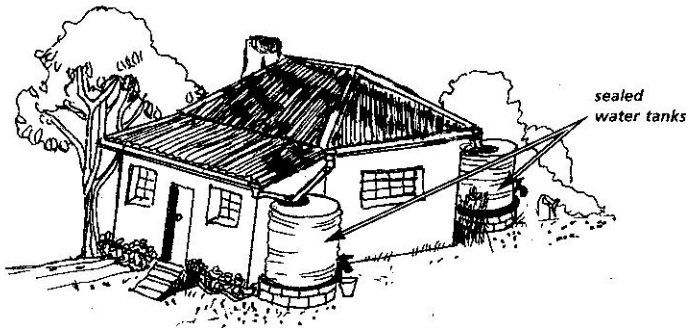
Another reason that many people want tanks is that some young people no longer want to fetch water in the way that their parents did.

Feelings about water fetching: Most people want water tanks in their homes. But, as with any change, there are things gained and things lost. In the old days women would go down to the river together, so fetching water was a social activity. It was a time when they found out about each other’s lives so that it was easier to offer support when needed, or to celebrate good things. In communities that have water tanks, this communal activity of water fetching has fallen away. But there are still many households where people have to go and fetch water manually. Some young people do not want to spend time doing this.

An elderly man from Nyanga (near Cata) told the researchers that he bought a tank for his household partly because of his children’s attitude: “My youngest children, especially the girl, didn’t want to go to the community tap. Traditionally when they go and fetch water they put the bucket on their head, but this generation no longer want to do this, they worry about their hairstyles. For them, fetching water is old-fashioned. This is why I decided to buy a tank.”

Rain water tanks are very useful for watering gardens. Mrs Ntusi says she suffered badly in the drought of 2006-2007 because she did not have a tank, so she could not water her vegetable garden. Now she has a tank so she can water her vegetables even when there is little rain.

In Cata and Glenconnor all the people that the researchers spoke to said it was a good idea to buy a water tank. The tank is right at the house so they don’t need to waste time fetching water from communal taps, or from the river.

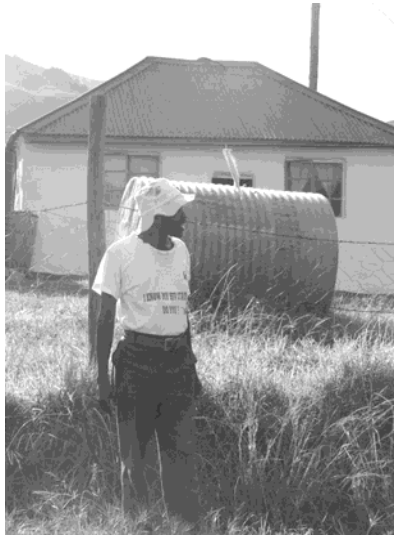


Another good reason to get a household water tank is that clean water helps us to stay healthy. For example, people who have water at home find it easier to wash their hands after using the toilet, or

before preparing food, eating, and caring for children or sick people.

What kind of rain water tank should we buy?

There are three choices: corrugated iron tanks, plastic tanks, or ferro-cement tanks.



Corrugated iron tanks are strong, but after a few years they begin to rust and start leaking. You can patch leaks in corrugated iron tanks. An elderly man in Nyanga has filled the cracks in his tank many times. He managed to use the tank for 40 years. "The tank is very old now," he says, "I can't fix it anymore." This man now has a plastic tank.

Ferro-cement tanks are made by plastering cement over wire mesh. The materials for ferro-cement tanks are cheaper than those for other tanks, and they last longer. To build a ferro-cement tank will need help from someone who knows how it is done. And we must pay this person to build our tank. The tank must be built at the place where it will be used and it cannot be moved once it is built.

Plastic tanks are the most popular. JoJo is the most common brand, but there are others too. Some people have been lucky to get assistance from an NGO or government plan for plastic tanks. Jojo tanks are guaranteed to last for five years, and many have lasted as long as 20 years. They need to be protected from the sun. Some people have used shadecloth to do this, others have planted trees near their tank, or grown creepers over the tank.

In Cata and Glenconnor, all the people that the researchers spoke to said it was a good idea to buy a water tank. The tank is right at their house so they don't waste time fetching water from communal taps or the river.

How much does a tank cost?

Tanks are expensive: for example, in April 2013 the price of Jojo tanks at Pennypincher's in Grahamstown was R9 250 for a 10 000-litre tank and R3 700 for a 5 000-litre tank. In this case it is cheaper to buy two smaller tanks than one big one. In any case, smaller tanks may be easier if your roof is not very high, so the water can run down from the roof into the tank. When you buy a tank (or tanks) you therefore need to think about the price and the size that the roof can accommodate. There are sometimes "specials", so it is a good idea to shop around and check different suppliers. Mrs Castina Gcilitshama bought a tank for cooking, cleaning and washing: "I used to take the washing to the stream, carry it on my head – and it is so far! So I thought, if

I can buy a tank it will mean that I can have water here and don't need to go down to the stream. So as soon as I got money – it was pension money – I decided to buy this tank."

Mr Joseph Njameni from Ndela says he cannot afford a rain water tank: "I just have to depend on the rain for my garden because the municipal taps are often not working. I would like to have a rain tank. But I'm not working, so I don't have money, that's the problem."

Mr Joseph Njameni depends on rain water for his garden – he would like a tank

[Mediator, please refer to Mediator Note 3]

It is very difficult for people to find so much money, but some people manage to do this by starting a savings club or stokvel. When everyone is saving

together and encouraging each other, it feels like less of a burden.

A few years ago in Cata many people were given free rain water tanks by the Department of Water Affairs, Working for Food project. The tanks were distributed by the Border Rural Committee, an NGO working in the Eastern Cape. The Working for Food project invited community members who were gardening, or interested in starting gardens, to come together and support each other. Each member household was given three or four JoJo tanks, to be used for food gardening. The project also donated tanks to elderly people and to those who were struggling financially. A total of 50 families received rain water tanks.

To get support from NGOs we need to know their rules. For example some NGOs support groups but not individuals. Mrs Plaatjies from Glenconnor expresses her frustration about this: "There is an NGO group who wants to give us tanks but you must be registered as a group. We might have to work and work for maybe three or four years before the group gets money from growing vegetables. People don't like that. People want money now. They don't want to volunteer."

How do I install a rainwater tank?

It helps to first look carefully at other people's tanks before you install your own. You can also get advice from neighbours who have installed tanks.

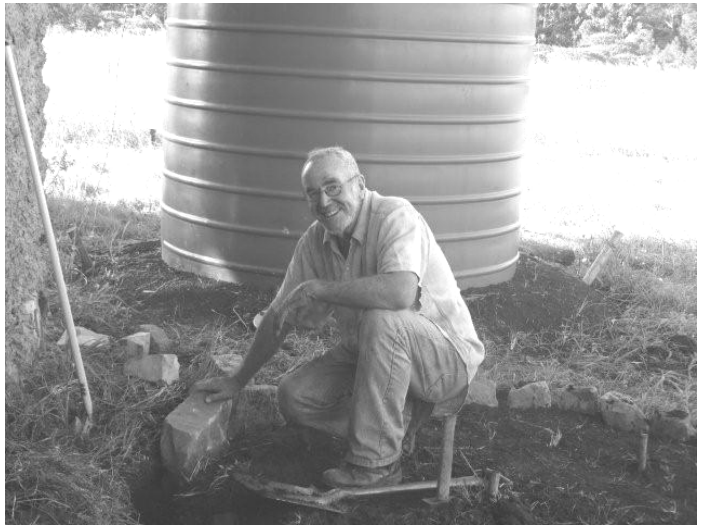
Two important things to know about installing tanks are:

- The top of the tank must be lower than the gutters of the roof. This is because water has to flow off the roof into the tank. (As we said earlier some people may need a 500-litre tank instead of a 10 000-litre one if the roof is not high.)
- The tank must stand on a firm and level base. The base can be made of soil or cement (note: this book does not provide information about cement bases, but a builder should be able to advise you).

Here's how to make a soil base: First put the tank in its place. Make a circle of stones around the tank. Then take away the tank. Fill the space inside the stones with soil. Stamp the soil so that it is firm. Take away any stones or sharp things that can make leaks in the bottom of the tank.

The soil base must be even (no lumps or ridges) and flat (no tilting to one side). To check that the base is flat use a spirit level. This is something you can borrow from a builder. When we put a spirit level on the ground it shows us if the ground is flat or tilted. It is important to place our tank on a strong

and flat surface and to prepare the surface with care.



Tim Wigley placing a circle of stones around a tank to begin making a base

On some tanks the tap is very near to the ground so there is not enough space to put a bucket under the tap (we can see this in the photo below). We can fix this by digging a hole under the tap for our bucket. Or we can fit a pipe onto the tank and put our tap at the end of the pipe somewhere away from the tank. But we must make sure that the tap is lower than the bottom of the tank, otherwise we will not be able to use all the water in the tank.

If the tap is near to the ground we can dig a hole for our bucket

Where is the best place to put a rainwater tank to catch water from our roof?

The best place is directly under the roof gutter, where we normally attach the downpipe. If this is not possible we can put the tank anywhere that is near to our house. But the tank must be downhill from our house, and the top of the tank must be lower than the roof gutter. We can then run a pipe

from our gutter to the tank. This pipe must be buried under the ground to the bottom of the tank base, and then it must come up to the top of the tank.

This pipe must be wide enough to carry water from a heavy rain. If the pipe is not wide enough, water will overflow from our gutter and be lost. It is cheaper to put a tank next to the house because a long pipe adds to the cost.

How do we maintain our tanks?

In the earlier section called “Why are rain water tanks important?” we learnt that we can get clean water from the roof of our house. However dirt can get into our tank if we do not install it properly and look after it. To make our tank work well we need to make sure that the gutters, pipes and the lid of the tank all fit properly.

People in Cata describe some of the problems they have had with tanks:

> “Some gutter downpipes are too wide to fit into the hole provided for them in the lid of the tank. So some people make a bigger hole on the side of the tank lid to get the gutter downpipe into the tank. It is difficult to strain the water coming through this gutter: as a result anything can get into the tank making water difficult to clean.”

"Some people leave the lids of the tanks open because the gutter can't fit into the hole and this results in tank water being dirty."

"The lids of these tanks are loose, the water gets dirty easily."

Group discussion: What are some solutions to these problems? For example, making our own filters and repairing lids.

What size tank do we need?

We already know that rainwater tanks can be different sizes, from small 500 litres up to 10 000 litres. The most popular size that you will normally see is 5 000 litres. If you have enough water coming off your roof and would like to store more than 5 000 litres you will need to find out if it is cheaper to buy one 10 000-litre tank or two 5 000-litre tanks. We saw earlier that at hardware shop in Grahamstown it was cheaper to buy two small tanks, but it is not the same everywhere, so you need to check prices. It is less work to install one big tank and also less maintenance. If you choose a big tank and the tank is higher than your roof gutter, then you need to position the tank away from your house lower down. Then a pipe is used to lead water from the gutter to the tank. You need to think about all of these things before deciding what size tank to get.

It also helps to think about how much water you can catch and how much water you need. Let us say, for

example, that your normal household use is 100 litres per day and you want the tank to hold water for 90 days (three months). This means you need to store 9 000 litres, so you should buy a 10 000-litre tank or two 5 000-litre tanks. On the other hand, if it rains a lot in your area, a 5 000-litre tank could be sufficient, as it will fill up once a month.

It is no use getting a big tank if your roof is too small to fill that tank. So before you choose a tank check how much water our roof can catch. First measure the area of your roof in square metres (sq m). Then find out how much rainfall is expected in your area per month. Every millimetre (mm) of rain produces 1 litre of water for every 1 square metre of roof.

For example, if we have 60 square metres of roof and we get 100 mm of rain (this is about average for Cata for a month of the rainy season) we will get 6 000 litres of water per month off our roof.

Mr Plaatjies of Glenconnor told us that rain is not plentiful in the Sundays River Valley. He said that even when his tank is full he uses the water only for drinking and cooking. This way he saves as much water as possible, since he doesn't know when it will rain again.

Measuring and recording rainfall: To measure rainfall, we need a rain gauge: this is like a measuring jug in the shape of a cone and it has numbers on it. It must be installed outside in an open place. After rain we can see how full the rain

gauge is and read how many millimetres of rain have fallen. It is helpful if at least one person in the village keeps a rain gauge.

Each morning after there has been rain, we read the rain gauge to see how many millimetres of rain fell the previous day. Then we record the amount in a book, then empty the rain gauge. School children enjoy practical examples of the things they learn at school, so it is a good idea to get their help. It will encourage their interest in nature and science.

How much water is in our tank?

This is easy. We must knock on our tank just like knocking on a door. We will hear a dull sound where there is water and a different (hollow) sound where there is no water. Start knocking at the bottom of the tank and move up until the sound changes. This tells you where the water level is.

Some tanks have calibrations (marks like those on a long ruler or a tape measure) on the outside marked 500 litres, 1 000 litres, 1 500 litres, 2 000 litres etc. If your tank does not have numbers, you can mark it yourself with a permanent marker (khoki pen) or paint. Now you measure the height of your tank. If it is a 5 000-litre tank, you make a mark exactly half way to the top. Mark this “2 500 litres”. Then divide the distance between the bottom and the half-way mark by five. Make five marks and write 500, 1 000, 1 500, 2 000, 2 500. Then do the same for the top half of the tank and mark these 3 000 then 3 500, 4

000, 4 500, and the top one is 5 000. Now it is easy to check how much water is in the tank.

What do I do about overflow water?

If your tank is too full, water will overflow. Overflow water has to be led away from the tank and the house in a trench, otherwise it can cause damage.

An elderly man from Nyanga said: “This tank has overflowed many times. This is why I’m planning to dig a trench … . It’s a long trench, so as soon as the tank floods the water will come out far away from the house.”

How can we harvest ground water?

We have talked about getting water from the roof, but it is also important to harvest the runoff water that falls on the ground. This runoff water can be used to improve our yard and garden. Another good reason to harvest runoff water it is to stop flooding and soil erosion on our own plots and on the property of people who live down the hill from us.

We spoke to one man from Nyanga, who harvests groundwater for his garden. He has seen that the runoff water causes flooding of his neighbours below him. He plans to use trenches to prevent this:

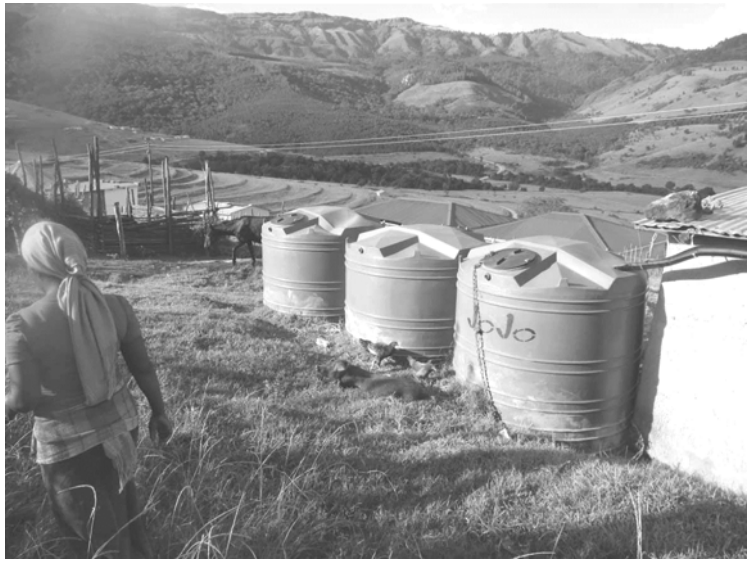
> “What I am using is especially for us people on the top, because the water starts here. It helps the downhill people, because this water is actually destructive when it rains a lot. It destroys people’s houses and property. If people

dig trenches at least they will slow down the water."

You will learn more about trenches in Section 3.

Can we use a tank to harvest ground water?

Yes we can harvest ground water into a tank. But only if the ground is on a steep slope like a hillside. The ground where the runoff water is flowing has to be higher up than the top of the tank. Because the water runs over the ground, we also need a *catch-pit* to stop soil and sand from getting into the tank (some people call a catch-pit a *silt* trap – silt is very fine soil). In the next section we will talk about building a catch pit.



Tanks storing rain water collected when it flows over the ground. Note: to get the top of the tanks lower than the catch pit it was necessary to partially bury the tanks

Most catch-pits are made from a 200-litre plastic drum that is buried in the ground. A furrow leads the runoff water into the catch-pit drum, and the soil and sand sinks to the bottom. Just below the top of the catch-pit drum there is a pipe that leads water from the drum to a storage tank (this is another storage tank, not the same as the one next to our house).

Collecting ground water works well for a group of homes on a slope. The downhill neighbours can harvest runoff from the uphill plots. If all the homes on the slope harvest runoff from the uphill neighbours, it will reduce soil erosion and flooding.

How do we build a catch pit?

Rain water running along the ground carries silt and gravel with it. We don't want silt to collect at the bottom of our tank (or our reservoir) because it is difficult to get it out. That is why we build a catch pit – to stop the silt from getting into a tank or reservoir.

To build a catch pit you first dig a trench to carry away the water that will flow over the ground. This trench must catch the water running down the slope and take it to the catch-pit. At the bottom end of this trench, dig a hole for a 200-litre plastic drum. This plastic drum is the *catch-pit drum*.

Near the top of the drum make the right size hole for a pipe fitting. The fitting must be big enough for a pipe that is at least 50 mm wide, otherwise the

water will flow out too slowly. Then clamp a pipe onto the pipe fitting. This pipe will take the water from the catch pit drum to the top of our storage tank. Now dig a trench for this pipe so that you can bury the pipe at least 60 cm underground to protect it from being damaged. Bury the pipe all the way to the tank, then add an elbow fitting so that the pipe can turn and run up the tank. In fact you need two elbow fittings, because a second one is needed to lead the pipe into the hole at the top of the tank.

[Mediator, please refer to Mediator Note 4]

How do we use ponds to harvest water?

If we do not have a tank, we can harvest and store water through ponds or small dams.

Two Cata residents who have experience with ponds are Mr Dumisani Khiba and Mr Sisiwe Khiba. They say that the best way to water your garden if you do not have a tank is to make a pond in the garden and dig furrows from the pond to the plots in your garden. “This is how we watered our gardens long before the tanks arrived,” they said.

Ponds and small dams are a cheap and effective way to store water that runs over the ground. If the soil is mostly clay, then the soil itself will hold the water well. But if the soil is sandy, the water will drain away and be lost. To make a pond work in sandy soil, we have to line the pond with a waterproof lining. There are different ways to do this. The

easiest way is to line the pond with chicken wire and then plaster it with cement.

Ponds can be dangerous to children and livestock, so we must fence them properly with good gates.

Some of the water in a pond will be lost through *evaporation*. We can reduce water loss from evaporation if we cover our pond with shadecloth, and if we grow trees around the pond to shade the water and block the wind.

word help: *evaporation* – when water turns into water vapour

Underground tanks

An underground tank, which is also called a reservoir, is a safer and less wasteful way to store water than a pond, but it is much more expensive.

Reservoirs are usually built with bricks that are plastered to make them waterproof. They have to be built well, by an experienced builder. Poorly built underground reservoirs can leak and they are not easy to fix because the whole structure is underground.

Several Cata residents have had problems with leaking reservoirs.

Mrs Phumzela from Nyanga said: “My reservoir is leaking slowly, and it is making my garden so wet that I can’t plough. I will try and use silicon to fix it when it dries out.”

Brothers Dumisani and Sisiwe Khiba from Nyanga said: “Since the reservoir was built it has been leaking. We tried to fix it with silicon but that did not help, and it leaked again. We can admit that we do not have a reservoir in reality.”

Mrs Nothemba Languva of Skafu says her reservoir stores the water well, but she does have one problem with it. Being underground, the water level is sometimes very low, making it difficult for her to scoop water out. As a result, she says, “It’s very hard work to get the water and it hurts my back.” She has been using 2-litre plastic bottles to draw the water from the reservoir to fill the drums around her garden. When the water level gets too low, she goes to the community taps for her water. Mrs Languva says one solution would be a pump or anything that would help her to get the water out easily.

Sometimes people use a ladder to get water from a reservoir, this works best when there are two people.

How do we keep our tanks clean?

The best way to keep a tank clean is to make sure that the water going into the tank is clean. If we are harvesting rain water from the roof, we must keep the roof and gutters clean.

Mrs Bolekwa Ntusi says: “When we were given our tanks we were told they were now our responsibility. They provided us with small ladders so we can go inside the tank and clean it. You need to always monitor the gutters. They are plastic, they don’t break, but they bend.”

When a tank is installed we should make sure that there is a strainer (sieve) covering the hole where the gutter meets the downpipe. If there is no strainer covering this hole we can make one with fine chicken wire. This stops leaves from falling into the tank, as well as birds, mice and frogs.

Frogs: Frogs and toads are very useful in the garden. In fact these amphibians are a sign of a healthy eco-system, and we should protect them. They feed on insects that eat our plants. Many people have strong beliefs about frogs. Some traditional leaders advise people not to drink water where frogs live. In KwaZulu-Natal some traditional leaders have told people not to have rain water tanks because frogs sometimes fall into the tanks and die.

Make sure the lid of the tank is on properly so that no light gets into the water inside the tank. Sunlight allows algae (green slime) to grow in the water and this makes the water green and undrinkable. Always try to keep the sun off a water tank, especially the

lid. A fully shaded tank keeps the water fresh, and the tank lasts longer because sunlight slowly destroys plastic. We can see this with old tanks that have been standing in the sun – they start to look white.

Granadilla plants protect these water tanks from direct sunlight

How do we reduce the acidity of rain water?

Rain water is slightly acid, so it helps to put a piece of limestone the tank. This will neutralise the acidity of the water, keeping it fresh and healthy.

What can go wrong with tanks?

Sometimes tanks are not installed properly in the beginning. If the base of the tank is not firm and level, it will sink or move when the ground gets wet. If there are sharp stones in the base, the heavy

water pressing down on the stones can make holes in the bottom of the tank. If the fittings for the tap are not screwed in tightly and sealed well, the tap will leak. So from the start, spend time making sure your water tank is installed properly, and check the fittings regularly.

The main problem with the tanks in Cata is leaking taps. Castina Gcilitshama commented: “The only problem I’ve had with my tank is that it leaks where the tap joins the tank. I think this was because it was not installed properly. I got someone to fix it, and since then it has been fine.”

How do we maintain a catch pit?

Every time it rains, silt will collect at the bottom of the catch pit drum. It is best to clean out the drum after every rain. If we don’t do this, our drum will soon be full, and the silt will flow into our storage tank. Cleaning the catch pit after every rain also helps to stop mosquitoes from breeding.

It is a good idea to leave a plank or pole standing in your catch pit so that frogs and toads that fall in can climb out. If there is no place for them to climb out, you will find dead frogs and toads in the catch pit, and this will affect the water quality.

How do we maintain a reservoir?

Once there is silt in an underground reservoir it is very difficult to remove it. So it is best to stop the

silt from getting in. The way to do this is to look after your catch pit.

We already know that we must keep sunlight out of our tank, and it is the same for a reservoir. To stop algae from growing we must keep the sun out by covering the reservoir.

SECTION 3: USING NATURE TO HARVEST RAIN WATER

[Mediator, please refer to Mediator Note 5]

In this section Mr Tim Wigley of Earth Harmony Innovators shares his knowledge about different ways to harvest water by working closely with nature, especially for growing food.

Let us first talk about why we want to work closely with nature to harvest water.

Here Mrs Bolekwa Ntusi of Nyanga explains how harvesting rain water has made a big difference to the *food security* of her family:

> "Before I got tanks I would only plant at a certain time of the year. After the harvest I used to have to abandon the garden and wait for the next season for planting. But since I've been a member of Working for Food, a gardeners' support group, we have learnt a lot of techniques.
>
> Before we planted our garden we dug a 3-metre hole and put tin cans in there. Then we dug trenches and furrows in such a way that when the water comes, the trenches can distribute the water across all our vegetable beds, and each bed will retain some amount of water. This way allows us to always have a crop in the garden throughout the year, so now we don't wait for a certain planting season. We always have food."

Mrs Bolekwa Ntusi in her food garden

Mrs Thandiwa Ngxafana from Nyanga village has a part time job at the pine plantation, but it is not enough. She says, “That is why I go back to my garden. I can’t rely on the job, it’s not enough to feed my family.”

Mrs Nothemba Languva, who has diabetes, helps to maintain her health by keeping a garden: “By eating fresh vegetables I keep my diabetes under control.” The garden also helps her financially because she sells some vegetables.

Growing our own food is not only useful for ourselves, it also allows us to help others, and so in this way it restores our sense of belonging to a community. An elderly woman in Ndele started growing food when she retired because she could no longer afford to buy vegetables. She says, “It is

nice to have a garden because I am able to feed lots of people, for example when my father-in-law passed away.”

Before Mrs Languva had a garden she needed to ask her neighbours for food. Now she plants mealies, potatoes and beans to feed her family. She says “Things are much better”.

Mrs Bolekwa Ntusi encourages others to improve their food security by growing vegetables:

> “Some households complain that they don’t have food. I encourage them to have a garden. Even if you don’t have money, if you have land you can grow something. As the Working for Food group we do try and encourage people to plant gardens because fresh vegetables assist a lot in fighting diseases. We go further and encourage families to have chickens, even one or two, so you can have eggs and meat. Not everything in life that matters has to be bought. If you have your own garden and small livestock, you will have access to food whenever you need it.”

How can we use the soil in our gardens to collect and store water?

If you look at nature, you will see that soil holds water well if it is rich in *humus*.

What is humus? Humus, also called decomposed organic matter, is made from dead plants and leaves as well as animal matter, including dung. Humus enriches the soil and helps it to hold water.

The rain soaks into the soil much more easily if the surface is covered with vegetation (plants, leaves, grass, trees). So, if we want our soil to soak up rain water, we must make sure that it is always covered with vegetation.

Imagine two different environments: one with the soil covered with vegetation and one with very little vegetation.

When soil is completely covered with plants and trees we notice that underneath the vegetation there is a layer of decomposing plant matter. We also find that the soil itself is rich in humus. When there is little vegetation we noticed a lot of bare ground baked hard by the sun. There will be hardly any humus in the soil, so it is unable to absorb water.

What happens when rain falls on the land?

What happens to the soil if it rains after a period of drought? In places where the soil is well covered with vegetation and healthy, the rain falls first on the leaves of the plants, then it drips softly onto the decomposing plant matter, then it soaks deep into the soil. In places where the soil is bare and baked hard, the rain falls directly into the hard soil. Because very little water can penetrate into hard soil, most of the rain runs off. This run-off water moves faster and faster as it flows down the slope and it takes some soil with it. This soil from the surface layer is called *topsoil*.

Now let us picture what happens in these two landscapes after two or three weeks without any rain. In the place where the soil is well covered, the plants are able to use some of the water (moisture) that is stored in the soil. There is very little evaporation because the soil is well covered and protected from the sun and the wind. However, in the places where the soil is bare, the small amount of water that did soak into the soil has now dried out.

Some older people say there was more rain when they were young. But Tim Wigley says this is not true: “The rainfall records for any area will probably show that the rainfall is much the same. What has changed is that rain is no longer absorbed the way it used to be. The land is much drier, even though we have had the same amount of rain.”

Tim says if we take a small amount of soil from the floor of a healthy forest we will see millions of very small living creatures called *micro-organisms*. “A piece of healthy soil just the size of the end of your small finger will contain more than six million living organisms. A piece of soil the same size, taken from a field that has been ploughed and treated with chemicals, will have between zero and three living organisms in it!”

Most of the micro-organisms in the soil are good for plants. They break down organic matter (dead plants and animals) and turn it into humus. The humus acts like a sponge and holds water in the soil.

Forty years ago our agricultural lands had an *average* of 20 per cent organic matter. Now they have only 1 per cent.

[Mediator, please refer to Mediator Note 6]

What can we do to harvest water in the soil?

If we can help our soil to become rich in humus, it will hold more water. We can help nature to do this by digging kraal manure and compost into the soil. This will attract earthworms. Earthworms help to keep the soil healthy and they like rich soil.

[Mediator, please refer to Mediator Note 7]

We can also stop soil being washed away by shaping the land in special ways, and by using plants to hold the soil. The methods we will discuss are a) digging furrows, b) making swales, c) planting vetiver grass, d) making planting circles, and, e) digging deep trench beds. The best way to learn about each of these methods is to see how someone else is doing it on their land. But this is not always possible, so let us see how much we can learn by talking about it together.

[Mediator, please refer to Mediator Note 8]

Furrows

Mrs Wandiswa Ndlazulwala from Nyanga says the best technique she has been taught is digging furrows. She has seen that by distributing water in furrows, she can grow food in her garden throughout the year.

There are two ways we use furrows to collect water. We use furrows to direct water to where we want to collect it, for instance in a tank or in a planting circle. We also dig furrows across a slope. These furrows must be exactly on the contour so that water flowing down the slope is slowed down and spread all along the furrow so that it can soak into the ground. Both these methods help to make our gardens more productive.

We should make trenches and swales wherever there is water flowing down a slope. The size of the trenches we dig depends on how much water flows when it rains. The trenches should be big enough to catch all the water, even in a heavy rain.

If we want to collect the water and store it for our garden in the dry season then we must dig our trench across the slope at a slight angle so one end is higher than the other. When it rains, the trench will channel the water to the lower end, where we can collect it.

A good example of a trench collecting water at the top of a garden. This water can now be put to good use instead of flowing over the garden causing soil erosion. A problem has been turned into an opportunity.

Sometimes people see the water that flows when it rains as a threat rather than an opportunity and they dig furrows down the slope to direct the water away from their home and garden. These furrows run down the slope speeding up the flow of water and causing soil erosion and problems for people further down the slope.

There is also the Water for Food method. To do this we bury coke cans and blankets under the soil to hold the moisture. (This method is described on page 40 after planting circles.)

Swales

A swale is a *ditch* that is built along the *contour* of a hill. There is a raised earth wall on its lower side. Swales are an excellent way of harvesting water down a slope, they work even on a very gentle slope.

word help: a *ditch* can also be called a *trench* or a *furrow*, but a furrow usually describes something shallower than a ditch.

contour: a contour is a line on a map showing all places at the same level or altitude.

This swale holds the runoff water that comes from the slope above

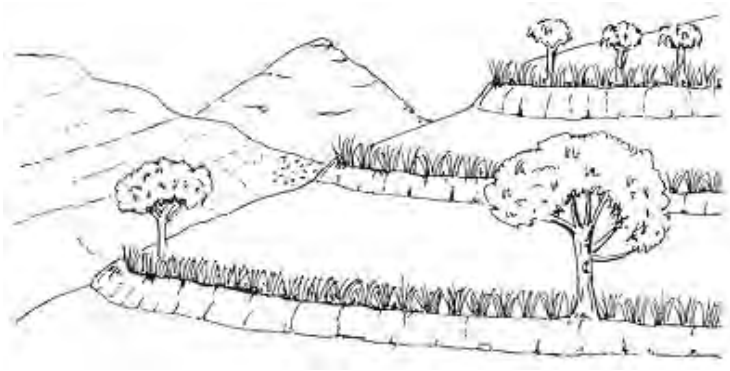
When we dig a furrow for a swale, we put the soil that is removed on the lower side of the furrow making a low 'wall'. This low wall holds back the water coming down the slope even if the furrow becomes very full. A swale must be built along the contour line so that it is level right across so that the water does not run from one side of the swale to the other. This means it stays equally wet all along

the swale furrow and the water soaks into the soil. The water lying across the swale soaks into the ground. The slope just below the swale will get a lot of water so it is a good place to plant fruit trees.

When there is a big rain, water will sometimes flow over the low wall of the swale all along the contour. But as the flow of the water is gentle, it does not cause erosion damage.

Remember, swales work only if they are dug exactly along the contour line, so you have to mark the contour very accurately before you dig. There is a tool called an A-Frame that you can make yourself to mark a contour. It is easy to make, easy to use and very accurate (see the catalogue that goes with this resource).

Vetiver grass



Vetiver grass planted along the contours of a hill

Another way to look after the soil and preserve water is to plant a type of grass called vetiver along

the contour. The diagram above shows us how this can be done. Vetiver grass has deep, strong roots that hold back water and release it slowly down the slope. The thick leaves of vetiver grass trap silt, so that soil builds up around the grass over time. After a few years the soil built up by the line of vetiver grass will be higher than the level of the soil below the line of vetiver. It will look as if someone has built a step in the slope. Plants grow well in this deep moist soil.

If you plant a half circle of vetiver grass below a tree growing on a steep slope the grass will trap water and silt. Vetiver grass does not spread – it only grows where you plant it – and its strong roots keep out the kinds of grass that spread and interfere with the growth of fruit trees.

Planting circles

A planting circle is a round pit that can be made in places where you can see rain water flowing in a natural furrow.

You dig the pit 60 cm deep (it must be up to your knees) and 2 metres across. Now use the soil that comes out of the hole to make a low wall around the edge, with a gap in this for the furrow that leads the water into the circle. Then fill the hole with anything that will decompose and

make compost. You can use mealie stalks, branches, weeds, bones, cardboard and paper, or tin cans – but not plastic or glass. Some tin cans, like cold drink cans and beer cans, are made of aluminium and these ones are bad for our health so we must not use them for planting circles or trench beds.

You fill the hole right up to the top of the wall of soil around the edge, and then cover everything with dry grass. You can now plant beans, sweet potatoes, and pumpkins on the circle of soil. You can also plant trees a little distance (about 3 metres) away from the circle. The roots of the trees will grow into the hole and enjoy the rich, moist compost that forms there. As the material in the hole decomposes and makes compost, the level will drop, so you need to keep adding material to keep it level.

A small planting circle is very productive because it holds and uses all the water that was previously flowing away and being lost.

Deep trench beds

Deep trenches work in the same way as planting circles. You dig a pit where you want to make a garden bed. Into the pit you can throw mealie stalks, branches, weeds, bones, cardboard, paper and tin cans – even worn-out blankets and clothes. Then cover this up with the soil you have dug out of the pit. Then plant your vegetables on top.

A deep trench catches and stores the water that soaks down. The plant roots will go deep down because of the extra water and compost.

An example of a well made trench bed

Tied ridges (also known as amdanyana)

This method is especially useful in fields. It helps to ensure that you get a crop to harvest even when there is a drought.

Instead of ploughing and planting in the usual way you form raised ridges following the contour as closely as possible. Between each ridge you leave an open trench. These trenches are formed when you dig out the soil to make the ridges.

You plant the crops on each side of a ridge. The trench between the ridges collects rainwater. Small walls across the trench (see arrow) prevent water from flowing away along the trench and this water soaks into the soil under the ridges.

Some people do not want to use this method because the trench takes the place of one or two rows. But people who have tried this method say it is very good in a drought because they get a crop even when normal planting fails. In good years when there is enough rain this method produces good results because the plants on the ridges get more moisture and nutrients and produce a bigger crop.

How do we keep the soil in gardens healthy?

If we regularly feed our soil with manure or compost and keep it covered with plants or plant matter, the soil's micro-organisms and earthworms will maintain it for us. Our soil will keep on getting more fertile and better able to absorb rainfall.

An elderly lady in Ndela uses natural compost, such as cow dung, for her garden: "I use natural things to

grow my garden. To chase away moles, I take chicken bones and then put them under the ground – then the moles don't come and eat my potatoes." This lady learnt all her skills from her father.

Adding bones also raises the fertility of the soil. The soils in the Eastern Cape are very short of phosphorus, and plants need this mineral to develop good roots. Bones decompose slowly, releasing phosphorus into the soil. Tin cans decompose slowly too, releasing iron into the soil. As we said earlier, we must remember not to use the aluminium beer cans and cold drink cans. Mrs Nothemba Languva looks after her soil by putting old tin cans and old blankets in her trenches.

Covering the soil keeps it healthy in two important ways. First it prevents the sun and wind from drying out the soil. Second it protects the micro-organisms that build the soil because sunlight kills these organisms.

Tim Wigley, who has run many workshops for Working for Food, says:

> "The soil that you can see is never as productive as the soil you can't see. Our grandparents planted many different things together on the same piece of land. When they planted mealies, they also planted beans and pumpkins. The pumpkin vines spread out over the ground protecting it from the sun. The beans added nitrogen to the soil, making it richer. In the

vegetable garden there were different things planted in the same space and these would be ready at different times. There was always something growing, so the garden was never bare. They also planted more trees and hedges in and around their gardens than we do now."

How can we involve young people in gardening?

Older people sometimes complain that younger people are not interested in gardening. Mrs Castina Gcilitshama of Skafu says her husband helps in the garden. When we asked if she passes on her gardening knowledge to her children she said: "Ja well, children, they refuse to help in any way, both in the garden and collecting water."

Mrs Castina Gcilitshama of Skafu in her garden

The best way to address this is through creating awareness. Everyone needs to be aware that humans are not separate from nature, we are interdependent with the rest of nature. What is happening to the world around us is also happening to us. We also need awareness of what the modern diet of processed highly refined food is doing to our bodies.

Mr Plaatjies from Glenconnor feels that formal education is one of the reasons why children are no longer interested in learning about self-subsistence:

"People believe a person must be educated. There is nothing like that. God gave everyone a brain to think. I only did Matric but look at what I have achieved. I am growing and growing by the day."

There are a lot of ways that schools can become the central place in a community to grow or learn how to grow food, and to learn how to look after our water and environment. A good movement to support is EcoSchools. This organisation explains its mission like this:

"The Eco-Schools water management and conservation programme supports schools and local communities across South Africa with food gardens and healthy living activities. With a focus on schools in low-income and rural areas, the project has installed water-saving irrigation schemes and trained schools on rain water

harvesting methods. The initiative, which promotes the efficient use of available resources to ensure food security, water conservation and management, is run in collaboration with the Department of Education, School Governing Bodies and a number of environmental development organisations, including the World Wildlife Fund and the Wildlife and Environment Society of Southern Africa (WESSA)."

We can encourage teachers in our local schools to become part of this programme and volunteer to help establish school gardens. Being part of Eco-Schools also means that we have access to lots of resources, training and expertise.

If children are aware of the benefits of working in the garden, they will not see it as punishment or a duty that has been forced on them. When young people have a positive experience of growing their own food, it makes gardening attractive for them. They will grow up understanding that gardening is a way of life, part of being a member of a family. Many people who are enthusiastic about gardening learnt to garden from their parents.

This can be seen in Mrs Bolekwa Ntusi's family. Mrs Ntusi says:

"Everybody here works in some way in the garden, even the head of the household. The children help in both the field and in the garden. It is not up to children to say 'I'm not interested

in the garden'. When I was a child I didn't like working in the garden but my parents pushed me. It was part of being a member of the household. Now as a grownup I understand how this has helped me. I tell my children 'I'm not asking you to help, I'm telling you that you go to the garden.' Even if I'm not around they know they must go and water the garden."

Mrs Nophakathi Njameni, a grandmother from Skafu, also involves the whole family in gardening. "I have a daughter. She has three children, one girl and two boys, and one grandchild who is seven years old. The one girl brings the water and the sons dig, their mother plants."

How can we support each other to have water and food all the time?

If we are lucky enough to afford a tank, or if we have been given a tank, then we can support others by letting them use our water. A lot of people show their humanity to others (ubuntu) by doing this. Mrs Plaatjies from Glenconnor lets the people living on church land near her take water from her tanks.

By growing vegetables we can help our neighbours with food. Mrs Boniswa Tontsi is passionate about making sure that people get healthy food when they are sick. She takes vegetables from her garden to the people she visits. Others, such as Mrs Nothemba Languva, support their neighbours by giving them vegetables. Mrs Languva shares her vegetables with

the poorest families and also with households where a family member is HIV infected.

We can team up with a neighbour and share a vegetable garden. Two families do this in Cata. They water the vegetables from tanks in the garden, and then cook together in each other's house every night.

A good way to support each other is to start a small group. If we do this it is easier to get help from NGOs and it means we can share many things. For example, we can share tools, we can save together to buy seeds, and we can share our experiences and learn from each other. Many people in Cata started gardening after they saw their neighbours doing this. They learned from their neighbours and in turn taught others. A group keeps you motivated. When times are hard a group can give support, not only with knowledge but with sympathy and sharing.

Mrs Nothemba Languva describes how the Working for Food group helps her:

> "We meet once a month to discuss problems. We share ideas and help each other. If you are no longer motivated, or seem to lose interest in your garden, a member will come and visit you and ask what is wrong. We also contribute R10 a month and at the end of the year we sit down and use that money to buy seeds which we share amongst ourselves. We also use these meetings

> as a platform to bring forward our needs, such as the need for garden tools."

A lot of groups split up because group members can't agree, particularly about money. The Working for Food group is still strong, but they have had to overcome difficulties. Mrs Bolekwa Ntusi explains:

> "At first we agreed that when the Border Rural Committee pulled out, we would fund our own projects by contributing a certain amount of money to buy seeds and seedlings and share these amongst members. But when we made the call for this, some of our members wanted to withdraw. But those who withdrew were not entitled to seedlings. They felt excluded. But we can't afford to pay for other people."

The Working for Food group has a monitoring committee to deal with problems. Mrs Ntusi told us:

> "The monitoring committee monitors our gardens to see if we are still active and planting. For those who seem to be discouraged or drop out, it is the committee's responsibility to ask what the problems are. Then as a group we see how we can solve the problem and encourage that member to plant again. If we see that members are lazy we quickly address this. So our meetings are related to our own functions and how we support each other. It is also to ensure that our relationships with each other are healthy."

HAS THIS BOOK BEEN USEFUL?

[Mediator, please refer to Mediator Note 9]

Let us briefly summarise what we have learnt in Sections 1,2 and 3 of this book.

In **Section 1** we shared information about our own water needs.

- Was it helpful for us to talk together about our water needs?
- If so, in what ways did it help?

In **Section 2** we learnt about different kinds of water tanks (how to choose a tank and how install and maintain our tanks). We also learnt about how to install a second tank that uses runoff water from our first tank.

- Did we learn new things about choosing a tank and looking after it? If so, how will this new information help us to choose and install a) a tank that uses water from the roof, and b) a tank that uses runoff water?
- What are some of the main things to remember about making a plastic tank last longer?
- What are some problems that we may have with tanks? How can we solve these?
- To help in the development of better learning resources please tell the Mediator if there were any parts of section 2 that were difficult to understand, or any sections that were not helpful for what you need to learn.

In **Section 3** we learnt about how to work with the soil to store water. This section is very important because it shows us that we must work carefully with the soil if we want to grow food now and in future.

- What methods for using the soil to store water did we learn about?
- For those of us who want to try one of these methods, what are the next steps to take?
- Please tell the Mediator if there were any parts of section 3 that were difficult to understand, or any sections that were not helpful for what you need to learn.
- How can the book or the facilitation process be improved?

Working together in future

When people work together, everyone adds knowledge and helps each other in practical ways. If we live on a slope we can work together with our neighbours to set up water systems down the slope. For instance if neighbours living higher up the slope have more water coming off their roof than can be stored in their tanks then instead of the water just overflowing onto the ground and making a mess you could install a pipe onto the tank overflow and lead it to a tank in your garden. By cooperating in this way everyone gains.

It can also be much easier to complete big projects, like digging planting circles, if we help each other. In

a few hours a group of people can complete a planting circle, so you take turns all going to one home and working together then on another day go to a different home. This is much easier and more fun than each person working on his or her own for a few days.

To keep our own water systems and tanks working we need to do maintenance, and we can help each other with this. As we heard from Mrs Nothemba Languva and others, people already working in a group can share their knowledge of how to set up and run a group.

Fieldworker Mr Monde Ntshudu believes that the success of the Cata projects comes from the strong leadership of the past:

> "There was strong social cohesion in the community under the very decisive leadership of Mr Gcilitshana, who mainly united this community. If I can remember clearly, when this community received their land back, the compensation money that came with it was split in half. One half was to be used for development and the other half given to claimant communities.
>
> A number of projects took off because of this, getting involved in such projects as building chalets, the museum, tarring the internal roads, the commercial pine plantation and the irrigation scheme. All these projects ran smoothly: there

> was no infighting, which is often the case. Now that this strong leadership is no longer there I wonder about the sustainability of Cata projects. I can see that it is not as it used to be. The Working for Food members have been decreasing since the Border Rural Committee pulled out. I don't believe Cata will be able to attract tourism to sustain itself. I have not come across any visitors who were here because they saw Cata on the internet or on a flyer. It is word of mouth only. I worry that as soon as all the funding ends, that's the end of Cata."

Leadership often depends on one strong person, but some organisations, like stokvels for example, keep going even without a strong individual as leader. This is because people need the stokvel so they keep meeting and if there are problems they talk together about how to overcome these. If we need water to live healthy lives then we too must keep talking to others to make sure we all have enough clean water and are looking after the soil.

Thank you very much for your participation!

APPENDIX: AWARENESS EXERCISE

Tim Wigley of Earth Harmony Innovators ran a Natural Farming workshop with people in Hombe village near Lusikisiki. He took the whole group to the nearby Mbotyi forest to learn about how a healthy ecosystem works. He explains how the exercise went:

> Before leaving we worked out three main questions:
>
> - How effectively does the forest use the rain that falls on it?
> - How does the forest care for the soil?
> - How effectively does the forest use sunlight?
>
> At the time it had been raining heavily. All the paths and roads in Hombe village were wet and muddy, so it was difficult to even drive to the forest. Streams on the way were full of mud. But when we got to the forest we were surprised to see no more mud. The soil was completely covered with a thick layer of fallen leaves and we could walk easily without slipping. Our shoes stayed clean. When we reached the stream that flows through the forest the water was clear and clean.

By observing the forest, Tim says, it became easy for everybody to answer the three questions.

1. How effectively does the forest use the rain that falls on it? Very effectively. All the rain that fell in the forest fell first on the leaves of the trees, then it dripped down onto the thick covering over the soil, then it soaked gently through the covering and down into the soil. No water was seen flowing on the surface.

2. How does the forest care for the soil? The soil was well cared for, deep fertile and soft. When we scratched through the covering of dead leaves the soil was so soft we could push our fingers into it.

3. How effectively does the forest use sunlight? All the sunlight that fell on the forest was used by all the leaves it fell on, first on the high trees then on different levels of smaller trees and plants. No sunlight reached the ground.

Tim says everyone remarked on how peaceful and healthy the forest felt. “One old woman said it felt so good that she would like to bring her bed and sleep in the forest, as it felt like it was healing her.”

After spending the morning in the forest the group went back to Hombe. In small workshop groups they walked around the village and compared conditions there with those of the forest. They asked the same three questions, but this time about conditions in the village. The answers were very different.

Then the group did an interesting exercise. Instead of thinking like human beings, they tried to imagine what it would be like to be the rain, and the soil and

the sun. Each person had a chance to speak as one of these elements. One man named Sipho said:

"I am the rain. Last week I was sent to the forest and it was a wonderful experience falling on all those leaves and soaking deep into the soft soil. It felt good to be able to make everything happy and the plants to grow. Then today, when God sent me to come and fall over this village, I felt excited, as I thought I would be bringing a blessing for the people who live here. Instead I found myself falling on bare ground without anything for me to hold onto. I started to flow faster and faster as I rushed down the hill carrying the soil with me into the river and down to the sea where the fishes complained that they could no longer see in the muddy water. Causing so much damage when I had come to bring blessing made me feel very unhappy."

MEDIATOR NOTES

Mediator note 1: Section 1 is deliberately short to allow time for participants to discuss their own water storage experiences and concerns. In general it is best to get participants thinking about a topic *before* presenting the formal information in the book. For Section 1 this is easy as you can simply use the 3 questions in the notes to prompt responses. In answering the three questions, participants are likely to discover that they already know a lot about the topic.

When participants have completed Section 1 we hope they will feel that their particular needs are understood by the group and, just as importantly, that their insights can be useful to others. This approach is based on the idea the learning works best when we feel accepted and can construct knowledge from a personal basis: we then have a secure foundation onto which we can build more elaborate technical information.

Mediator note 2: Before going through the information in the notes ask participants what they know about the different kinds of tanks, for example cement tanks keep water cold but they are difficult to erect and maintain; zinc tanks tend to rust, etc.)

Note also that parts of Section 2 and Section 3 may be too technical for some participants. Explain in advance that this is not a problem and that learning

technical information from a book is not easy for anyone. The most important thing is active participation, and the aim is to come out of the workshop feeling motivated to tackle water-related challenges.

Mediator note 3: This is a good place to initiate a discussion about possible ways to pay for a tank and for people to make suggestions of how communities can lobby NGOs for support.

Mediator note 4: It should be made clear that this only works for land on a reasonably steep slope. The place where you have water flowing over the ground surface that you want to collect must be at a higher level than the catch pit, so that water can flow down the furrow you make and into the catch pit. The top of the catch pit must be higher than the top of the tank in which you want to store this water.

Mediator note 5: Before reading through this section draw participants out on why they might wish to work with nature.

Mediator note 6: Here is a simple way to demonstrate the concept of an average. Make a grid on a piece of paper, containing 10 squares. Find some small objects (e.g. seeds or torn-up pieces of paper). Take, for example, 30 'seeds' (enough so that you can put the same number into each square). Put 3 seeds into each square (better still get a participant to do this). Make it clear that the

total number of seeds is 30. Now get a participant to redistribute the 30 seeds so that some squares have more seeds and others fewer. Explain that the total number of seeds is still the same. This means there are still enough seeds for three in each square even if they have been distributed differently. The *average* is therefore three seeds per square.

Mediator note 7: Encourage a discussion in which participants offer ideas about 1) how organic matter breaks down in the soil and 2) how earthworms contribute to soil health/aeration. Organic matter (which is anything that was once living) is broken down by small creatures called micro organisms, either bacteria or fungi. Earthworms feed on the bacteria and produce waste that is very good food for plants. This interaction between many different things that live in soil makes conditions right for plants so they can be healthy and grow fast.

Mediator note 8: Demonstration models of swales in particular will help to get the concept across. If possible make a model of a swale in clay or any suitable material and also of vetiver grass planted at intervals along contours.

Mediator note 9: Give the main topic of each section, then allow participants a few minutes to consider what they have gained. Then invite people to briefly describe what they have learnt. Only once participants have spoken should the Mediator summarise the content covered. When you have dealt with Section 1, 2 & 3 ask the participants what

questions have arisen as a result of the information provided both in the book and in the workshop discussions. New questions are a sign that the information has been of value.

PROJECT TEAM: WRC project K5/2074/1

Change Orientated Learning And Water Management Practices

Project Manager:	Inga Jacobs
Project Leader:	Heila Lotz-Sisitka
Lead Researcher & Project Coordinator:	Jane Burt
Coordinator of Writing & Editing:	Robert Berold
Researchers:	Charles Phiri
	Nina Rivers
	Monde Ntshudu
	Ewald Kruger
Writers of resource:	Tim Wigley
	Robert Berold
Editors:	Mindy Stanford
	Robert Berold
Rewriter for target readership:	Mindy Stanford
Designer:	Liz Gowans
Translators:	
isiXhosa	Monde Ntshudu
Afrikaans	Ewald Kruger
Reference group:	Mr MP Nepfumbada
	Ms S Blignaut
	Dr G Raven
	Dr SJC Slabbert
	Dr D Roux
	Dr T Palmer
	Ms S Nienaber
	Mr DR du Toit
	Mr J Dennison
	Mr DR Weston
	Mr V Munnik

APPENDIX C: Student Resources

AMANZI ACOCEKILEYO

Uphando eQhoboshendlini- eSajonisi

Ibhalwe ngu Sithokozile Yalo

WESSA Environmental Education

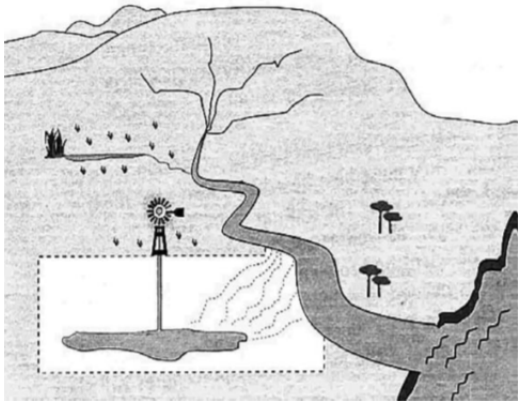
ISIQULATHO

INSTHAYELELO

Amanzi endaweni yaseQhoboshendlini

Lencwadi yenzelwe abahlali basezilalini, abasebenzisa amanzi afumaneka emilanjeni emikhulu nasemithonjeni. Injongo zayo kukufuna ukujongana nococeko lwamanzi nezinto ezifana nezifo ezenziwa ngalamanzi,izophinda iqwalasele kwanemikhwa elungileyo yezempilo.

Indawo apho afumaneka khona amanzi akwimilambo emkhulu uMzimvubu, emthonjeni eKhukhaphi, kanye nendidi ezimbini zamatanke. iJojo kanye netanke embiwe phantsi emhlabeni eqokelela ukuncenceshela egadini.



Imilambo, imisinga,imigxobozo,amacweba omlambo,namanzi aphansi komhlaba (*DWAF*)

Isiqendu 1

Yintoni amanzi acocekileyo

Amanzi athembekileyo akhuselekileyo amanzi acocekileyo. Amanzi emlanjeni okanye emthonjeni angcoliswa zizinto ezininzi,eyokuqala kwi mfuyo “imfuyo isela phakathi ishiye nokungcola kwayo phakathi emanzini” Nonkazimlo Mseswe. Abantu abahlala phezulu ekuqaleni komlambo bayangcolisa amanzi ngendlela ezinintsi umzekelo baye bahlambe impahla balahle ukungcola kanye nelindle labo, konke okungcola kwehla nomlambo kuthelele abantu abasebenzisa amanzi ngezansi ngenxaki. Kwezinye ilali kukho nedip ezenziweyo phezukomlambo, kanye nokulima phezulu komlambo xa inetha imvula zonke ityefu ezisetshenziswayo zingena emlanjeni zonke ezizinto zenza amanzi angacoceki.

Zininsi izifo ezifunyanwa apha emanzini ezifana notyatyazo. uNonkazimlo Mseswa wathenga itanki ngenxa yokuba ebona ezinxaki zamanzi, amanzi ayephinde abenetyuwa kwezinye indawo abanike inxaki nasesikhumbeni.

Nonkazimlo Mseswe standing next to her tank

Isiqendu 2

Indlela ekufunyanwa ngazo amanzi

Amanzi afunyanwa kwimlambo emikhulu njengoMzimvubu, kwimilanjana emincinane njengeKhukaphi. ‘kukude kakhulu ukulanda amanzi kuthatha amahora amabili ukuya nokubuya eMzimvubu umntu ukwazi ukuphatha imbombozi enye engu 20L into eyenzekayo abantu baye baqeshe idonki kumelwane okanye uyithenge ngebhokwe ezimbini’ Ndabeni. “eKhukhaphi kunendawo ezihlukene apho kuvaswa impahla okanye kukhiwa amanzi okusela kanye nendawo yokuhlamba umzimba Abanye abantu baqesha imoto ukubalandela amanzi”.

Abanye abantu basebenzisa amatanke ukuqokelela amanzi, amanzi emvula amahala kanti futhi acocekile,’ ngathenga itanki kuba kukude emlanjeni,namanzi emdaka afunyanwa emlanjeni.’ Elalini sanikwa amatanki ngumasipala kodwa sangakwazi ukufumana amanzi

saqokelela imali sathenga igatari sawafakela emizini ngoku ilali iyakwazi ukufumana amanzi okusela’ Nonkaziml Mseswe. Amanzi asematankeni siwasebenzisa ekuncencesheleni isitiya”.

Enye yendlela zokulanda amanzi usebenzisa idonki

Isiqendu 3

Ukusetshenziswa kwetanki ukuqokelela amanzi emvula

‘Abantu abaninzi bathenga amatanki ukuqokelela amanzi emvula acocekileyo,okukudalwa ukuba kukude kakhulu emlanjeni futhi sele uyileukuyowakhaufumane amanzi amdaka’ Lungeka Bili. Abanye abantu bagugile abasakwazi ukuya emlanjeni. Itanki icocwa noba kanye ngonyaka ukuba uyabona amanzi aphumayo amdaka

kakhulu, uqiniseke ukuba akukho manzi xa uzakungena ukuzikhusela ekutshoneni nasempilweni.

Umntu othenge itanki

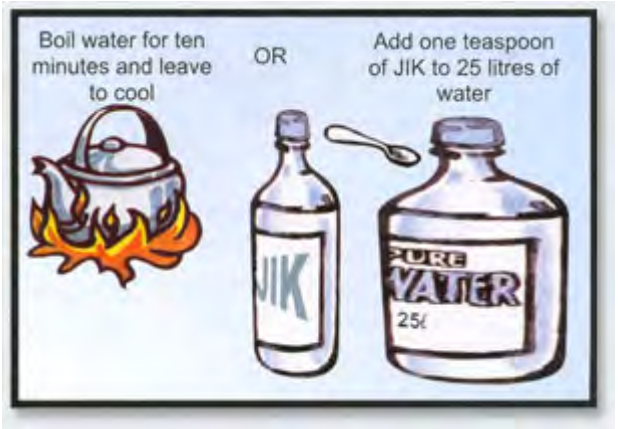
Isiqendu 4

Indlela zokucoca amanzi

‘Amanzi angacocekanga njengamanzi asemilanjeni kufuneka phambi kokuba uwasele uwabilise,uwahluze, uwagalele ebhotileni uwafake emkhenceni uzakuwakhupha sele ecocekile’ Xoliswa Bili. “Indlela ekwakwenziwa ngazo kudala kwakusetshenziswa ikalika okanye ialeni lifakwa epailini litsale ubusuku bonke amanzi aselwe ngengomso esecwengile, abanye abantu babewabilisa, zazinencasa embi emlonyeni ngoku abantu bayeka ukuzisebenzisa” Ndabeni.

Amanzi aye abagulise abantu ngezifo ezifana nezorhudo, bayabacebiswa ikliniki ukubana

ungasebenzisa ujik ukuvikela izifo ndingabalula isigo sotyatyazo,nokugubhuka emzimbeni. kodwa kufanele ubenisikalelo esifanelekileyo, icephe elinye embombozini engu 25L.



Ukucoca amanzi (DWAF)

ISIQUKUMBELO

Umzansi Afrika ujhongene nenxaki yamanzi. Lelona lizwe linamanzi anqabileyo.

Amanzi amanintsi amdaka akalungelanga kuselwa okanye ukuhlamba – kwindawo ezinintsi asinazo nendlela zokujhonga ukungcola kwamanzi. Namanzi esiwafumana kumasipala ukathembekalanga ixesha elininzi abamdaka akacocekanga.

Imibulelo

Ndibulela kubantu abalandelayo ngokusebenzisana nami ekubhaleni lencwadi:

Nonkazimlo Mseswe

Lungeka Bili

Xoliswa Bili

Gertrude Ndabeni

Indiphile Ndabeni

Grey water booklet testing

22 november 2013

in the heat of the late morning sun five community member my self and Carla are turning compost we have been meeting every second day turn turn the heap. our task done we head indoors, a class room has been set aside for us to escape the cloudless sky while we drink tea and coffee. i would like to say in peace but its anything but peaceful, we strain to hear each other over the din in the next door class separated from us by a thin wooden consatena panel.

i have brought my using used water booklet with me to get feedback from the Melani group who help the school in the food gardens at W.B.Tshume, they are also members surrounding community. as things happened non of the people that were in the book were present on that day never the less i decided to go ahead since they all knew the people that were in the book. Nomahlubi who is a wonderful new member in the group, she is a sungoma with great charisma and strength who has taken on a leadership role and that of translator .

i asked if we could go through some of the booklet maybe the parts that interested them in order for me to get their feed back. they agreed, i also asked how would they like to go through through the booklet, for translation prepossess we decided that i would read and Nomahlubi would translate. so while we waited for the kettle to boil i began to read.

during the interview i listened to the translation and watched the body language while they listed to the translator, i made notes of this through out the session. i started by going through the contents i said they should stop me when they wanted to know about something or if the found something interesting. the first stop was at where does water come from? every one enjoyed the water cycle there was much animated discussion and agreement. one lady said she was interested because she did not know that the rain filed the rivers and dams, questions also came up they

wondered why water in the tap is clean and in the dam it is dirty, does clorien purify water?, why does clorien purify water?, is clorien good for you?

after this first section i started to think that this almost needs to be a work shop where the booklet is just used to underpin the discussions that develop.

when we got to the part that explains that the water that is leaking all over the driv way of the school is not surge but just greay water from the surge tank. the listed carfuly to the storie of the people that the know that they have sean and have spoken to over the years. they do and express there own consers about the hearth haseds they wonder why the kitchen staff don't wash the plates and they wonder what happens at other schools.

as we progress through the book moving through the section on waters as a precious resource, the interest level heightened except for one lady who was not feeling so well. they said that they know very little about this subject and that the information is useful and interesting. the asked is grey water useful, i was happy because this was the next section in the booklet it confirmed that that order of storeys was right.

they appreciated the stories of tp and Linda collecting water from the rivers some could remember the time when they to had to go collect water from far away, they remember the days when they had to walk to the gape taps (communal taps) and carry heavy buckets home. a lively discussion developed about water practise in the rural ares where they grew up, stores were told about the various ways of saving water and that most houses had corrugated iron or cement tanks an those that did not have tanks would dig holes for the water to flow into. some of they ways that they use grey water came up such as because there is so much soap when you wash your clothes and because one must rinse

the clothes many times. we should dilute the heavily soaped water with the rinse water so that the water does not leave a grey film on the pavement or on the soil.

i could see that the stores stimulated a natural conversational style that facilitated there own story telling, as Nomahlubi translated she add her own wisdom and her stores were wonderful extentions to the ones already written she told stores of of the effects of polluted water and how fishemen will know emidiatly by the fish in river wether it is polluted or not, the dicused biger water probles such as oil spills in the sea and how they have seen penguins beeing washed on tv.

as we read further we came to the section on what is in grey water and diferent typs of grey water, immediately one of the ladies started talking about a Zionist practise of mixing Jay's fluid with scrubs ammonia, vinegar and salt to wash people in for skin problems.the other ladies were horrified that such things are used to wash the skin they also commented on how these things can't be good for the plants.

although we did not go through all the sections in the booklet,i got a real taste of it potential, i started to find it useful to speak to the stories that were coming up in relation to the stories that had been written. the further we read the more the discussion was enriched by the groups personal knowledge. one lady said that she is usually very tired but she is so interested in the subject that her eyes are wide awake. they informed me that they have seen a knew usefulness for something that the throw away every day and that they are happy because now they have extra water.

Starting Asset Based Community Development and Permaculture at WB Tshume and Emzomncane Primary Schools

By Carla Collins

Produced in fulfilment of the Rhodes University
'Changing Practice' Short Course 2013

As part of an internal evaluation by Calabash Trust,
a developmental NPO in Nelson Mandela Bay

INTRODUCTION

Combining ABCD and Permaculture

It started with a conversation around a fire. Alhyrian Laue, Calabash Trust's permaculture consultant, told me about permaculture as he was in the process of doing his Permaculture Design Course (PDC) at Berg-en-Dal in the Karoo. He explained that permaculture is a sustainable way of food gardening which provides all the elements necessary for the garden to sustain itself in the long-term. The design of the food garden is holistic: the designer will look at the entire school area, considering all internal and external natural and social influences that could impact on the area. In demarcating different zones of the garden the natural cycles of seasons and time of day are considered as well as the physical aspects of the terrain including built structures: these influence planting decisions. For example a slope or trees may be used as sun and wind protection, water may be harvested from the roof and ground, and compost made from fallen leaves. Above all the permaculture system enables a conducive learning environment while restoring and conserving the eco-system.

Permaculture is the conscious design and maintenance of agriculturally productive ecosystems which have the diversity, stability, and resilience of natural ecosystems. It is the harmonious integration of landscape and people, providing their food, while potentially providing energy, shelter, and other material and non-material needs in a sustainable way. Its main principles are taking care of the earth, and taking care of the people. Permaculture as a systematic method was developed by Bill Mollison and David Holmgren during the 1970s. The word "permaculture" originally referred to "permanent agriculture", but was expanded to also stand for "permanent culture" as it was seen that social aspects were integral to a truly sustainable system.

I in turn spoke to Alhyrian about a new approach to community development that I was learning about called Asset Based Community Development (ABCD). As suggested by the name, this approach to developing communities places emphasis on the assets that already exist within communities rather than on needs. It therefore aims to shift poverty mindsets by encouraging people to start with what they have and build with what they know. As part of the process, ABCD focuses on mapping and creating inventories of five types of assets – 1) human, 2) social, 3) natural, 4) material/physical and 5) financial. Alhyrian and I saw permaculture as a way of designing a lifestyle that connects these assets in a beneficial way, and which also considers our basic needs.

Asset Based Community Development is an inclusive approach to community-led development that appreciates and mobilizes individual and community talents, skills and assets (rather than focusing on problems and needs). John L. McKnight and John P. Kretzmann (1993) came up with the term, Asset Based Community Development, after researching successful communities and identifying common success factors. Since then tools have been developed and refined internationally, and specifically adapted to the South African context.

I became excited because both the permaculture and Asset Based Community Development approaches are designed with sustainability in mind, thus linking social and environmental issues synergistically. As a personal aspiration, this combined approach seemed like a good starting point for an attempt to clean the Zwartkops River Estuary/wetland area where Alhyrian and I work and live.

The estuary is the part of the lower course of the river that meets the tides of the sea: it is a wetland, as many parts of the area are temporarily or permanently covered with water. For Calabash Trust the idea of sustainable food gardening seemed like an opportunity to work more developmentally with schools and communities. It had the potential to improve nutrition at schools that Calabash Trust works with: nutrition has been a programme of the Trust since it started in 1999. I felt passionate about the idea, Alhyrian was willing to participate and Calabash Trust was open to trying it as a pilot to see where it might take us.

I've been working at Calabash Trust since 2009, and in 2012, after I attended training in Asset Based Community Development (ABCD), the Calabash Trust has been exploring ABCD as a paradigm and piloted initiatives incorporating permaculture food gardening principles, design and implementation at primary schools in Nelson Mandela Bay. This document explains the process in more detail, and includes an evaluation of the first pilot process at two of Calabash Trust's partner schools. The document can be used by Calabash Trust staff as a future guideline, to reflect on and share ideas with others interested in this process.

What is Calabash Trust?

Calabash Trust is a non-profit organization that was initiated by Calabash Tour Company in 1999 to harness the potential of traveller's philanthropy by channelling resources and supporting projects and opportunities arising out of tourist engagements with communities. As a result the organization, in its early years, focused more on material, infrastructural and educational support for schools and early childhood development centres in and around township areas of Nelson Mandela Bay (Port Elizabeth). During this time Calabash Trust assisted in establishing a 'Cluster of Schools', an independent body with their own leadership structure, with Calabash Trust as a development partner to effect the common objective of creating schools as centres of learning. The belief is that bringing schools together to share experiences, successes and failures is of value, and increases chances to leverage resources within the community and externally. Through this 'Cluster', the ABCD and permaculture process outlined in this document were made possible.

HOW WE STARTED

Funding partners

Calabash Trust started negotiating with African Bank, planning and restructuring for almost eight months to finalise a project charter that would cater both for our developmental goals and the outcomes of the potential funder. We at Calabash think more in terms of qualitative long-term improvements, including consciousness building, creating schools as centres of learning, and environmental awareness and restoration, which are sometimes difficult to measure. Some funders tend to think in terms of immediate results, where bigger numbers (for example in terms of people reached) mean greater success. Nevertheless, permaculture has the potential to provide enough predictable, tangible outcomes, and it thus became the "hook" which enabled us to receive funding for this pilot process to implement ABCD and permaculture at one of our partner schools, WB Tshume Primary School in KwaZakhele.

At the same time Calabash Trust received funding from Tribes Foundation in the United Kingdom, which funded the permaculture aspect only, while not having enough funds for ABCD as well. We therefore decided to implement the permaculture system funded by Tribes Foundation at a second partner school, Emzomncane Primary School, within the same community and to combine the ABCD process with permaculture at both WB Tshume and Emzomncane.

Both WB Tshume and Emzomncane Primary are in the KwaZakhele community situated in the poorer northern suburbs of Nelson Mandela Bay.

This area is next to a series of lakes and salt pans that are part of the Swartkops River Estuary mentioned above. A variety of bird life is present – flamingos make their home here and migratory birds frequent the area on their journeys. It is sad to see pollution from the ever-increasing population and industries destroying the estuary. I am fairly convinced that many people living in this area are unaware that they live in an estuary at all, even though, in terms of its biodiversity and economic value, Swartkops Estuary happens to be the 11th most important in South Africa.

A disregard for the natural environment in my view goes hand in hand with poverty of mind and spirit and a lack of self-regard and respect in many instances. Even though the church plays such a strong role in the community, it does not necessarily promote the ubuntu spirit effectively; therefore a lot more work is needed as the social challenges facing the community have a strong influence on the wellbeing of the environment. While cleaning up the Swartkops wetland area was never a focus of Calabash Trust, I saw ABCD and permaculture as naturally contributing to cleaning the environment beyond the schools. In this respect, a phone call from a group of KwaZakhele women, wanting to assist in cleaning up the wetland area, is possibly starting to move Calabash Trust into assisting in that direction.

Approaching the school

As mentioned above, the Calabash Trust has been working in partnerships with a 'Cluster of Schools', these are in the New Brighton, KwaZakhele, Zwide, Joe Slovo, KwaDwesi and Motherwell areas of Nelson Mandela Bay.

Of the two schools involved in this pilot project, WB Tshume is one of the Calabash Trust's older partners, while Emzomncane partnered with the Trust more recently. Since we already knew the people we were going to work with in the pilot, we didn't need to spend time negotiating access to either of the schools. I've had a particularly close relationship with two teachers at WB Tshume, Rita Bakada and Zoleka Zinto, which allowed me to speak to them about starting our process there. Speaking to the principal and the 'Calabash Committee' instituted at WB Tshume made me feel we were making the right decision, although I found the lack of questions and engagement a bit worrying, almost a similar experience with other community work where people say 'yes' to whatever it is you are 'bringing', without really understanding consequences and participation. At Emzomncane, where only the permaculture implementation had taken place up until that point, the principal seemed very excited.

At the stakeholder meetings with the teachers, school governing board, cooks and parents present, I had to keep my energy levels in check. The people looked very bored and I felt I had to try hard to lift the energy of others. I was also aware of people not understanding English, both among those who were not interested, and those who were genuinely interested. The latter were in the minority. Thinking back to this, I should have registered the warning bells, but at the time I shrugged it off thinking people were simply preoccupied with their own workload and tired. Nevertheless, all those present agreed on the implementation of a pilot ABCD/permaculture process, although not being fully aware of the expectations and levels of participation.

Mr Sali, Principal of WB Tshume, at initial stakeholder meeting

Ms January, Principal of Emzomncane, at initial stakeholder meeting

Inviting the community

Ntshantsha Madinda, Calabash Trust's fieldworker, Alhyrian and I walked around in the surrounding community to invite people to the first ABCD workshop. Besides the school's involvement, we wanted to increase community involvement in and around the school, and we felt that facilitating an ABCD process was a possible way to unlock potential for involvement, specifically in the permaculture implementation and maintenance. We walked the streets of KwaZakhele on cold and windy days, me feeling a little self-conscious as people stared and wondered why the 'umlungus' were walking around. However, I try not to think of how others perceive me in these situations.

JC Mvusi Methodist Church soup kitchen visit during community connecting

Ntshantsha did however mention that after our community walks (which were in the community where she grew up, where her church is and where her grandmother lives), people frequently arrived at her grandmother's house to ask for jobs, assuming that she and her grandmother could offer opportunities. This after being seen walking around with an 'umlungu'.

We were drawn to houses that were well or differently looked after. I suppose we were 'judging the books by their covers.' At least this was our initial method and then we followed the snowball flow from there to other houses and contacts. Ntshantsha was able to guide us around, avoiding more commonly known dangerous areas and we never felt under threat.

All people were very open to receive us and listen to the reasons for our visit. Some conversations remained at the door, others were over juice or tea, but most took place while residents were showing us their gardens. The hospitality was incredible and it was one of my favourite parts of the process. I especially

enjoyed experiencing the community at different times of the day – morning, afternoon and evening – many people in the street engaging with each other, unlike my own high walled suburban experience. At times I was nervous about expectations being created, but thought we would deal with these once we were together in one room.

PROCESS EXPERIENCES

Levels of engagement – becoming involved

When it was time for the workshop to start I was nervous about whether people would attend. 'African time' didn't help my nerves, and only when people started arriving half an hour to an hour later, I found myself relaxing more. I knew that many people came only for the food, and they would came every day, others came and went, but there was a core group who attended for the right reasons throughout. These were also the people who stayed on to volunteer afterwards. Over the four-day period, about 80 people attended during the afternoons (after school hours) with about 30-40 attending all day. Many people dropped when they realised that they were not going to be paid for attending. One particular young man, who joined the workshop towards the end, asked, "What are were getting out of all this?" I had already explained to the group that the workshop was about looking at skills and assets, and that it was up to them to drive things forward, whatever direction it might be. I was happy to explain this again and to clarify, and was also pleased when some other members who attended the full workshop were able to explain to the young man what they had experienced and that creating their own opportunities was ultimately up to them.

As a first time facilitator in the process I found it very enjoyable and surprisingly easy. I thought that the process and tools brought out the best in people and I could feel the energy rise during certain activities. At the back of my mind, though, I could sense that some people were still there for the wrong reasons and did not fully understand what the process was about. In one instance the people I was unsure of complained about the quality of catering (which the school was providing at the time), which confirmed some of my suspicions. On the one hand I felt irritated, but at the same time it also gave me an idea of where people's minds were at, especially in terms of the workshop process; others complained about those complaining about the food, showing their appreciation and understanding of what was occurring in the workshop.

Catering at first consisted of muffins and white bread, and before we could ask the school to provide healthier options, seeing that we are promoting healthier lifestyles, the group made us aware that many older people suffer from diabetes and should not be eating these meals which contain too much sugar. Again I was pleased that the group wanted to eat healthily and that they were looking out for each other.

Refreshment time during the workshop

A language barrier existed where Ntshantsha translated from English to isiXhosa, which meant extra time had to be incorporated. In later workshops some youth members translated, which in turn allowed for more meaningful interaction between the youth and elderly.

After the first ABCD workshop and a subsequent permaculture workshop the week after, the core group mentioned earlier showed eagerness to participate in a process of connecting with the wider community – collecting some information and asking questions to start a community mapping process. I felt pleased because it was what we hoped would happen, a first goal achieved. We felt ready for action and agreed to meet weekly to share feedback. However, without us being directly involved in the information collecting process to constantly mentor and check up on progress, there wasn't much action from the group's side, with very little information to share. I assumed the group would understand, but the capacity was not there to understand why information was needed for mapping, why we were doing mapping in the first place, and how to ask people questions in a way to get the right information.

What caused a further loss in momentum and the dropping out of some group members along the way, was the long period between the first ABCD workshop and the next mapping workshop. There was a gap of about two months which we assumed would be needed for the collection of information for the mapping. This was the first experience of something not working out according to plan, and we thus had to be flexible and adapt to the capacity and pace of the group. We also had strong preconceived ideas of what we would like the map to look like, and perhaps put too much importance on the use and potential of the map. We had to let go of this and decided it was not as important as keeping up with the pace and understanding of the group instead.

It was only during the evaluation, that Ntombizanele, a volunteer cook at the school, made me aware of the value of the map, saying that the first ABCD workshop was very important as she didn't know what was going on in the area and to see what is important in her life. She didn't realise for example, that so many associations existed between women and other community members in the surrounding community. These were manifested in things like soup kitchens, home care visits for the elderly, and taking care of disabled children.

The ABCD and permaculture workshops and process led to the formation of a core group. Altogether this group volunteered over 4800 hours to implement the permaculture system at WB Tshume and to maintain it in future. The women in the group also showed an interest in sewing (the mapping process had showed that there were unused sewing machines at the school) and in making products from waste materials (recycling was mentioned as part of permaculture). The group diminished in size over time, with about 10 to 15 members remaining and calling themselves the Milani group.

Why Linda became involved

During the workshops we tried to identify key people with leadership qualities. Linda Bartman (pictured left), who lives down the road from the school, seemed to always be present and willing. The Milani group agreed that Linda was the best candidate to be in charge of overall activities. She did catering for our subsequent workshops

(as it was a skill of hers identified in the first ABCD workshop), although we had a brief complication when switching from the school's catering to her. The school thought we had made the change because their catering was not good enough, but when we explained that we simply wanted to support local business the misunderstanding was quickly resolved. Linda became a motivator for the other women and for me. During times of doubt and questioning of the process, she would sms words of encouragement to let me know we were doing the right thing in the right way.

I became a bit nervous about the group's involvement when Linda found a job at the local Spar, and was relieved (with a feeling of guilt because that income meant a lot for her and her family) when it turned out to be a temporary situation and Linda came back!

When asked what Linda expected when she was first invited to the workshop, she said, "The first time I came here I thought we were going to get something like a job or whatsoever." However, she was not disappointed as she wanted to learn how projects work and gain new skills. One day somebody asked Linda what she wanted to do with her life, she answered: "I want to do my own thing, I'm sick and tired working for other people, I want to start my own business. That's why I'm interested in other things, so I can learn."

Linda is 55 years old with a lot of energy, she gets up between 4 and 5am every morning, gets ready, then waters the garden at the school from about 6:30am. She speaks isiXhosa, isiZulu and English, with isiXhosa as her home language. She returned to Port Elizabeth from Johannesburg in 2009 to care

for her daughter who was sick at the time, and wanting to do more, her church eventually put her in touch with Nithemba project, feeding people with HIV/AIDS where she was a volunteer for one year until volunteering at WB Tshume in 2012.

MAINTAINING MOMENTUM

Group work dynamics

In the previous section it is clear that we spent a lot more time and energy with the school and group during the first eight months, running workshops, mentoring and implementing. I felt comfortable when our time there naturally became less, not necessarily because I thought the group would stick together and move things forward, but because I knew Linda was there to make sure everything is maintained, and also because I felt it necessary to lessen dependence and then see how things unfold. Linda's continuous involvement has been key to the momentum of this project, however she also grapples with the issue of continued community participation – involving the Milani group members in gardening work and practicing sewing skills. I therefore wanted to figure out how to help Linda, how to make the people who are willing and committed more active. It seemed to be a passive willingness that needed unlocking.

Linda likes to work in groups but sometimes there were challenges with working in groups. Milani group didn't always make time to meet and come to the project; they always seemed to have "this and that". So when she worked alone it became boring, she enjoys having people to talk to. She would go to

the other group members' houses to fetch them, otherwise they tended to stay away.

Some more issues we had to deal with were difficult characters with persistently negative mindsets and a tendency to cause trouble, especially when it came to money matters. We had to be aware of these cases so we could 'nip it in the bud' before it affected and influenced other group members. Jealousy also existed within the group, which Linda felt was a main reason why difficulties within groups persisted. Again we were aware and tried to prevent unpleasant situations from persisting and spreading.

I found it frustrating that the group did not take more initiative in our absence, even though I was aware that people have many personal and family issues to deal with. I felt uncomfortable at times, trying to make suggestions and 'telling people what I think they should do' when I am about 15 to 20 years younger than them. I felt aware of my age and of treating them as elders, perhaps that's why I was unable to find relevant ways to unlock more energy at the time.

Why Linda remained involved

Linda knew about gardening because she spent 6 years (from Grade 5 to 10) in Lenye, Keiskammahoek, learning from her mother's side of the family (her uncle now farms in Addo). "There are large spaces to plough, you can't do it by yourself or with your family, you need a group of people, that's what they were doing." As children they didn't want to cook, "we wanted to go there and plant – mielies, beans and whatsoever. It was so nice, oee, it was so nice, we never suffered nothing, we had everything, we take it from there. We had milk

from cows, goats, sheep, chickens, pigs and everything." They used river water for the garden and to drink, but her grandmother installed drums to catch rainwater for drinking too, and in case the river dried up during dry seasons. They also used cows to transport water in drums from the river to the garden. She learnt from her uncle that it's better to water early in the morning, not when the sun is up, because the leaves are going to get dark, not be green. "It was very different to the garden here [at WB Tshume] – there they planted in rows, sowed the seeds, then the cows would pull a special tool that would cover the seeds to let them grow. When they are finished they would sit under the tree, eating and telling stories. We were told to get up early, otherwise you would be tired the rest of the day! If you get up early you will have energy for the rest of the day."

Based on Linda's gardening and catering background, the project at the school seemed ideal – she enjoys getting up early every morning to water the garden, and she was also asked to cook at the school when they were in need of an extra hand. Linda loved the crops growing in the zone 1 garden (beds closest to the kitchen) at the school as she had never seen how lettuce and herbs grew. When she bought these greens at the shop she always wished to see how they actually grew. She never knew you could have beds in between grass which acts as a pathway, she only thought of growing with soil around. She learnt about water going underground then up to tanks and how you can use stones to decorate. She is happy that the school children get healthy food and that the Milani group gained skills (sewing, gardening etc) that they didn't have to pay for.

Why the group found it difficult to participate

Other Milani group members were also asked why they find it difficult to participate in the process on a constant, regular basis, and like Linda they also mentioned jealousy as the biggest disturbance. Other factors mentioned were people getting irritated with each other, not valuing each other's efforts, being lazy to do and think, and being too dependant on others instead of doing their own thing.

The group automatically started suggesting solutions for the above challenges, some of which included improving communication within the group and networking externally, regular gatherings as a group, assisting others without expecting anything in return, gaining more knowledge and skills and re-learning how to be independent.

What value the process added to the lives of group members

While a focus on the challenges was and is necessary to overcome them, we also wanted to appreciate what the group gained out of the process, which the following list summarizes:

- Working with people has been valuable.
- They learnt ways of 'beating poverty of stomach' by growing their own food, making healthy soil to get healthy food and keeping their bodies and minds active.
- There are beautiful gardens at the schools which feed their children.
- Other people in the community started to show interest in gardening and noticed the school being neater with many trees.

- They learnt how to make things for themselves and sell it – using sewing machines, how to 'play' with land to make decorations – you can design your place when you 'plough'.
- They received opportunities to clean and cook at the schools.

Some Milani group members giving feedback during an evaluation

LESSONS LEARNT

Maintaining participation

Thinking back to our initial stakeholder engagement, if I find a lack of questions and engagement in future meetings I will reconsider, or at least spend more time working out what people really know and expect. After receiving advice from Jane Burt, who worked at the Environmental Learning Resource Centre (ELRC), I intend to ask more questions for feedback and to add specific levels of participation that are expected from the schools prior to

the initial stakeholder engagement. This way, if they agree on the process, everybody should know what is expected of them from the outset.

Ingrid Schudel, also from ELRC and involved with eco-schools, said parents and teachers might become more involved when they see and understand the value added through initiatives like this one, which help the children. A project like this one has to be worthwhile for the teachers, support their teaching, and have creative activities included, and it must be a platform to share ideas. This made me wonder whether we took the added value aspect of the project for granted – assuming that people would automatically see it and agree with us. I therefore think more dialogue around this with the community and the school should be included next time. Ingrid also said that competitions within the school, between schools and entering other competitions (e.g. Eduplant) maintained some momentum and excitement. At WB Tshume we witnessed excitement around competition before, which might be short-lived but worthwhile.

Similarly, Ashley Westaway, who now works at Gadra Education and who used to work for Border Rural Committee, commented that installing a sense of benefiting could increase buy-in. There should be an emphasis on the people (capacity building and education) rather than on the projects. Even though we had a strong emphasis on the people during the process, there were unrealistic expectations of how long consciousness shifting, empowering and capacity building takes, therefore a sense of disappointment existed throughout the process, which we should take more note of in future.

Marsha Berman, who has done extensive community development work in Papua New Guinea, said that “experience in Papua New Guinea shows that it takes at least 5 years (5 to 9 years) for a new resource or development project to truly take root in a community. This is because real development does not mean a change of theory, opinions or views only. Development means to facilitate changes in attitude and behaviour. These changes take place only gradually and over time. There are no quick fixes, so do not become discouraged if progress appears to be slow. Speed is not important in development: it is continuity over time that counts.” This is also why long-standing partnerships are important, as mentioned below by Bernie Dolley from Ikhala Trust.

Speaking to Bernie Dolley, it became clear that starting projects and then leaving is not working, when approaching and working with a community we need to partner for the long haul. Find that one person and invest in them. Build up formal (business-like) and informal (friendships) relationships. Through these relationships, which should be based on trust, levels of engagement can increase as it is understood we are all on a learning journey which does not end once the project is implemented. We learn from each other as development practitioners and community members. The idea of having our long-standing partnerships with schools helps as long as there is continuous mentoring, meaning there is no official “exit strategy” with the school. But we need to act if we feel that over time our presence is being taken for granted or if wee feel that the school’s involvement is not what it should be, which we have sometimes experienced at WB Tshume.

By actively involving more youth from the community we might both increase the levels of participation and maintain participation provided that we keep on considering how to engage with more effectively.

Workshop process

During the first ABCD workshop we introduced a tool called ‘levels of engagement’ to reflect on the difference between responsive and reactive development, and also to determine the community’s level of involvement during the processes. Even though most agreed that a sense of ownership is clearly the most empowering position to have during a process, it is possible that we introduced the tool too early, before any concrete initiatives had been identified that could be ‘owned’ by the group. This meant the discussion remained on an abstract rather level rather that being experienced. We spoke of opportunities around permaculture and sewing and making goods from recycled materials before permaculture was fully explained and implemented, therefore this discussion could be introduced at a later stage.

It might be worth defining ‘ownership’ according to the way the term is used by Marsha Berman: “By sharing responsibility for the project…from the start, you enable each group to 'own' some aspect of the development process, and a sense of community 'ownership' of the project to grow over time as the project progresses . 'Ownership' may mean literal ownership of new assets, if the project aim is a new material or technical resource for the community. But more importantly, and regardless of the type of project, ‘ownership' in the context of human development means to own responsibility for the success or failure of the project. It is our fault if we fail to meet our aim; it is our success if we achieve our aim…An ill-conceived project will not integrate into the

existing living patterns of the community or behavioural patterns of individuals.”

According to Sally Timmel, who co-wrote ‘Training for Transformation’ material for development practitioners. “A group is far more likely to absorb and benefit from more technical knowledge if the programme is started with dialogue, which brings to surface all the latent questions in their minds…As community workers we need to learn to create a friendly affirming climate in the community so that even the shyest person will gain sufficient self-confidence to contribute his/her experience and insight to the common search for solutions to the enormous problems we face…..skills en techniques alone can never solve problems or build real community, but they can help people and groups of goodwill to know what is needed to act effectively in the spirit of self-reliance and hope.” It is therefore worth spending more time creating a space for listening and dialogue to find out what people have strong feelings about, as this then creates motivation for them to act.

We felt a bit of confusion was created within the group by trying to link ABCD and permaculture too closely. On the one hand ABCD is trying to open possibilities and opportunity for people based on what they already know and have, on the other hand permaculture is teaching a design methodology that seeks to use what people already know and have to create a living eco-system that provides for their basic needs. The overlap can be encouraged but not mixed up too much. It seems to become too much for people to tackle all at once. They were learning about and engaging with consciousness building and self and community appreciation, which at the same time tries to engage in a new way of thinking about design and structure of human and agricultural systems. Although there is a lot of overlap of thinking and motivation between

the two approaches, they have quite different ways of engaging with human needs and wants.

We had a problem of expectations which we think was because of introducing a potential vision too early. Again on the one hand ABCD is trying to break down expectations and the hand-out mentality by bringing people back into contact with who they are and what they are capable of, while permaculture comes along with a great vision of abundance as a result of an integral design.

General

Some division existed between the Milani group and the school, where they didn't engage actively around the project as one entity. Some woman in the Milani group at one point commented that some teachers think they are better than them because they have a well-paid job which gives them more status. It took a process of facilitating more interaction, communication and understanding between the two parties to break down these barriers.

Questions around harvesting arose: Who is ultimately in charge? Who can and cannot harvest? Who keeps records? How to deal with theft?

Questions around maintenance: Who looks after which part of the garden and when? What happens if one of the parties do not do what is expected of them?

Issues around secure space: Finding a solution for the use of sewing machines – the secure room to store sewing machines is too small for use as a place to sew, so the machines must be taken to a bigger room when the women sew and returned for storage. This is not a very energy efficient way of operating, especially since the older ladies should not be carrying heavy machines.

Working with communities from two schools created some confusion about whether the initial single core group should remaining as one group or split in two. There were also some maintenance issues around the school garden.

Way forward

Some areas of the pilot process might have been a bit idealistic, as we are working with many abstract ideas with unpredictable issues and outcomes when put into practice. At the schools the main challenges faced had to do with the capacity of the group members, and the time it took to implement certain aspects of the design and to move other initiatives forward. It was a learning curve that made us think more realistically for the next time.

Overall, in terms of the permaculture system, it will grow if maintained well, and we are positive that the system could become a site for future training and internships. With further business training the Milani group has an opportunity to turn this project into a business, which could include products from sewing and recycling materials.

This was an inclusive, informal evaluation of the pilot process, which we plan to expand as the process unfolds and is replicated.

References

Burt, J., du Toit, D., Neves, D., Pollard, S. 2006. A Participation in Water Resource Management: Book Two: A Task-orientated Approach to Participation. Water Research Commission

Hope, A., Timmel, S. 1995, Training for Transformation: A Handbook for Community Workers: Book 1. Mambo Press, Zimbabwe

Bernman, M. 2000. http://www.pngbuai.com/300socialsciences/management/community_dev_mgmt.html

Mulch for a Healthy Garden

Compiled by Lunga Mhlonyane

A learning resource to improve food gardening through the use of mulch for schools and communities in Port St Johns

Produced in fulfilment of the Rhodes University 'Changing Practice' Short Course 2013

Contents

Introduction

This booklet about food gardening has been compiled for the schools and community of Port St Johns and other schools and communities that have similar weather condition of long dry seasons. It focuses on the knowledge and experience of Super Nofemele, an experienced gardener at a Roman Catholic school in Port St Johns in the Eastern Cape. It will be especially helpful for schools and communities that experience long dry seasons similar to the conditions in Port St Johns. For those already gardening under similar conditions the booklet may offer a new view and also strengthen what they already know and practise in conserving water.

Most of the information included in the booklet comes from Super Nofemele's knowledge and understanding of the garden at the school where he has worked at the school for two years now.

Super Nofemele (above) is a quiet tall friendly man at his mid 50's, originally from Cwele, in Umtata. Now he resides in Port St. John's, in Roman Catholic School premises and has been with the institution since April 2011. He only visits his family once a month and also during school holidays.

After some attempts to meet up with Super, one late winter cloudless and shiny morning, just after the normal routine of school assembly before classrooms could commence, I was sitting on a van, a distance from the school and watching every move happening at the school as I slowly gathered my tools, and trying to figure out if I could identify this man whom I do not know.

As soon as the assembly was dismissed, I jumped off the van and slowly walked towards the staffroom to ask access and permission to interview Super – the man I had heard so much about. Finally Super was at school premises and I was taken to him by Ms Ndamase – a teacher who coordinates and facilitates the garden at the school. Before I could lay my eyes on him, Ms Ndamase saw Super from a distance and told him that he had a visitor.

We were introduced to each other by Ms Ndamase and she left. As we were talking about the beautiful and unusual morning during those days and also some difficulties of getting hold of him from the previous days I was there. I noticed that he was a quiet man, but I was not sure if he was quiet because he had no idea of why I wanted to interview him, or just that he wanted to be sure what exactly I had to say to him.

Food Gardening

Food gardening at the Roman Catholic School has been practised over a long period from the time when Agriculture was still a learning area (subject) at the school. Even after the education system changed, the Port St Johns School did not abandon the practice. Gardening is now used as an additional 'outside classroom' lesson where pupils are given tasks to propagate plants and any related garden activities.

Food gardening can be practised for a number of reasons. Some people do it so they can sell vegetables or fruit to make a living, others so they have fresh vegetables for their own families, while others so they can beautify their garden with a variety of plant species, these could be ornamental, herbs or vegetables. Super said the Port St Johns school maintains a food garden primarily to grow food, but also to generate revenue for the school: "The school utilises the garden to produce food for the pupils and also to sell and make if we harvested more than enough food."

School teachers at their healthy intercropped garden

To garden successfully, Super explained, you need to look after the soil and keep it moist. “In order for one to have a successful healthy garden one must have good soil and moisten the soil often; in order to have a moist soil one is not always obliged to use water, but one could also use mulching – that would also lead to a successful healthy garden. He further went on to say “Having a moist garden is important as the vegetables thrive better and produce healthy food.” People still use a lot of water because they assume that plants also use water more-the-same as humans and follow the saying ‘water is for living’.

When I asked him to clarify, he simply said “Jong’ apha”, [listen], plants do not really need water to survive but only

moist soil and with that you could use mulch to preserve water.” Therefore having mulch could assist and support the successful growth of plants. There are other techniques to conserve water such as mulching, growing groundcovers, trees and etc.

What is mulch?

A pupil applying mulch at the school garden.

Mulch is any material that can be applied on the surface of the

soil around the desired plants in order to keep moisture in the soil. Mulch is also an effective way to control garden weeds. In order for the mulch to protect against garden weeds it must be properly applied. Mulch is applied in a way that the thickness of the layer should be able to keep soil moist and

weeds controllable for a reasonably long period. But at the same time the mulch should not be applied around the stem of the desired plant as this would cause the stem to rot.

There are two types mulch, namely organic and inorganic mulch. Organic mulch comes from the animal products and plants material such as compost, chopped bark, chipping and grass cuttings. Organic mulch breaks down to enrich the soil. As the mulch breaks down one needs to consistently apply another layer of preferred mulch so as to continue to keep soil moist and suppressing the seeds. In the Port St Johns school they apply grass cuttings. Inorganic mulch is mulch that does not break down the soil, such as stones, gravel and pebbles.

Why people use mulch?

There are many benefits from using mulch. People use mulch to enrich the soil, to prevent the erosion, and to keep the soil moist. Mulch strengthens the roots of plants by holding moisture around the root system. People are becoming aware of the importance of water and the role that this resource plays, and the scarcity of water that other people experience. Super has also said that mulch prevents or delays the growth of weeds. Super also mentions that he uses mulch to keep out chickens and other domestic animals.

How people use mulch?

School facilitator, showing pupils how to apply mulch.

Super said that if you use grass as mulch, you need to lay down a thick layer of grass. He explained: “We do that to avoid the grass from being blown away easily, as our garden is in an open area.”

According to Super “We normally use the grass for our garden because after it has done its major role – mulching – it will decompose and later it will improve and enrich the soil we have”.

Other people use mulch for other reasons and with different materials such as stones, pebbles and plastics – these materials are not environmentally friendly. When people use such materials they do it for different reasons, it could be for decorating, or for totally suppressing the weeds, or it could be to create walking paths.

Benefits of mulch

Mulch preserves water in the soil and results in less water being lost. Super explained that “by applying mulch helps the desired plant to grow successfully as mulch retards the growth of weeds because they tends to competes with desired crop in the garden for water. Mulch also improves the drainage of the soil and encourages the plant roots to develop deeper root system.

Super says mulch can also shade roots from the sunlight and protect them from wind. Mulch plays an important role in temperature control wind. It cools the soil during the day. It holds the warmth in the soil at night thus protecting plants against frost damage”.

Super said “the application of mulch in the garden also reduces the soil compaction, especially when they had activities in the garden as they walk all over and in numbers. Mulching therefore loosens the soil for harvesting.

Reflection on what I have learned

As I conversed more with Super I realised that my first perception about his personality was incorrect. I found that he was actually a talkative and open person. Maybe in the beginning he was not sure why I wanted to talk with him.

I have learnt that before one could conduct an interview, one should inform the interviewee and explain clearly what one is expecting for, so that the interviewee may be aware and be prepared of the interview. Or maybe one could even give the list of questions one would be asking on the proposed interview day. Super had deep experience of gardening, particularly with mulching.

INTRODUCTION

Who this book is for

I decided to write this booklet for my community to know the improvement of Amatola Wild Trout in our community.

What is the project?

[add]

How and where the project started

We got funds from Suradec to start the project. This project won an award from the European Union (SEED Award) since it is a community owned project that is unlike any other project in surrounding communities.

When we decided to start the project we saw none of the challenges that we would face. We tried to make community awareness and training to some people. Others paid a visit to Mpumalanga in Dullstroom for a week where this type of project was happening for some years and is still happening and is very well known there. We also call on other networks for help since we are having challenges. Yes it comes with jobs as you know to people from the community but we see a need of improving it so that it can be sustainable. We have gone a long way but we see a need to improve it

COMMUNITY AWARENESS

Community meetings (Committee and General)

Before we started the project we called several meetings to explain to our community what we were trying to do. A delegation from Border Rural Committee (BRC) led by Ashley Westaway, the managing director at the time, along with Pumeza Grootbom and Nomonde Feliti, were part of the meeting. We wanted to know whether people accepted the idea of starting the project and they did.

I was the chairperson of the development committee. At that stage we still did not have a clear understanding of exactly what type of a project it would be, our main interest was that it would bring jobs to people.

The people from Border Rural Committee pointed out that we already had a dam with Rainbow Trout in it where tourists came to fish without paying. That was going to be our opportunity.

After the meeting with the BRC delegation, we called a general meeting for the community and shared the ideas with them. [summarise what the idea/ideas were] They were so very interested when we described the phases we were going to undertake. We started our project working with our community members and we told them that we should control ourselves and take control of our children because tourists do not want to be disturbed by people when doing their fishing.

First steps to publicise the project

With BRC we designed a billboard written by Thina Sinako, who was the funder from European Union and partners ie Border Rural Committee, Upper Mnyameni Development Committee and Cata CPA Communal property association, and we put it at the bridge near our village so that everybody who is coming should see. We also designed a website for people to find us on the internet and pamphlets were designed and distributed at East London Airport. We went to neighbouring villages and told them about the project so that they should be aware of it. We also went to our schools and suggested to the head teachers that tourism should be introduced as a teaching subject and that it should be understood in our community. As a result students from grade 10 and 11 are now given assignments by teachers relating to tourism. For example the students conduct research by asking people [are these people within the community or tourists?] how do they know about Amatola Wild Trout, how the project is working, and what is the importance of it.

With the funding we also wrote a constitution and developed a business plan. We paid a visit to Dullstroom in Mpumalanga where fly-fishing is happening with some of the delegation coming from Cata and Gxulu because they are neighbour villages. [this sentence shold go somewhere else]

WATTLE CLEARING

When we started the project in 2009 we saw that we have much wattle around the dam and on riverbanks. The wattle sucks the water since it is an alien tree and the fish need water. From the funding we got from Surudec we decided to remove the wattle around the dam and on riverbanks by employing 71 people from our community at a rate of R50 per day.

They started cutting the wattle using chainsaws and slashers and a poison called Mamba to stop the stumps from growing again. These people continue to clear the wattle by revisiting it because the wattle seedlings grow again and again. We also employed another group of 50 people under the community works programme (CWP) to clear the wattle and maintain the footpath around the dam. These people are also from our community so the wattle clearing employs over 100 people.

After removing the wattle the quantity of water in our dams and rivers increased. Our economic development has been boosted now in our community.

How to clear the wattle

This is Mcebisi Wiseman who is the chainsaw operator holding the chainsaw to cut the tree. Mxoxolo Nyandeni, Zoliswa Thsoni, Nyameko Mfenyana and Nosithembele Nyandeni are taking the wattle straight to fill up dongas to prevent soil erosion. Masabandile Mfenyena is having a 8l container filled with poison and is putting the poison on the stumps so that the trees cannot grow again. Others are

using a slasher to cut the trees while others are using a hand spray to poison the tree stumps.

[PICTURE OF WATTLE CLEARING TEAM]

TOUR GUIDING

From the funding we've got from Surudec we see a need of having guides in this type of a project because we are using dams and rivers and tourists are not familiar for our sides to understand. We the community decided to train guides from our youth up to a certain standard. We selected eight guides, six from Cata and two from Mnyameni. We employed Louis [add his surname] as the trainer. Unfortunately two guides missed the last session because not many people understand the need for self discipline.

In his report Louis said people did not understand the level of intellect and knowledge needed to be a tour guide and sometimes training doesn't work because training providers lower the standard of training to where the student is. What needs to happen is that the students must rise to the expected level with good education methods. Also cultural differences need to be understood and respected.

The need for customer service is not always understood. One needs to develop leadership and accountability. The tour guide training opens doors to advanced training if done correctly. People need to rise to a high level of expectation. The average training provider does not know how to achieve this.

[caption] This is Zandisile Nongwe, Lwandile Mponge Olwethu, Mfenyama and Wandisile Madlokazi with Siyabonga and Khanyisa Libalal who accompanied students from grade 10 and 11 to pay a visit near the dam telling them about the Amatola Wild Trout. Those are the six

guides we are using. We are requesting funds for them to be trained.

[PICTURE OF GUIDES ACCOMPANYING STUDENT]

Again when we have tourists to visit us they pay into the fishery account and we now use guides from Cata. They do not just go straight to the dam and fish they are guided by other guides who are not legal. [not sure that this belongs here]

Is guiding working?

Yes it is working because university results are good [make clear the link between good university results and guiding] and the guides are regularly employed during vacations. The feedback from employers is excellent. To get tourists we need to get out into the market with public relations campaigns, websites and advertisements.

EXPOSING PROJECT TO COMMUNITIES

The guides need to be exposed to a variety of work places where guides are employed professionally. Our guides were assigned to Storms River Adventures and Addo National Park to get more work experience. They performed exceedingly well and proved that they were way above the standard.

That is Lizo and Ayanda who just clean up what was done by those guides who missed the class at a later stage. [make the meaning clearer] Lizo and Ayanda are now completing the second year of study at Rhodes University. This proves they were well prepared and have motivation. Students and guides need to be encouraged by community leaders, parents and the trainer who trained them. There needs to be follow-up support and mentoring by someone with much experience in making tourism work. This is more difficult than people think, it takes more than just a workshop.

We went to our High School Luxolo where we told learners about the project and gave assignments to research the trout project. They also paid a visit to Nuyameni Hearts [is this another project or NGO?] where they went on a guided tour for some days and they went several times to East London to learn about environmental issues. We also paid a visit to the local Amahlati Municipality to get help and address the project at large. We approached the Dept of Social Development who requested us to make a proposal [about what?]. After we saw an advert in the Daily Dispatch we applied to the Amatole District Municipality. We went there for a workshop and gave them information about the project and they promised to give us something to maintain

the project.

NETWORKING

It was not easy for me to find networks from the Internet, but I networked with other organizations and also government departments. Some people are not easy to talk with but I tried to convince them though they didn't give me anything.

We also went to ADM (Amatole District Municipality) for the exposure of the project. We contacted Mr Edward from Gubu dam near Stutterheim and made an agreement for them to pay a visit in our dam. We contacted Mr Ndwayama from ADM he promised to also pay a visit to our dam. Mr Kubu from Rural Fisheries is Rhodes his contract come to an end. Then we have some problems since we don't have funds to re employ him. [last two sentences need to be clearer]

LAWS & PERMITS

When we started the project in 2009 we did not have in our minds that there are Government laws about the dam and the land. We found out we couldn't just build a lodge because there are laws saying there are sensitive parts around the dam where the tourist can fall and we will be in a problem. We ask for advice to show us those sensitive parts so to show the guides. They said they are going to send surveyors to check the dam boundaries, and if the space we have chosen doesn't touch the dam boundaries they will allow us to build the lodge. But we are still waiting for them. We've met Pumeza Grootbom from Border Rural Committe to discuss the problem. Then we wrote a letter to the Dept of Water Affairs in Port Elizabeth in 2013 to pay a visit. A delegation of the fishery committee will will be responsible for the visit.

CHALLENGES

The first challenge was that an eco-tourism project was not familiar for the community to understand. That is when we took four people from our community and two people from neighbouring villages to pay a visit to Dullstroom in Mpumalanga where fly fishing is happening.

Discipline

A second challenge is that not many people understand the need for self-discipline. For example two students had to be removed from the training course for drinking. Another problem was wasting money training people, only to find that they miss a session at a later stage.

Funding

Another big challenge is funding. We have no funds to train more guides whereas there is a need for them. We have no regular income for the trained guides to be employed under the EPWP and CWP contracts.

We don't have funds to take the project forward for the training of other guides, for equipment like fishing rods, trout flies, or fishing clothes. We are still waiting for response to proposals we have requested like the proposals to Dept of Social Development and Amatole District Municipality.

We do have a boat and a boat house but nobody from our community is trained to drive the boat. Only tourists can drive it at the moment. We see a need of having a driver from our community.

[caption] This is Siyabonga Nkoloti one of our community youth members riding a boat with some tourists and guiding them all over the dam.

[PICTURE OF BOAT]

Laws and Permits

The last challenge is the laws and permits. That is a huge problem we are facing. We do have a boat and a boat house but we cannot use them because of this permit. We are stuck.

CONCLUSION

The project itself is still continuing with over 100 people of Mnyameni Community are still on their jobs.

Some developments have been held up because we are still waiting for those proposals we have made to Dept of Social Development and Amathola District Municipality. We are also waiting for the response from the Dept of Water Affairs and Forestry.

In conclusion I can say it is not easy to start something you do not know about, whereas it is easy to deal with a project you understand. It was very easy to talk about the project as it is but not easy to get other networks. I would like to say to other youth members "Let us pool together."

Tour Guides

For Community

By Pumeza Mqalo

DRAFT

Intshayelelo:

Le ncwadi yenzelwa umntu ongumhlali ofuna ukuba ngu mkhokheli emkhondweni, apha kule ncwadi kukho indawo ebonisa abakhenkethi xa be thatha uhambo.

Ikwa cacisa banzi nge ngohambo mkhondweni kwaba khenkethi, kule ncwadi umbhali ubonisa ukuba abakhenkethi bazindidi funeka uqhelane nabo.

Le ncwadi inganceda nangakubi abantu abanendawo zokulala abakhenkethi naba bandakanyeka imidlalo eyonwabisa abakhenkethi. Inganceda nendlela yabahlali abanolangazelela ngayo abakhenkethi.

Ingaba zeziphi iindidi zemibuzo ozakuyibuza ebantwini (What kind of question you go to ask to people?)

- Ingaba bazi ntoni nge ngotyelelo kunye naba tyeleli?
- Zeziphi izinto ezinokwenza ukuba siphumelele kutyelole apha eCata?
- Ukuba kunobakho abatyeleli singabaphatha njani ukuze bazive bemnkelekile?
- Ingaba zeziphi I (activities) esinazo ezinonika mdla kuzo?
- Kutheni sinomdla wokwenza indawo zotyelelo apha eCata (interesting place)?
- Zeziphi izinto onozenza okanye manyathelo mani onowathatha xa ethe wanezikhalazo umhambeli?
- Xa ifumene umonzakalo kude ncedo luni onoludinga?

Yintoni oyibone ilulutho kuwe (What did I find useful?)

Into endiyifumeneyo ukuba luncedo kum, kufumana ulwazi olubanzi kwi community yam ngo tyeleleo nanga batyeleli. Apha kwi kukho imizi engcina abantu xa bethe baza beyi (group) bangoneli kwi accommodation esinayo aba abantu abazi host baze baxhamle xa kufike abahambeli kwaye baqeqeshwa ukuba babaphathe njani abantu, nakwezo activity ke zenzelwa abahambeli bayakwazi uthatha inxexheba, enye yezinto ebeziluncedo kum kukuma phambi kwabo ndithethe ndibacacisele banzi nge (history) ye community, indawo izinika umdla kubatyeleli Ingxangxasi(waterfalls, toposcope, horse riding ,museum) lonto yandinika I confidence enkulu, apha kwi guiding ndifunde lukhulu kuba ndidibana ne ndidi zabantu abane choices nge choices, ukutya okwahlukeneyo abakutyayo kwaye bayathanda ke nokutya ukutya kwesiXhosa oku kutyiwa apha ezilalini eyonanto bayifunayo kakhuku ku

(experience) ubom esibuphilayo, funeka ungabonakalisi discrimination ke ubaphathe ngoku linganayo.

Pumeza oyi guide unika abahambeli abasuka e Swiden aba ngaba fundi bafuna ukwazi banzi nge Imbali (history) yase Cata

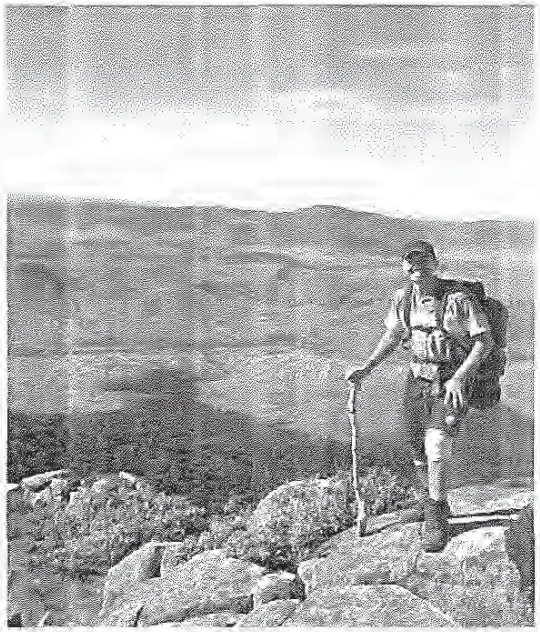
Imbaliso (Narratives)

Lessons

Ndathatha uhambo naba khenkethi siyobuka indalo, bona babezixelele ukuba abafuni ukuhamba namntu ndacela ukuba nceda ngokwam kuba ndicingela ukhuseleko lwabo, ngoba babenga yazi lendawo bafuna ukuya kuyo nee mpawu zendlela zazinga cacanga kakuhle kodwa sade sahamba sabuya kungekho nto imbi yenzekileyo. Balo nwabela uhambo ngenxa yolwazi endandinalo ngendawo nemibuzo ababeyibuza inika umdla kakhulu.

Ngosuku olulandelayo baphinda bafuna uku zihambela bodwa, kodwa ndaban xhobisa ngezinto abasenoku dibana nazo endleleni ezinokuba nobungozi, umzekelo iinyoka ngoba kwa kushushu. Bahamba bendixelela ukuba bacinga bakhuselekile, kodwa ke xa ndithekelela ukuba bayabuya ndaba ntsalela umnxeba ndiba jonga ukuba ba hamba kakuhle

na; kanti omnye wabo ufumene ingozi wophuka umlenze.



U Terron ngomnye wa bakhenkethi abathanda ukusindwendwe apha eCata kwenzeka ethathe uhambo wophuka umlenze.

Lona ngowona mceli mngeni kubakhenkethi abaye bafune ukuzi hambela bodwa. Badibana neengxaki kungekho mncedi onokubahlangula onje ngomkhomba ndlela. Awukho umthetho othi abakhenkethi mabanga hambi bodwa, kukuba cingela nje kuba bengayazi indawo kwaye bethembele kumaphawu endlela, noku funa ukuba bakhuseleke ngalo lonke ixesha. Amaphawu lawo ke anga cacanga ncam.

Challenges

Onye wezihlobo zam wathatha uhambo naba khenkethi ukuya engxangxasini, waba xelela ukuba zingaphi ii yure aba zazi thatha nezi hlangu aba mazi nxibe kuba kukho indawo ezityibilikisayo, ngoba babeza kuxwesa nemilambo. Nyani baye bavumelana ngesinxibo nange xesha, bathi abanayo ingxaki yokuhamba ngenyayo abayifuni imoto kuba bafuna ukugqitha emahlathini kwaye bafuna ukubona indalo.

Kwala xa sele besendleleni ebuyayo, lathi elinye inenekazi lidiniwe alisafuni kuqhubeka nohambo lifuna imoto ekubeni babevumelene ukuba abasifuni isithuthi. Bamxakekisa uVuyo kodwa ke wazama ukuba cacisela ukuba sele bekufuphi kwi Lodge I kilomiters eziseleyo zimbalwa gqithi. Inenekazi alizange lixole yile nkcazelo lagqiba ekubeni lizohlala phantsi lisithi alizokwazi ukuhamba lizolinda isithuthi. Baqhala ke nabanye ba baxhalaba befuna isithuthi.

U Vuyo wenza inzame ebacebisa ukuba isithuthi asizokwazi ukufikelela apho bakhoyo kuba babephakathi ehlathini kwaye kukude ukuba baye ngemva apho ikhoyo indlela yemoto.

Uncedo lokuqala ewalicingayo kukuntsalela umnxeba umphathi wabakhenkethi phaya ekuhlaleni. Wazama ngazo zonke iindlela ukuba thoba umsindo nodinwa ngalo mzuzu behleli phantsi wathatha ithuba wathi ucela bamamele kancinci wabaqala nge mbali yaseCata wabaxelela wababona ukuba bazolile

nomsindo wehlile wababuza imibuzo apha kule mbali ebeyibalisa hayke baqala baqhabalaka bephendula imibuza bekwabuza futhi imibuzo kwalapha ku Vuyo, wahamba waye emlanjeni okufutshane wabakhelela amanzi wabanika basela bathoba unxano nokudinwa baphinda bathathisa endleleni bade bayokufika kwi Lodge.

Kutheni (Why?)

Indi ncede kakhulu kwicala lokuzithemba noku khuphula ulwazi lwam nge tourism. Naxa ufumene I challenges ahamba nabo kuba bafanele ba complain nawe ukuze ube comfortable funeka bakubuze imibuzo.

Ukuphendula imibuzo enzima yabakhenkethi indinike ukuzithemba nokuba ndime phambi kwabantu okanye phambi kwe (group) yabakhenkethi.

Izikhalazo zabo zindenze ndaziva comfortable ngoluhlobo:

- Ndakwazi uku sombulula ingxaki ezithi zibekhona ndize ne (solutions)
- Xa ethe wonzakala umkhenkethi ndinike uncedo lukuqala
- Phambi kokuba bathathe uhambo ndiqale ndiba krobise

Ingaba ikhona enye into ebekufanele ukuba ikhona kule ncwadi (Is there anything that should be in this book that isn't?)

- Imingeni othi uyifumane okanye udibane nayo
- Ulwazi olubanzi malunga ne tourism

Omnye wabatyeleli batyelele ihlathi lase Cata wathanda nokuthatha ifoto

Lo ngu Patrick oyithanda kakhulu indalo utyelele enye yengxangxasi (waterfalls) zase Cata

Apha sibona enye ye guide zase Cata ithatha uhamba nabatyeleli ababini ukuya kwi hearts,uhambo oluzakuthatha intsuku izintlanu.

Sharing and Caring for a Rainwater Tank

Compiled by Sibongile Mputhing

Draft learning resource for Galela Amanzi and the Grahamstown community

Contents

Introduction

What is in this booklet? (and what is not)

This booklet provides basic information on how organizations, schools, households and individuals can take care of their rainwater tanks. It is aimed at organizations and schools with water tanks, and it is useful for the maintenance of a rainwater tank.

The stories included in the booklet aim to connect the information provided on water tanks with real stories of how people in Grahamstown use their tanks and how they take care of them. The real life stories are from people using water tanks in the townships of Grahamstown.

Additional information is provided along with success stories from local people about the best methods of sharing and caring for their rainwater tanks.

There is minor information in this booklet about the installation of a rainwater tank. If you are looking for more information, you can read the *'Rainwater Harvesting for Home and Home Food Gardens'* booklet compiled by Nina Rivers, Tim Wigley and Robert Berold at Rhodes University.

How was this booklet put together?

My name is Sibongile Mputhing. I am a student at Rhodes University and a committee member for Galela Amanzi. Galela Amanzi is a student organization at Rhodes that helps provide water tanks to organizations that work in the areas of Grahamstown that are disadvantaged and where water is less accessible and water cut-offs happen often.

To compile this booklet, I spoke to people at two local Grahamstown organisations that use rainwater tanks donated by Galela Amanzi.

The first organization I spoke to was Umthathi training project. Umthathi helps provide communities with the skills, activities and networks needed for healthy living. Umthathi provides seedlings and develops training to help people establish and cultivate food in their school, community or backyard.

The second organisation I spoke to was St Mary's Development Care Centre. St Mary's provides for the basic needs of local children in a safe and caring environment. St Mary's provides meals, school uniforms, educational support, and after school activities for more than 85 children.

Asanda Klaas is a pre-school teacher at Extension 7.

Asanda collects rainwater using the Jojo tank. She uses the water for their vegetable garden and in the house when the water is cut-off.

What is a rainwater tank?

Galela Amanzi has decided to work with only plastic JoJo tanks, this is the reason why this booklet only contains information concerning plastic tanks. There are other types of water tanks,

for example: underground tanks, corrugated iron tanks or ferro-cement tanks.

Rainwater tanks are big plastic containers that people use to collect water from their roofs. These containers come in different sizes and colours. The tanks which Galela Amanzi installs are the green or brown 5000-litre JoJo tanks.

[Kaylene Booth, Manager at St Mary's DCC] from St Mary's explains that water tanks are a solution to the water problems in Grahamstown: "The tank is very helpful especially as we have no running water here at the Centre."

One of the children from St Mary's commented: "The tank is where we get water to drink."

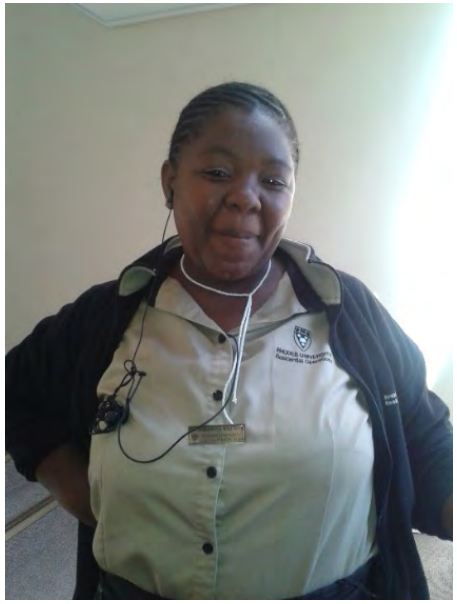
What are rainwater tanks used for?

Abongile Jaca from Lingelihle, a gardener at Umthathi:

"I am using a water tank for watering my garden. The tank is closer to my vegetable garden than the tap."

Rainwater from your roof is a great way to supply water for a range of purposes including washing clothes, flushing toilets and watering your garden. Rainwater tanks can also help you save money on your water bill.

The decision about what to use your rainwater tank for is a matter of personal choice. The use of rainwater to water gardens is common in Grahamstown organizations and schools.



Ntombikhaya Bikitsha is from Fingo location.

"At home we have a rainwater tank and we pay for services. When we use the tank, we are saving money because the services include water, so not using the tap water saves us some money."

People generally use rainwater tanks for water security. They want to know that during a water crisis they will always have water. The rainwater tanks are used as a back-up plan for organizations, schools and households. Some use tanks on a daily basis for drinking and other uses.

People working at Umthathi mainly use the rainwater for watering their vegetable gardens. Community members own vegetable plots at Umthathi, they come in almost every day to water and tend to their gardens. People use watering cans to collect water from the tanks to use on their gardens.

How much water is in our tank?

To check how much water you have in your tank, do the following:

1. Knock on the tank with your knuckle starting from the bottom and moving upwards towards the top of the tank.
2. If there is water where you knock, you will hear a dull flat sound. If there is no water where you knock, you will hear a hollow sound that rings.

Where the sound changes from the dull flat sound to the hollow ringing sound is where your water level is.

How can you receive a tank from Galela Amanzi?

Galela Amanzi tanks are installed by an external contractor, Jon Lisher of Quaflow guttering company. Galela Amanzi does a follow up after the installation to make sure the tank was installed properly.

Requirements to receive a tank from Galela Amanzi:

1. The tank must be used in support of a vegetable garden.
2. You need to provide motivation why the tank is needed.

Wellington Dywilli:

"I would like to have a rainwater tank, especially now in my situation, we have not had water for the past four days."

Why is it important to take care of your water tank?

It is important to take care of your rainwater tank for health reasons and to make sure that the tanks lasts for a long period.

The JoJo tank has a guarantee of 5 years, but if you take very good care of it and protect it from fire and strong winds, your tank could last up to 10 years.

"Our first tank here at Umthathi is almost 3 years old, we got it from our very first sponsors." [Xoliswa Maaotla, Umthathi]

If you take good care of your tank and keep it clean, then the water inside the tank will stay clean and healthy to drink. If you neglect your tank, the water can get contaminated by harmful substances and drinking such water can make you sick.

What are people say they already doing?

At Umthathi and St Mary's they know that it is important to care for their tanks. Umthathi is very organized and everyone is dedicated to their work. People in the Umthathi project appreciate everything they have and want to look after their tanks so they work well and provide clean water for a long time.

"We feel very blessed to have a tank from Galela Amanzi. We show our appreciation by taking good care of our tanks. In my culture, the Xhosa culture, if someone gives you something and you do not take care of it, then that is an insult to him or her. We do not want to insult Galela Amanzi. Siphiwo Frank who works at the nursery cleans the gutters and the roof regularly. We do not have lot of big trees, but dirt still is trapped in the gutters. To be honest, we have not done anything else besides this. [Xoliswa Maaotla, Umthathi].

At St Mary's they recently cleaned their tank, which was donated to them in October 2012 by Galela Amanzi.

"I did not know that you could actually get inside the tank and clean it until I saw the young men doing it. What we have always done is to clean our gutters and the roof. After receiving the JoJo plastic tank, we thought of the idea of getting inside the tank and cleaning it." [Kaylene Booth, St Mary's DCC]

Mud and dirt inside the tank

When Galela Amanzi went to check the rainwater at Andrew Moyake School in Grahamstown, one of the teachers told us that there was mud inside the tank and this was making the water dirty. We went to the tank and opened the tap, the water was brown in colour.

The teacher said that the water is dirty due to the gutters and the roof not having been cleaned regularly. The children also open the lid at the top of the tank and do not properly close it, and this could be another reason why there is mud in the tank.

“Children are very curious. If they see something closed, they will want to open it and see what is inside,” said the teacher.

St Mary’s has a similar challenge, their tank is situated next to a playground which is an open dry field. On windy days, this area is very dusty and Kaylene says that some of the dust could be going inside the tank. When they cleaned the tank, they found dirt inside.

Basic installation and maintenance

To correctly use your tank, make sure it is installed properly. Make sure that the tank is not very close to the ground, so you can easily place a bucket or your watering can under the tap.

A rainwater tank requires little maintenance to keep it functioning and healthy. The JoJo tanks are fitted with a ladder inside which makes it easy for you to climb in and out. A tank must be cleaned out every year.

Base area

It is a good idea to have your tank supported by a flat and level base. Keep the base area free from overgrowing weeds and plants. Inspect the base every 6 months to check for any movement or damage to the concrete-slab or tank stand.

Tank Lid

It is a good idea to keep leaf build-up, soil and sticks off the lid of your tank. Keep your tank lid clean and tightly closed at all times.

Inlet leaf strainer

This is a fine stainless steel mesh, the water passes through this strainer as it enters your tank and is located on the top of your

tank. If your tank has a strainer, it should be cleaned regularly to make sure it does not become blocked.

Sediment build up inside

Over time your tank will build up a sediment layer on the bottom of the tank which is normal. This layer build up is dust that settles out of the water that has run off your roof and gutters. This is harmless and natural. It should not be disturbed or removed until the build-up reaches the tap of the tank (approximately 20 mm thick). This doesn't happen quickly and usually takes take many years depending on the location and environment. A good option is to wait for your tank to be empty. When empty, open the bottom valve and remove the inlet strainer. You can then use a hose through the inlet to stir-up the sediment and allow it to run out. This will not do a 100% job but will remove most of the build-up.

Smelly water

Some people who have a lot of leaves in their gutters can sometimes have a smell from their tank. This is best dealt with by first ensuring the gutter and leaf strainer are clean and then by placing a small amount of chlorine in the tank to kill off the bacteria causing the smell. It is best to use the tablets from a pool supplier, but ensure that you check with them the correct

amount for your tank capacity. The chlorine will disinfect the water and then after a week or so most will be evaporated out of the water. This tablet can also be bought from the pharmacy.

First Flush Diverters

If you have a first flush diverter installed, occasionally unscrew the cap at the base of the diverter and remove the filter. Wash the filter with clean water. There is also a flow restrictor inside the cap which should be removed and washed. Re-fit the flow restrictor, filter, and screw the cap back on. Remember that regular maintenance will improve the water quality and extend the life of your system.

[PTJ green plumbing]

Who is responsible for taking care of a shared water tank?

Galela Amanzi installs rainwater tanks, but leaves the responsibility for the use and care of the tanks to the owners. This can cause some conflict sometimes.

The story below shows why it is important to think carefully about who is responsible for and who has access to the water tank.

Galela Amanzi donated a tank to the Sun City community, the tank was installed at Sun City Crèche where the community garden and the schools garden are next to each other. Everyone was happy to receive the tank and seemed to be working together in harmony until one day when we received a phone call from Sheila, a member of the Sun City community.

After the tank had been put up there was very little progress in the garden. There was planting once, but not much monitoring, and after the first harvest was picked there was nothing done . There were a lot of weeds and the garden was left desolate. The correctional services also came to help at some point.

The tank belongs to the Sun City community, but the property is the school's. Mrs. Nortji (Sun City Crèche) said they were closing their gates because there were seedlings being stolen out of the garden. Also, people that used the community hall misused the

garden and pulled potatoes and carrots from the ground, leaving them scattered on the floor.

Galela Amanzi had to mediate. Galela Amanzi called a meeting with all the people involved. At the meeting, Sheila said that it was not fair that the gates were being closed because the water tank belonged to the community not just the school.

Galela Amanzi stated that we expect things to be taken care of by the community. There are 19 members of the Sun City community development group (garden group), and we think that it is a good place to start, and both parties should look into it.

One other requirement to receive Galela Amanzi tank is that there must be a person who will look after the tank and be responsible for the garden.

Where can I find out more?

Contact Galela Amanzi project coordinator on galela.amanzi.ru@gmail.com / manosa.nthunya@gmail.com or phone Anje Niemandt on 079 253 6152

Visit http://www.ru.ac.za/communityengagement/svp/studentinitiatives/galelaamanzi

Acknowledgement

I am grateful to Jane Burt the course coordinator and Monde Ntshudu the logistics coordinator for their assistance. I am grateful to households and organizations that participated in this booklet. Gratitude goes to a number of people for comments on my earlier presentations of these ideas, the course mentors. Also thankful to Treve Jenkins for his input and assistance.