Section 2

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South Africa Case Study

Acronyms

ANC	African National Congress
BOT	Build, Operate Transfer
CBD	Central Business District
CBO	Community Based Organisation
CBS	Community-Based System
CDW	Community Development Worker
CMA	Catchment Management Authority
CMA	Catchment Management Agency
CSIR	Council for Scientific and Industrial Research
CT	Cape Town
DEWATS	De-Centralized Water Treatment System
DWAF	Department of Water Affairs and Forestry
DWR	Durban Water Recycling
EMA	eThekwini Municipal Area
EWS	eThekwini Water and Sanitation
EWS	eThekwini Water and Sanitation Service
FBW	Free Basic Water
GDP	Gross Domestic Product
GEAR	Growth Employment And Redistribution
GIB	Groenland Irrigation Board
GIS	Geographic Information System
GWUA	Groenland Water User Association MDG – Millennium Declaration Goals
HSRC	Human Sciences Research Council
IDP	Integrated Development Plan
IFP	Inkatha Freedom Party
KZN	KwaZulu Natal
KZNW	KwaZulu Natal Wildlife
MIG	Municipal Infrastructure Grant
MSP	Municipal Services Project
NGO	Non Government Organisation

NPA	National Ports Authority
NWA	National Water Act
PRG	Pollution Research Group
PTP	Package type Treatment Plant
RDP	Reconstruction and Development Programme
SA	South Africa
SAB	South African Breweries
SAPREF	Oil refinery located in the South Durban Basin
SASOL	Oil refinery located in the South Durban Basin
SDCEA	South Durban Community Environmental Alliance
TWK	Theewaterskloof Municipality – comprising the head office in Caledon and the administrative arm overseeing services in Grabouw.
UAW	UnAccounted for Water
UD	Urine Diversion Toilet
UNDP	United Nations Development Programme
VIP	Ventilated Improved Pit (latrines)
WESSA	Wildlife & Environment Society of South Africa
WFWP	Working for Water Programme
WISA	Water Institute of Southern Africa
WRC	Water Research Council
WSA	Water Service Authorities
WSDP	Water Services Development Plan
WSP	Water Service Provider

'boetie-boetie' system - System of 'favours' for people who know municipal officials

Preliminary Coding Frame for Data Collection and Analysis

In South Africa, the social and institutional contexts -where conflict, competition and cooperation occur over the shared water resource - vary widely. This variability is related to the highly uneven social landscapes residual from apartheid era inequalities. They are expressed in spatial as well as social terms, not limited to various forms of ghettoization, infrastructure legacies and regimes, as well as race, ethnicity, class, age, and gender cleavages.

The case study portion of the research, then, sought to generate two preliminary coding frames comprising issues around which conflicting perceptions of the water resource could be expected to vary. The frames correspond to two 'most different cases' selected (see section on case selection below) and in both cases were based on independent preliminary assessment field work. That is, they are based on preliminary context-specific observations as well as familiarity with nation-wide debates more generally (see preliminary hydropolitical map).

This coding frame informed the creation of an open ended questionnaire designed to afford latitude for informants to comment on these issues, as well as leave room for new and unexpected information. The frame also informs the system to be used, ultimately, to segment data (interview material) for the creation of the situational, social worlds and positional maps detailing and rendering accessible the hydropolitical constellations. In the end, however, the framing process was expected to be iterative and recursive. That is, the data gathered was expected to both map onto and to challenge the preliminary frame, and that new, previously unperceived axis of conflict, competition and cooperation would also become apparent during coding and triangulation processes.

Triangulation refers to subjecting the coded data to a number of different ways of interpreting the data to make sure that no good reason exists for doubting the results. Triangulation, however, comes in at a later stage of data analysis and (re)synthesis.

The scope of the questionnaire was also bounded by the parameters of the study commissioned. These boundaries were: representation of self (in relation to water use), representation of people (in relation to water use), the dominant scalar level used in mental models, representation of water, perceived drivers of change, water use, perceptions of access, and perceptions of allocation mechanisms. That is, questions were also designed to elicit a range of perceptions related to these nine components of hydropolitical landscapes.

As noted, two 'most different' cases where chosen: 1) Mseleni Water Project, Umkhanyakude District, KwaZulu Natal, and 2) Grabouw, Theewaterskloof Local Municipality, Western Cape. Researchers identified the following issues as potentially important (these categories are explained in greater detail below in the Case Study Briefs):

Mseleni: Issues for Preliminary Coding Framework

Gender

Although water is considered a 'women's issue' women have less representation and voice, of particular concern was lack of female representation in traditional authority structures, through which all local development practice is channeled.

Traditional Governance

Traditional governance systems have a great deal of influence over day-to-day life. Although not formally acknowledged in the national and municipalframeworks for water resource management and water service delivery, the influence is recognized by local actors in the sector.

Race

During apartheid, it was considered 'a luxury' for Africans to have piped tap water and few steps were taken to provide water for them. The small professional of (mostly white) medical professionals have access to fully reticulated systems.

Environment

Water for the Mseleni water project is extracted from Lake Sibaya, a delicate ecosystem. The Institutional conditions under which the Mseleni Water Project extracts water from the lake remain complex and *ad hoc*.

Religion

The professional community at the hospital and the Zulu community are deeply religious and conservative. In the community at large, people who were not religious were sometimes described as 'bad people'. In adjacent communities, local pastors were asked to recommend potential beneficiary households.

Disability

A condition known as Mseleni joint disease is indigenous to this area of South Africa. Physical disability makes accessing water more difficult and disabled and/or elderly people are more likely to pay someone to fetch water for them. Disability can improve access through other channels as disabled people in receipt of a state pension are among the richer strata of the community.

Wealth

Wealth influences access to water by determining how much people can afford to pay for water, as well as level of service. The fieldworker observed wealth/success to be a source of jealousy and it was reported sometimes conflict in the community, people who were doing well had had property damaged and/or stolen.

Proximity

Some isigodi (traditional boundary) and some households are better served than others by the Mseleni water scheme; those closest to the hospital are best served and appear unwilling to ration their usage to help regulate water pressure for the scheme as a whole.

Access to land/agriculture

Land in the case study area is held in trust by the inkosi (traditional leader), for the people of his tribe. People are allocated land for homes but do not own the title to the land and are not able to ´sell´ it; likewise land for agriculture. The fieldworker believes that land is allocated primarily to men. In the surrounding area land is used for commercial forestry, commercial agriculture (sugar cane, citrus, cotton, nuts, vegetables) and there are two National Parks nearby: Lake Sibaya and Sodwana Bay.

Technology

The Mseleni water scheme operates and maintains a piped reticulation network (140km), water treatment plant, bulk and secondary storage reservoirs, which is a state of severe disrepair and which provides only limited coverage. Radical repairs are required.

Various levels of water service exist throughout the area, from reticulated systems near to the source of the scheme to off the grid wells. Distinctions of health and wealth map well onto the limits of the scheme.

Corruption was noted in the tanker supply system to outlying areas.

Municipal Governance

The local municipality is not well capacitated to provide basic services to communities within their jurisdiction and is seen as a barrier by most stakeholders.

Community Participation

A community elected water committee is currently managing the Mseleni water project. They are not well-capacitated. 6 out of 7 members are male. Members were elected in 1999 and no election has taken place since, despite the constitution stipulating re-elections should be held every 2 years. There is also a parallel committee.

Grabouw: Issues for Preliminary Coding Framework

Cost recovery

Limited cost recovery of rates and service charges threaten the financial viability of the Municipality. Some municipalities wrote off the apartheid debt, but the former Grabouw municipality did not. There is a large amount of accumulated debt in these areas. Some household have been placed on punitive water restriction regimes, which challenge the legitimacy of the post-apartheid regime. The apartheid regime did not place restrictions on water use.

Income, unemployment and poverty

Most employment is based on seasonal fruit farming and fruit-juice producing industries. Unemployment may be as high as 70 percent after the fruit season. Unemployment and poverty exacerbated by demanding service payments is placing strain on relationships within households, amongst the community and ill will towards the municipality.

Racial tension

Tensions exist between coloured people in established low-income (former township) households (subject to new cost-recovery regimes) and black squatter camp residents with free stand-pipe water (which often runs freely into the streets due to stolen taps).

Apartheid planning/ geography

Apartheid planning, or lack of, has meant that there are widely differing services and delivery technologies offered to different communities within the municipality.

Gender

Traditional gender roles, as well as broader gendered asymmetries mean that lack of access to water places a higher burden on the women in the household.

Municipal governance

A breakdown of communication between households and the municipality is evident. There is a strong sense of disillusionment with the municipality as a result of inconsistent and inflexible payment options.

Community participation

Grabouw is part of a Ward Committee System that relies primarily on Ward Councillors to disseminate information to the community. The lack of commitment of certain ward councilors has lead to uninformed communities. The introduction of Community Development Workers could signal an improved communication system.

Environment

Gabouw's average rainfall is 670mm per year, although in 2004 a local water source dried up affecting a water-based business in the area. There is no water saving scheme in Grabouw given the increasing demand on water for household use. Grabouw is surrounded by a number of protected water sources.

Other Sources of Conflict

Other potential drivers of conflict and/or co-operation are the elderly; political power struggles; the rural-urban divide; the broader Elgin vs. Grabouw town rivalries; formal vs. informal business; and, slow economic growth that cannot support population growth.

Selection of Cases

It was expected that hydropolitical dynamics would vary with highly divergent historical, cultural, economic and social experiences. In this light, we have selected two case studies (as per scope of work) in order to capture a range of complexities and textures from South Africa's highly divergent scapes: one in KwaZulu Natal (Umkhanyekude) and one in the Western Cape (Theewaterskloof). In-depth descriptions of these cases are provided below.

The KwaZulu case is deeply rural and largely undeveloped. It comprises primarily black Zulu speakers, a distinctive and highly coherent South African ethnic group. It is part of what was formerly known as Zulu Land, a semi-autonomous tribal zone. Traditional authority structures remain intact and continue to govern most of daily life and the allocation of resources. The formal economy is weak and unemployment is the norm. Formal educations levels extremely low. Coverage by the formal water scheme is extremely limited, and the scheme is in advanced state of disrepair. Responsibility for the scheme remains a complex mix of pre- and post apartheid institutional and operation and management regimes. Significant reform is required.

In contrast, the Western Cape case is predominantly a 'coloured' former apartheid township area, which was well integrated into apartheid-era social and economic systems. The area is comparatively *well off* – at least according to the statistical data - although the case study brief brings both of these claims made in the official data into question. The lines of responsibility for

water services and operation and management models are clearly drawn, and the municipality *nominally* has the resources and infrastructure to deliver both water and sanitation services. The area has consistent seasonal employment opportunities and a tax base owing to a well-established agricultural sector and related production, such as *Appletizer*. Yet, unemployment levels remain high and educational levels low. HIV-AIDS and alcohol related diseases are widespread. The area has experienced a massive influx of people from around the country (mostly Khosa speakers), in search of seasonal employment. Many live in proliferating squatter camps rimming the area.

9 Draft Hydropolitical Map

By Dr **Zoë Wilson, Eleanor Hazell with general project research assistance from Chitonge Horman, Amanda Khan, Emeka Osuigwe, Horacio Zandamela Research Director: Dr Julie Trottier**

9.1 Introduction

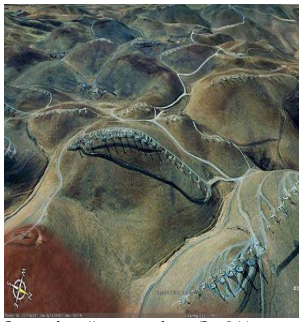
This chapter is designed to form the basis for the development of a methodology to map South Africa's hydropolitical context for the purpose of developing empowering mapping tools to be used at the policy, implementation, community, household and individual levels. The emphasis is on people; how people understand their water needs and how these map onto resources and capacities. The chapter first proceeds through a theoretical discussion of maps, their key features and functions – both intended and unintended. These sections are accented by various examples of types of maps. The chapter then continues with a discussion on why situational maps are an effective tool for mapping conflictual, competitive and cooperative landscapes. Their main strength lies in elucidating complexities within the shifting and unstable empirical world. Such maps have proved useful in making the 'usually invisible and inchoate social features of a situation more visible' (Clarke 2003: 572). Finally is discussion of the relationship between maps and interests (maps and power), and how interests are expressed in often subtle embedded ways. This is then correlated to a preliminary discussion of the methodology being developed by this project for case study research, including a special section on tackling multiscalar issues. The chapter concludes with some examples from the progress in the broader hydropolitical mapping project already underway, including groundwork for the social world maps and preliminary situational map. It is expected that the hydropolitical maps and mapping tools developed will provide valuable knowledge for decision making on water related issues.

General Reference Map

Source : http://www.lib.utexas.edu/maps/africa/south_africa_reliefmap.jpg

9.2 Theoretical Discussion of Maps

Digital Map of Wind Turbines in US



Source: http://www.sprol.com/?p=244

9.2.1 Types of Maps

For much of human activity, knowing where things are is essential. Maps extend the ability to know information that is either too remote, abstract or disperse to be directly known. Maps, then, are a vehicle for the transfer of information that cannot be directly experienced. Thus, mapping is also a process of representation that results in knowledge that did not exist before.

At its most general level, the key challenge for map making is one of representation. Representation requires generalization, a process of simplification that requires de-emphasizing or eliminating what is *irrelevant* while emphasizing what the map maker has identified as critical information. As Mark Monnier notes, however, any 'in single map is but one of an indefinitely large number of maps that might be produced…from the same data' (in Wood 1993: 1970). In other

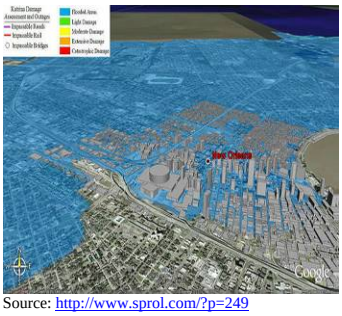
words, mapping is more than a process for transferring knowledge, it is also – and perhaps more commonly - a process of constructing knowledge.

Following is a list and short description of some of the most commonly used, but not mutually exclusive, types of maps (in alphabetical order):

Boundary maps: These are the most common of all thematic maps. They tend to represent either proprietorship or political boundaries and include: 'maps of treaty organizations and national borders; maps of provinces, territories and states; maps of boroughs, counties, parishes and townships: maps of towns and cities, neighbourhoods and subdivisions: maps of water and soil conservations districts, maps of garbage collection routes and gas service districts; fire insurance and land use maps; precinct maps; tithing maps; congressional district maps; maps of jurisdictions of courts…' etc (Wood 1993: 11).

Digital Maps: Today, most digital mapping forms are subsumed **geographic information systems (GIS)**. This is relatively recent. Digital mapping first emerged as a response to the information production and synthesis demands of the modernizing western states of the 50s and 60s. The achievement of fully digitized production then gave way to an emphasis on database management and software development. In particular, from a properly managed and updated digital database, a user can now generate very quickly any number very specific maps, and overlay this information on base maps, making it readily useable. What was once a painfully slow and time consuming process, is now flexible and quick. "Although the advantages of digital systems for geographical research figure largely in the literature, it should be appreciated that the main users are of such systems are concerned with management and administration rather than research' (Keats 1997: 275)

Katrina's Advance



Source: http://www.sprol.com/?p=249

The 20th Century saw the emergence of environmental - and often explicitly political – maps.

Environmental Maps – For much of the history of maps, they have concentrated on human activity within an idea space that saw such activity as beneficial, evidence of the proper use of natural resources to improve the world. Thus, to map more roads, town, city density, the expansion of utilized areas and sharp distinctions between inhabited and park areas, was to reveal the march of progress. Gradually, the last few decades of the 20th Century saw the emergence of environmental - and often explicitly political - maps designed to reverse this trend. "The emphasis was on interdependence, on the manner in which the environment linked often very distant communities, and was in part a reflection of such linkages." (Black 1997: 81). The hallmark of an environmental map, then tends to be boundaries that are not absolute, but rather mark transitional zones between environmental processes and/or the interface between those and human processes (Wood 1992: 25.

General Reference Maps: These tend to represent the world using *conventional* symbols – that is, symbols that look substantively similar to what they represent. They attempt to come close to the world that we actually see, or might see from the window of a low flying plane or mountain top. They point towards the world we know.

Mental Map: The neuronal circuits of the brain which actually 'store' information do not have a scale, thus 'features on a map are recorded in relation to their relative positions.' The true scale only becomes apparent when the scene is apprehended in reality. Where no direct experience of the phenomena is possible, the burden placed on the map is intensified. 'As the 'true' or real size of the continent [for example] cannot be visually imagined, concepts of large areas are more of a schematic framework for locations than a picture that can be recognized. Although the term 'mental map' is often applied to such internal representations, they are quite unlike maps because they are personal, fragmentary, incomplete and presumably frequently erroneous. Indeed, one of the main reasons for making maps must be that 'mental maps' are inadequate as useful stores of locational information' (Keats 1997: 57). Quite evidently, all humans make and deploy mental maps. Yet, the '[r]elationships among spatial cognition, the ability to make maps, and their actual production are not straight forward, and the failure of the latter cannot be taken to indicate an absence of the former' (Wood 1993: 33).

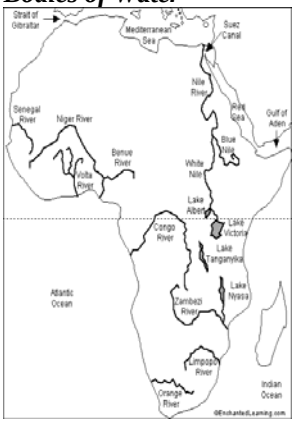
Narrative Maps: These maps tell a story, they narrate through space and time from one place to another. They may even narratenew social, political or economic orders, a way from where we are, to where we want to be.

Situational, Social Worlds/Area, and Positional Maps: The emphasis is on documenting heretofore invisible localities, partialities, positionalities, complications, tenuousness instabilities irregularities, contradictions, heterogeneities, situatedness and fragmentations. In other words, complexities, heretofore unstudied – even unseen. These maps make use of Strauss' cartographic approaches: situational, social worlds/arenas and positional maps in order to elucidate complexities within the shifting and unstable empirical world. Such maps have proved useful in making the 'usually invisible and inchoate social features of a situation more visible' (Clarke 2003: 572).

Special Subject Maps: What is included and excluded is not left to the cartographer's discretion, nor is the conceptualization of representation open to the cartographer's interpretation. Rather, special subject maps are bound by agreed upon standards and conventions, and must meet the needs, interests and standards of generally well known and defined groups. 'Once the purpose and scale have been agreed, then a whole range of specific features have to be included.' (Keats 1997: 135).

Thematic maps are general or popular maps with a clear emphasis, such as vegetation, climate, or cities. However, while they tend to advertise one theme, there are typically a number of maps in play.

Major African Rivers and Bodies of Water



source: http://www.enchantedlearning.com/africa/rivers/outlinemaplabeled/

Thematic Map: Thematic maps are general or popular maps with a clear emphasis, such as vegetation, climate, or cities. However, while they tend to advertise one theme, there are typically a number of maps in play. For example the vegetation map of Europe, must necessarily provide one or more representations of the boundaries of and/or within Europe.

Topographic Map: Such maps represent the features of the landscape on the Earth's surface, but also tend to include many invisible of political features, such as boundaries, and intangible features such as contours of the earth itself. These will always tend to be only a small proportion of the total number of features that could be represented (Keats 1997: 100). '[E]ven in those cases where the landscape is essentially similar (as in much of Northern Europe), both the content and the representational methods of map series produced in different countries show interesting variations' (*ibid*.: 256) .

Ultimately, very generally, maps can be categorized as 'multipurpose' or 'specialized'. General or 'multipurpose' maps, independent of their unique features, draw upon codes and symbols that are likely to be understood by the user without any specialized knowledge. That is, that the target map user is 'average' in any particular society. In this case, it should be more or less obvious to the user that some generalizations are in fact distortions of considerable magnitude. Yet, even here, as Coulson (in Keats 1996: 106) has pointed out, 'A pervasive characteristic of in the perception of maps (and for that matter diagrams) is the apparent objective, factual nature of the image presented.'

Specialized maps are concerned with representing knowledge particular to a discipline, trade or other area of expertise. This will affect how space is represented, the concepts designated by the symbols and the interpretative framework - or in other words, the units, the relationships between them and the context within which these have meaning. To the general user, generalizations and distortions will not be apparent. The uninitiated user will be insufficiently aware of the connections between the units of information, scale and principles of generalization at play to know the relationship between the map and the data being represented.

The difference between multi-purpose maps and specialized maps are, to some extent, contextual. For example, applying maps cross-culturally and/or across other social divides can situate an otherwise multi-purpose map as a specialized map.

A further caveat relevant to both multipurpose maps and specialized maps is that good information can be badly presented, while bad information can be well presented. This presents a special problem for strategic map use, in that the fall back position of casual map users tends to be one that assumes not only that information represented has scientific integrity, but that it more or less perfectly replicates reality at scale.

9.2.2 Understanding Maps

On the surface of it, using maps – at least generic maps – seems relatively straightforward. The codes and representations are familiar, as is type terrain. We know its features, the legend, the index and so forth. It is relatively straightforward to find a route, a city, a country, a continent. Yet, most of us would also admit to having been dissatisfied with maps. Perhaps things are not where they are supposed to be; the emphases and/or relationships appear skewed. This is our first indication that maps are more than what they seem. They are more than mere representations of reality. Keats (1996:3) notes that 'looking at a map is highly complex, and involves a whole sequence of processes, not all of which are perfectly understood.'

The story of the Peters Projection

The notion of a map space being larger or smaller than a country is a strange one. Yet, it lies at the heart of one of mappings most sensational controversies. The Mercator projection – the map of the world with which we are most familiar – presents an essentially distorted picture. Placing Europe at the centre, it also exaggerates the size of the temperate latitudes, therefore exaggerating the land mass size of the northern Hemisphere (Black 1997: 31-34)

At least two categories of processes intervene in how a map represents, or fails to represent, reality effectively:

1) Capacity to distinguish the map from reality, and

2) ability to interpret the visual structure of the map.

One's place, vis à vis the map is probably one of the most important determinants of the maps meaning. Richard Dennis, for example, in his study of nineteenth-century English industrial cities notes that " 'insiders', such as slum dwellers, and 'outsiders', such as medical officers, were unlikely to see things in the same way, or even agree on what they should be looking at" (in Black 1997: 23). That is, maps assert knowledge about reality (and become constitutive of that reality). Yet, there is a modern tendency to assume that because some kinds of accurate maps are possible, that all maps share the property of accuracy. For example, Keats notes that: 'Whereas at one time it was obvious that many items on maps were fictitious or imaginary, one result of the power of modern surveying is that correct maps of the topography are known to be possible.' Because of this, Keats argues, we have acquired the habit of assuming that other kinds of maps, even where their information, scale and projects are of quite another order, also have the same level of accuracy. Conversely, in fact, large scale maps tend to be compiled from a number of disparate sources, each of which has made important decisions about what to generalize, what to omit and what to emphasize. As such '…any simple notion that areas, distances and direction can all be 'correct' is quite untenable (Keats 1996: 97). However, because the tendency is to assume that maps represent reality in relatively straightforward ways, normative claims are often exceedingly difficult for map users to filter effectively. Related distortions are read in complex and unintended ways as users enter the paradoxical space of contesting what is presumed –even by themselves – to be fact.

While maps often give the impression of being self explanatory, the features they have and symbols and symbolic systems they use to convey information are merely marks to those who do not know the code.

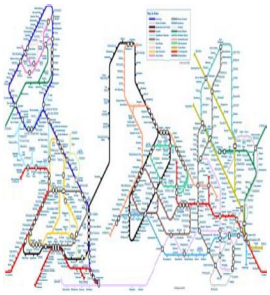
One way to counteract this is **basic map literacy**. This relates to the users ability to 'respond to the visual structure of the map, the ability to make inferences from geographical evidence, and the amount of

geographical knowledge that can be recalled' (Keats 1996: 5). We might also add the type of geographical knowledge that can be recalled. 'The interpretation of the map also depends on understanding the meaning of the signs on the map, how these relate to the phenomena they represent, and the graphic structure in which they appear' (67). That is, a map's meaning is expressed through its key features and the relationships between them. Maps make assertions, and those assertions are embodied by the map. Maps are *en*coded. As such they viewer has to be able to *de*code them, if they are the read the map and its message - effectively.

Section 2.3 provides a break down of some of the features and codes found in typical maps.

9.2.3 Key Features of Maps

While maps often give the impression of being self explanatory, the features they have and symbols and symbolic systems they use to convey information are merely marks to those who do not know the code. Similarly, to the inexperienced map user, features and symbols can sometimes easily be misread, as Keats (1996: 98) notes: 'intricately detailed representations, however inappropriate to both scale and generalization, may give the superficial impression that the map has been produced with great attention to detail, and can therefore be regarded as correct [rather than aesthetic]'. Thus, maps as a source of information are inherently limited by the how their sign system works and how effectively people are able to use it. The same can be said for language. The comparison to language would make mapping amenable to borrowing from the sophisticated tools for analyses developed by linguists and semioticians, such as Barthes, Strauss, Mills and Fairclough – at a later stage. At this point, it is important to highlight some of the key features and symbols that comprise the basics of map literacy.



Map Using Iconic symbols. Source: http://www.flourish.org/upsidedownmap/

For purposes here, 'features' are defined as those map elements that mark the communicative form as a map or that are otherwise typical features of maps. These include scale, legend, signs (such as a broken single green line indicating hiking trail) and index.

'Symbol' and 'symbolic system' refers to those elements that characterize meaning. Symbols tend to be expressed by their relationship or reference to conventional meaning systems and by their relationships with other symbols. For example, a red X might be taken as a symbol for stop. A red X at the entrance to a highway sign might be taken to indicate that it is not open to the public. Clearly, the meaning of symbols depends on an *agreement* or common understanding between the map maker and user. As such, they can function in an almost unlimited number of ways, including organize and arrange space, stand in relation to or give meaning to other symbols, make or reinforce assertions, draw attention to or away from certain elements of the map, or difference, reinforce abstractness through iconic signs (closely resembling that which it represents) or generate familiarity through conventional signs (only abstractly resembling that which is represented), and so on.

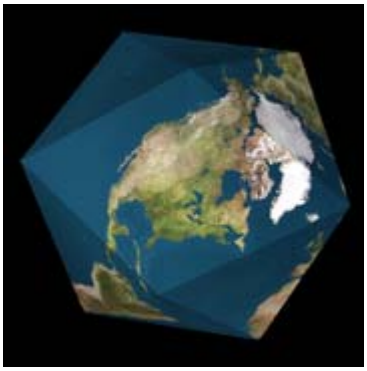
Elements of maps can also serve more than one function, simultaneously as features and symbols.

Features:

Setting: This is the landscape to which all other features and symbols apply. The setting must simultaneously be a relevant outlines as well as include enough detail about the space that we can locate the critical features of the in space. All of this, however, must be subordinate to those critical features.

According to Szegő (1987: 53), the major components of the typical setting include:

1) Hydrographic elements
2) Political boundaries
3) Elevation data and the shape of the terrain
4) The characteristics of the vegetal covering
5) The man-made elements of the civilized landscape – buildings, and clusters of buildings such as town and villages, roads, railways, man-made waterways, cables for the transmission of electricity and information.



The Dymaxion map of the Earth is a projection of a global map onto the surface of a three-dimensional regular solid, which can then be unfolded to a net in many different ways and flattened to form a two-dimensional map which retains most of the relative proportional integrity of the spherical globe map. It was created by Buckminster Fuller, and patented by him in 1946.

Source:
http://en.wikipedia.org/wiki/Dymaxion_map

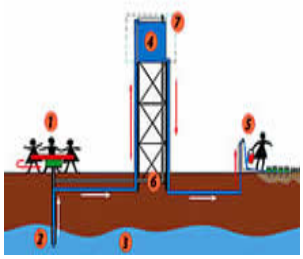
Scalar level: Scale is the ratio between the size of something and the representation of it. It distinguishes between the large and the small. It involves important tradeoffs between the quality of features and symbols and the extensiveness over which they can be represented. This is because area of coverage trades off against level of detail. Further, 'what is considered a suitable level of generalization for a map at a given scale is not constant (Keats 1996: 289), thus maps that draw off other maps for their information come to include increasingly complex generalizations and distortions. This is a particularly important issue with respect to social and environmental processes, which play themselves out at different scales but can only be represented through highly complex mapping processes. When mapping gender for example, complexity at level of lived experience tends to be lost – or at best inadequately and unevenly expressed - at national and international scales.

Projection: A projection is a flat two-dimensional representation. Because the word is not flat, but round, the larger the land surface being covered, the more the projection inevitably distorts. Most commonly maps are made rectangular to fit onto a standard page. Black (29: 1997) notes, however, that 'rectangular maps deprive the world of its circularity: they make each parallel and meridian appear as straight, instead of circular.' In that distortion is an inherent feature of projection the process is open to manipulation in favour of the purpose of the map. For example, the Mercator Projection (1569), originally designed for global navigation 'treated the world as a cylinder, so that the meridians were parallel rather than converging at the poles.' To compensate, land masses are distorted, 'greatly magnifying temperate land masses at the expense of tropical ones.' This would have seemed accurate, however, to most people at the time who understood their known world to predominate in more ways than one.

Legend: The legend is typically a text box insert that provides explanations of some of the symbols found in the maps – but never more than a small portion of them. The effect can be to imply that those elements and symbols that do not appear in the legend are self-explanatory. Yet, this is only rarely the case. Thus, it is important to look to the legend for meaning, but also to look to what does not appear in the legend for meaning – even if this meaning is by virtue of not appearing in the legend. Wood (1993: 101), for example argues that '[legends] put into words signs that are so customary as to be widely understood without words, while leaving map images themselves littered with [difficult to articulate] conventions.'

Index: The index is an insert with a list of, usually street names in alphabetical order. These correlate to sections on the map, labeled across the top A thru X and down the left 1 thru X. In a functional sense, the index greatly facilitates the location of streets and places. More subtly however, Black (1997: 13) argues, the complexity of urban life is rendered as a uniform background of streets, while other important information, such as density of traffic are neglected. 'Far from being composed of neighborhoods, the city is a sphere of distance to be negotiated, indeed overcome, by road. More generally, the structure, typology of activity in the city is neglected.' Thus, more generally, the index foregrounds a particular relation of form and function.

Play Pumps

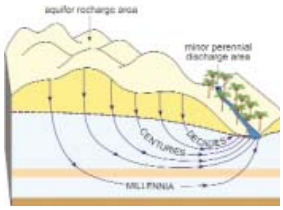


Source:http://www.roundabout.co.za/main_the_playpump.htm

Iconic or Conventional signs: Signs can either be abstract or resemble what is that they represent. For example an iconic symbol for a forest might simply be a cluster of circles, while a convent symbol would be a small cluster of tree shaped signs. Conventional symbols are usually easier for lay map users to understand, and thus appear often in tourist and publicity maps, such that their presence might be taken to indicate a promotional purpose.

Generalization: Maps represent, and as such must make distinctions. 'What the cartographer is trying to do is to provide a legible, coherent version appropriate to the smaller scale' (Keats 1996: 289). This is not a straightforward task, but depends upon interpretation and judgment. 'The procedures involve eliminating whole classes, selective omission of some features, simplification of lines and outlines, and frequently combination, exaggeration and displacement.'

A map is a snapshot in time. Yet many phenomena –such as climate – cannot be accurately represented outside of the spatial and temporal issues inherent in the data.



Source: UNESCO World Water Report, 2003: 80.

Symbols and Symbolic System:

Interpretive Framework: Maps combine factual information with symbolic representation. Their primary concern is typically to provide accurate locational information, usually expressed in mathematical relation to other landmarks in the field. The messages or meanings communicated through this representation must also express some intellectual coherence. To do this effectively, they are guided by a set of conventions or rules. This interpretative framework helps to guide the user to realize the meaning of the relationships between certain objects in space. However, no matter how disciplined the interpretative framework is, it will also be rich in possibilities.

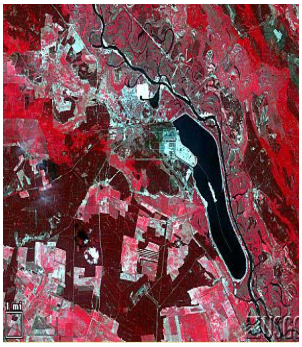
Time: A map is a snapshot in time. As such, maps tend to freeze processes at a particular stage of their motion. In doing so, they can

give the impression of immutability or timelessness. Yet, depending on the map's purpose, many processes – such as climate - cannot be accurately represented outside of the spatial and temporal issues inherent in the data. Attempts to do so are more limited than the detailed nature of the map may suggest.

Motion: Often the symbols in the map are mobile such as currents, weather patterns, etc. Movement can be represented in a number of ways, such as regular, irregular, eruptive, and periodic. Things that move can also vary from the simple to the complex. Thus, overall, as Szegő (1987: 63) notes, 'the pattern of movement defining the area can vary from the irregular movement of an individual…to a complex, regular pattern of movement in highly-complex network of communications where the actors include a large number of individuals, transfers, etc.'

Thematic Constituents: Every map has a theme. These can be overt, in, for example, a Map of South Africa's Major Rivers. Thematic constituents can also be more subtle or deeply interwoven with other themes and taken for granted conventions. For example, a map about South Africa's Major Rivers might also include provincial boundaries and dense road system, but not climactic zones or vegetation.

Roster of Names: Names are an essential means of specifying place on a map. Yet, the connection between any feature of reality, a name given to identify that feature and the symbol used to represent it on a map is open to interpretation. They can be loaded with emotional, evaluative and prescriptive content (i.e. Liberation Square, Danger Bay, etc). According to Keats (1996: 81), they present endless problems. For example, '[p]lace names are unsystematic, arbitrary and frequently ambiguous. They are unevenly distributed, repetitious, and incomplete. They are only valid amongst users who are familiar with them. They are circumscribed by the organization of particular language and script, and although they are 'linguistic' cannot function through translation' (Keats 1996: 81). Names, then, can only function in relation to the other features (i.e. setting) and symbols in the map.



Chernobyl in 1986 - The worst nuclear accident ever happened right here about a month before this photo was taken.

Source: http://www.sprol.com/?p=46

Colour: Maps are a form of art. One of the most important aspects of art is colour, chosen for both its representational and emotive value. While maps tend to use colour mainly for contrast – and to some extent their natural associations, such as blue with water – the symbolic use of colour is also an important variable in map meaning.

Critical points: The mapping process is one that makes it possible to re-present space in order to make certain elements of the social or geographical space more apparent, to give them a clearer material dimension, a place in space. Thus, each map must be careful to emphasize its critical points, such as the utility of meridian lines for navigation in the case of the Mercator projection, or the entirety of the drainage basin in the case of catchment maps.

Silences: Critical points are also expressed in silences – what the map omits, doesn't say. For example, maps tend to assert boundaries. A map of state boundaries might ignore or omit other transnational phenomena, such as forests and catchments, in order to naturalize and reinforce the legitimacy and primacy of the boundary asserted. Silences may also express long standing biases of the mapping tradition or the limits of technology, as commentary of

Supposedly Google Earth is so accurate that it endangers troops in Iraq. Those who make such claims forget that satellite photos to that level of detail cost a lot of money and take years to gather. The globe you see under your mouse pointer is a patchwork of images harvested over the past two years.

mapping's latest innovation Google Earth suggests: "Supposedly Google Earth is also so accurate that it's endangering our troops in Iraq…They [those who make such claims] forget that satellite photos to that level of detail cost a lot of money and take years to gather. They're not just traveling through space in Google Earth, but through time. The smooth globe you see under your mouse pointer is a patchwork of images harvested over the past two years.' (Newitz *Alternet*: 2005).

Synthesis: All maps are the synthesis of various themes. 'Maps are about relationships. In other words, they are about how one landscape – a landscape of roads, of rivers, of cities, government, sustenance, poison, the good life, of whatever – is positioned in relation to another (Wood 1993: 139). Maps also make assertions about those relationships, about cause and effect. This is an important part of synthesis – the dialogue between different parts of the map and the information background we use to make sense of those parts. For example, it becomes obvious why two roads run parallel with each other when a river is shown to exist between them. Further, maps often make use of other symbolic systems that make sense to the user. For example, the map of African river basins and river basins with treaties to the left assumes sophisticated knowledge on the part of the user.

Overall, features, symbols and symbolic systems tend to create emphases. Sometimes this is without necessarily having the intention to do so.

9.3 How to Map Conflicts, Competitions, Causes

Conflict is characterized by the clash of interests and high levels of uncertainty punctuated by the breakdown of organized and agreed upon institutions for settling disputes. This is the effect of a lack of agreed upon rules, norms and understandings. All social landscapes comprise invisible localities, partialities, positionalities, complications, tenuousness, instabilities, irregularities, contradictions, heterogeneities, situatedness and fragmentations. However, unlike competitive or cooperative contexts, under conditions of conflict these conditions tend to be dominant. Under ideal conditions, an absence of shared rules of engagement tends to result in low levels of interaction, rather than conflict. Conflict emerges when interests collide over a shared resource, but few mechanisms exist to mediate those interests. In such cases, no mechanism exist to downgrade conflict into competition or for cooperative relations to emerge.

Situational, Social Worlds/Area, and Positional Maps have proved useful in making complexities, heretofore unstudied –even unseen – visible, and amenable to intervention. These elucidate complexities within the shifting and unstable empirical world.

Conflict emerges when interests collide over a shared resource, but few mechanisms exist to mediate those interests.

9.3.1 Situational Maps

To create a situational map, first, a list is complied of as many as possible of the obvious and implicated individuals, collective, discursive, political, spatial, temporal, symbolic/cultural and other elements (actants), such as technologies, information systems,

infrastructure, capacity, etc. The boundary of the map is 'the situation', and the aim to provoke the relationships among them to be revealed. Key questions are: 'Who and what are in this situation?' 'Who and what matters to this situation?' 'What elements make a difference in this situation?' 'What seems present but unarticulated?'

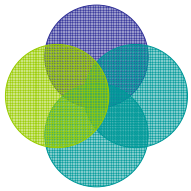
The Discourse Space is the limit of what constitutes the legitimate debate; it marks the – more or less conventional – limit of what is 'sayable' about the situation.

After an extensive search that nears completion (but is always open to revision and additions) once the same actors and elements systematically re-appear and new search terms and methods have been adequately explored, the map typically takes the form, first of a brainstormed space, then gradually of an ordered space, where terms come to rest in like-groups.

Please **see section 5.1** for the preliminary hydropolitical situational map of South Africa.

9.3.2 Social Worlds/Arenas Maps

South Africa's Overlapping Water Discourses



The social world mapping process begins with a search for all the groups engaged in collective action. It then proceeds to make available select information about those actors. Specifically, it is interested in how they represent themselves and the arena in which they are involved. 'How do they interpret the situation?' In order to surface this information, the researcher 'codes' what the actors say about themselves or other key features of the situation. In this case for example, we looked to how the actors characterized water and water users; what scale they implicitly or explicitly argued was the most appropriate, and so on.

The key is to uncover the negotiation/ meaning space between actors. This is known as the discourse space; the limits of what constitutes the legitimate terrain of debate; what is 'sayable' about the situation. 'Negotiations of many kinds from coercion to bargaining are the "basic social processes" that construct and constantly destabilize the social worlds/arenas maps" (Clarke 2003: 560) Things could always be otherwise and these maps express the interfaces between possibilities.

Please see **Appendix B** for the preliminary data for the hydropolitical social worlds map of South Africa.

9.3.3 Positional Maps

Positional maps illuminate the complexity of reality, including networks of relationships – and even contradictions. This is what makes them a critical tool for identifying the crux of conflict.

Once the discursive axes have been identified through social worlds mapping, the positional map works to lay out the major positions taken and not taken by both collective and individual actors, including types of actors, such as women, youth, etc.

The key objective is to identify full range of issues at play in any situation and then to position differences and the various configurations of relationships in relation to each other. This map will make apparent 'the multiple positions and even contradictions within both individuals and collectivities' (Clarke 2003: 560).

In that it can illuminate the social field, the relationships of which it is constituted and the range of contradictions it embodies, this final map is critical to identifying the crux of conflict in the situation.

Methods of data collection may include multi-site research, including discourse analysis, secondary and archival research and multi-stage ethnographic field notes.

9.4 How to Use Maps in Empowering Ways

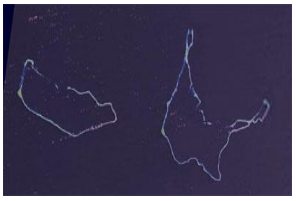
Maps and Their Interests

It has been noted that while the term 'mental map' is often applied to internal representations, these are quite unlike maps because they are personal, fragmentary, incomplete and presumably frequently erroneous. Indeed, one of the main reasons for making maps must be that 'mental maps' are inadequate as useful stores of locational information' (Keats 1997: 57). That said, however, for most human activity, knowing where things are, their relation to each other and ones position in the landscape is essential for effective action. Maps, then, significantly expand our capabilities.

'It doesn't feel to me like Google Earth is making the spaces and relations of the world more obvious. I can see roads in Russia, but not Kenya. Hawaii is a snowstorm of information, but Gujarat is silent. Perhaps what Google Earth really shows us in stark relief is how many parts of the world are still invisible to people in the United States, where Google generates its Earth.'

Yet, maps do not represent the world in an unmediated way. Maps represent realty, but in a selective way, mediated by, among other things, the mental worlds of the map maker. As we have seen, there are inherent limitations to the map making process. Projection, for example, inevitably distorts. Further, maps are generalizations. They emphasize critical points and de-emphasize those elements considered less important or irrelevant to the map's purpose. They do this in both intended and unintended ways. For example, Google Earth provides a clear, crisp detailed look at western spaces, while the southern spaces tend to be blurry and indistinct. Newitz (*Alternet*: 2005) reports: 'It doesn't feel to me like Google Earth is making the spaces and relations of the world more obvious. I can see roads in Russia, but not Kenya. Hawaii is a snowstorm of information, but Gujarat is silent. Perhaps what Google Earth really shows us in stark relief is how many parts of the world are still invisible to people in the United States, where Google generates its Earth.' She concludes that 'At least Google Earth lets us see what we can't see, shows us the gaps in our vision.'

Micronesia (Marshal Islands, Google Earth)



Source: http://www.sprol.com/?p=78

There are silences in maps. There are people who live these silences, often unaware that they have been written out of the landscape.

Maps are also constitutive of a certain form of reality, not merely representative of it. Mapping tends to be activity of those in power. Most maps are created by states for administrative purposes. They are boundary maps; maps that assert boundaries. They are not always explicitly political, but the frame of reference tends to be a political boundary, or the assertion of one. For example, catchment maps in South Africa also assert the legitimacy of the Water

Management Areas and the Catchment Management Agencies. Maps, then, 'create a knowledge space within which certain kinds of understandings and of knowing subjects, material objects and their relations in space and time are authorized and legitimated' (in Black 1997: 21).

Berg River Basin

Source: http://www.dwaf.gov.za/Projects/BergRiver/st_area.asp

The process of representation results in knowledge that did not exist before, knowledge that may, in fact, be contested. There is any number of ways that the features in any particular landscape can be generalized and represented. Thus maps also construct knowledge about the way the world *ought* to be, rather than merely transferring of objective information. Maps are a particularly effective way of presenting partial information as objective and immutable because maps tend to be understood as scientifically rigorous. Maps are taken to accurately reflect reality.

Harvey, for example has argued that 'Whether a map is produced under the banner of cartographic science…or whether it is an overt propaganda exercise, it cannot escape involvement in the processes by which power is deployed (in Black 1996: 24). Yet the interests that maps serve can be yours.

9.4.1 Maps as Empowerment Tools

The information in a map is more than just something to be looked at and apprehended, but rather a more or less useful tool for analyzing and synthesizing data in order to achieve a goal. How can one effectively bring this dimension of mapping to bear on problem solving? Taken uncritically, there are three common uses for maps:

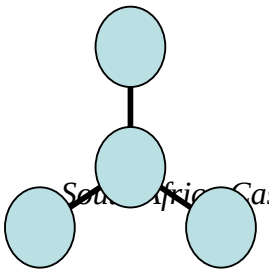
1) Anticipate or verify positions (of self in relation to targets),
2) anticipate the future, and
3) get a lay of the land – perform an extensive search through unfamiliar patterns.

How can we strike a balance between leveraging the very real advantages of maps and the traps they embody?

The complex underbelly of these functions includes:
1) The scripting of place and configuration of relationships, and overlaying these onto an otherwise open-ended landscape,
2) the scripting of narratives and futures as inevitable, and
3) providing a general assertion about what is important, what matters in a landscape or situation.

How can we strike a balance between leveraging the very real advantages of maps and the traps they embody? Wood argues that (1993: 182) 'Once the map is accepted for the interested representation it is, once its historical contingency is fully acknowledged, it is no longer necessary to mask it.' That is, he argues, maps are not ways to transfer objective information about reality, rather they are instruments for processing data, for bringing intellectual coherence to qualitative data and, foremost, instruments of persuasion.

The following is a narrative hypothesis of how selected case study communities may leverage a hydropolitical mapping process towards their self-defined goals.



First, the research team will bring various maps to the site as well as newly developed situational maps for both South Africa and the case study areas. Every effort will be made to gather a broad set of maps that pertain to the landscape upon which community member goals might be appropriately set.

Workshops will be held to deconstruct and reconstruct these maps until they reveal all the relationships constituted by the interplay of data. Key questions include: What are the critical points and silences? What are the rules and conventions that seem to guide synthesis? What other ways could the data be presented? And so on. Participants will be asked to interrogate what tends to get generalized in and out of the mapping process? Is there a pattern?

The research team will also undertake, in association with participants, outside-of-map verification. In situ, we will gather as much outside data as possible. This may include simply walking around the area, or a small portion of the area, to verify local experience against that of the maps. Participants will be asked to identify which data feature in the maps assembled, to identify patterns and to hypothesize about the meaning of those patterns.

Finally, participants will be asked to think through and create their own maps; maps they feel will be useful to for decision-making and reaching their water-related goals; maps that represent their world. They may select an already existing map or attempt to recombine useful elements from the various maps as well as the outside verification process into a decision-making map. In addition to basic artistic ability, key issues that may arise include desire to omit important features of the landscape because they are seen as negative influences, difficulty generalizing, weak reflection on silences, and so on. It is expected that the exercise will yield important insights into what mapping elements and skills require further elaboration for mapping to be an effective tool for empowerment at the local level – especially in developing areas where problem solving skills and analytical and synthetic literacies are expected to be uneven.

This preliminary data has already yielded important information for getting a lay of the land - the result of an extensive search through unfamiliar patterns.

9.4.2 Mapping Hydropolitical South Africa

This section includes some discussion and features of the Preliminary Hydropolitical Social Worlds Map (see Appendix B)

As noted above, one of the three key tools for mapping conflicts is a Social Worlds Map. For these kinds of maps, the key objective is to uncover the negotiation/ meaning space between actors. This is known as the discourse space; the limits of what constitutes the legitimate terrain of debate; what is ‘sayable’ about the situation. Things could always be otherwise and these maps express the interfaces between possibilities. To this end, the project team has already compiled a list of key actors, starting at the national level, and including actors that are linked robustly to the national level, but whose mandate lies at the sub-national or global levels. Moving outward from this point following a network logic, this list will be further expanded in the next research phase beginning November 2005.

'Maps can also be used to define and understand bio regions that can serve as the basis for eco friendly human existence. Yet maps also threaten the environment by revealing its resources'

This preliminary data has already yielded important information for getting a lay of the land - the result of an extensive search through unfamiliar patterns. It has provided the team with important preliminary data about the possibility space and the features, symbols and symbolic systems we are likely to see represented in hydropolitical maps of South Africa.

To date, the identities and discourse of a total of 39 key actors working in the water field water in South Africa have been deconstructed and analyzed. These include government, NGO, INGO, various private sector, and academic and research actors from all points in the spectrum. Key features of the discourse that have been delineated include: representation of self, representation of water, representation of people's relationship to water, scalar level, water use, access modalites and allocation and transmission. Below several of these themes are highlighted in order to illuminate why we have chosen these themes, the social world map-building process more generally and the specific direction the discourse seems to be taking:

Representation of Self

"the map can appear to reify what is often a more complex reality, as in the role of river basins in hydropolitics, and the nature of oil and gas basins'

Rationale: people use discourses to do things, to persuade, to make claims, to make excuses, to present themselves in particular light, and so on. Discourses about the self, then, tell us as much about what constitutes a legitimate identity and the boundaries of legitimate debate as they do about any reality existing independent of the discourse.

Private sector in the national interest; parastatal in the interests of the people; network hub; global centre of water excellence; water manager for South Africa's future; accountable to the people of South Africa; multi-partner research, policy and educational initiative; training centre to address the needs of rural poor; defend the environment; specialist in water purifiers; water service company; scientific research organization, etc

Representation of Water

Rationale: 'Maps can also be used to define and understand bio regions that can serve as the basis for eco friendly human existence. Yet maps also threaten the environment by revealing its resources' (Black 1997: 84)

scarce Resource; improves people's quality of life; limited resource amenable to management; water for sustainable development; precious and scarce; value for money; public good, basic service; water essential resource addressing the needs of the rural poor; natural resources are finite; tap water is not safe; water services are needed for the poor; scarce resource, etc.

Representation of People

Rationale: “the map can appear to reify what is often a more complex reality, as in the role of river basins in hydropolitics, and the nature of oil and gas basins’ (Black 87)

Shareholders, customers, energy users; in need; agents in water management; clients, stakeholders; consumers, clients; people with limited resources, clients; vulnerable, in need of protection; clients, gendered; health of people and the environment are intertwined; clients; customers, rural disadvantaged, low income, poor; poor, rural poor, etc.

For the creation of the Social Worlds Maps, the major elements of the discourse will be delineated and systematized into a map of the discourse space. This will be key tools to made available to participants during the case study and empowerment phases of the project. This will also be an important verification step for the Map, itself. The discourses of the institutional actors will be compared against the perception of legitimate discourse held by case study participants.

9.5 How to Tackle Multiscalar Issues

There has been a dramatic shift in the spatial scale at which water institutions, organization and strategies operate. In the process of transition, the previously dominant mode of managing interscalar relations –bounded by the central state apparatus - has given way to a much messier transitional space.

In terms of water service delivery and competition over water resources, perceptions of primary scale appear to be in transition, from national to local, from water source or water point to catchment or even ecosystem. As the Scoping Chapter discusses in detail, this is particularly true for South Africa, where water management has passed from a mixed system of Metro and riparian rights management to a wholly publicly managed system at the District and Local Municipality level. Simultaneously, a new water resource management strategy was also adopted creating catchment-level management areas. That is, there has been a dramatic shift in the spatial scale at which water institutions, organization and strategies operate. In the process of transition, the previously dominant mode of managing interscalar relations –bounded by the central state apparatus - has given way to a much messier transitional space. For example, while the Department of Water Affairs and Forestry set out the decentralized plan for water service governance, it retains neither a regulatory nor policy function. The operationalization of service delivery is left entirely to the discretion of the District or Local Municipality, many of which lack capacity.

Today, various and not always well understood logics operate differently in different functional sub-systems, involving complex and tangled causal hierarchies rather than simple linear bottom-up or top-down management processes. At multi-scalar levels, then, a complex re-ordering is taking place, characterised by the absence of a new primary scale capable of managing inter-scalar relations or re-regularizing hydropolitical regimes. The dominant trend to date, appears to be a disordered proliferation of threats and opportunities for economic, political and social forces.

Formally (from the Department of Water Affairs are Forestry design) scales are designed to be linear and nested, but in reality, instead often appear eccentric, interpenetrated by different scales and types of social organisation, with smaller sites emerging as key sites of counter-tendencies and resistance to central government de-centralisation efforts. In particular, idealism about local politics as participatory, accountable and egalitarian politics seems to have been misplaced. The taken-for-grantedness that politics could be re-naturalized at the local level appears to remain unstable and provisional, giving way instead to convoluted mix of interscalar (complex mixes of local, regional, nation and international) strategies deployed by various types of actors – from industry and government to conservationists and social movements. All of this affects how one analyses the re-articulation of scale. 'There is no pre-given set of places, spaces, or scales that are being re-ordered. Instead, new places are emerging, new spaces are being created, new scales of organisation are being developed, and new horizons of action are being imagined – all in light of new forms of (understanding) competition.' (Jessop 1999: 5).

The authors go on to challenge the assumption that features, once scaled up and magnified, are really and necessarily there, and not simply features of the mapping process itself.

In this context, maps that reveal 'information about space by showing that information scaled within the boundaries of another space' will be limited (Paulston and Liebman 1994: 223). At the most general level, the interplay between boundaries and scale, in general, tend to create dialectical distortions. For example, large scale maps tend to be compiled from a number of disparate sources, each of which has made important decisions about what to generalize, what to omit and what to emphasize. As such '…any simple notion that areas, distances and direction can all be 'correct' is quite untenable (Keats 1996: 97). Yet, the uninitiated user will be insufficiently aware of the connections between the units of information, scale and principles of generalization at play to know the relationship between the map and the data being represented. Thus, a special problem for strategic map use, in that the fall back position of casual map users tends to be one that assumes not only that information represented has scientific integrity, but that it more or less perfectly replicates reality at scale.

In South Africa, the question of scale is one of emerging representations of reality within a decentralization process that is/ has disrupted previous scalar strategies and contributed to a chaotic landscape of new and experimental strategies.

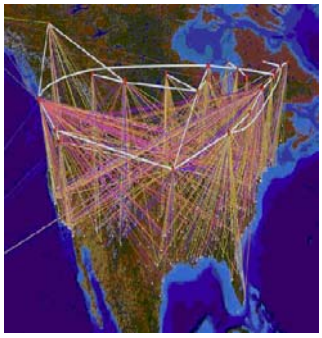
Yet, multiscalar issues give way to a more profound critique as well, as Law and Singleton (2000:5) note:

[R]epresentation, as we know, is not a neutral tool. It makes assumptions about what can be known (also known as 'epistemology') and about what it is that can be known about (also known as 'ontology'). That is, mapping, as the particular version of representation that we are interested in here, carries a series of assumptions.

The authors go on to challenge the assumption that features, once scaled up and magnified, are really and necessarily *there*, and not simply features of the mapping process itself. They challenge that either scale or size is given in the natural order of things, whether it is possible to get a sense of the 'big picture' by either scaling down or up. They also challenge the definitiveness and stability of what appears to be *there.* There is, perhaps, rather more ethereality and fluidity.

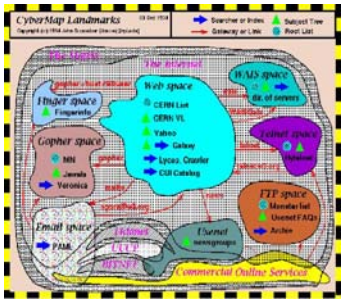
South Africa's Government territorial maps and institutional diagrams often reify constructions that often do not exist at the local level and tell us little about the economic, social and political conflicts and how they are actually mediated. Similarly, preliminary evidence seems to suggest that scaling up local expressions of those conflicts will fail to yield something that maps straightforwardly onto the territorial and institutional aspirations that government maps and diagrams embody. In South Africa, the question of scale is one of emerging representations of reality within a decentralization process that is/ has disrupted previous scalar strategies and contributed to a chaotic landscape of new and experimental strategies. There is, as yet, no privileged scale that imparts structured coherence across all scales.

The scalar issues involved, then, provide further support for the selection of situational and social worlds mapping as the appropriate tool for hydropolitical mapping in South South Africa. As noted elsewhere, such maps have proved useful in making the 'usually invisible and inchoate social features of a situation more visible' (Clarke 2003: 572). By rendering discourses, paradigms, actors, actants, etc. - and the spaces between them - visible, social worlds mapping allow for identifying 'momentary crystallization and institutionalization of one particular set of rules and norms' in dialogue with given constellations of structural conditions – while illuminating other highly plausible sets, which may be merely contingently not enacted (yet) (Paulston and Liebman 1994: 224).



Here, unsettled multiscalar negotiations and conflicts are possible – even unproblematic - while the fluidity and contingency of negotiations between those scales is allowed to disrupt false stabilities and *thereness* without undermining the value of the map. Rather a new dimension is illuminated, that of mutual constitution and co-production. The essential distinction to be made, then, is between maps that view the hydropolitical space as physical reality, and maps that view it as 'a reality that exists not on some objective coordinate system or grid, but in a non-physical context generated through cultural socialization, the creation and exchange of symbols, cognitive activity, and social interaction' (King nd: 3).

King illustrates the difference with respect mapping the internet. In the first example, the internet is being represented as having a physical referent and existing in space and time just like any other object:



The internet can also be represented as 'a non-physical thing, an ethereal terrain made up of symbolic and logical relationships in a limitless cognitive space. In this view, the Internet is not just another telephone, train, or highway network' (10).

In the latter, scaling is meaningless, in that the referent is non-physical. Scales that correlate to physical referents claim to represent physical and geographical objects that exist is space/time. 'Its scaling would then reflect the limitations and constraints of

physical reality, as well as its implied permanence' (3). In the non-physical context, the visual representation depicts relations along dimensions. The spatial distinction between the different parts of the visual representation is arbitrary, or it might cluster, but around logics not landmarks. This type of map is also sometimes referred to as an information landscape. This type of map is useful in that it doesn't presume that actors have specialized or even accurate knowledge about the *real world*. In fact, politics is often based on partial or highly impressionist interpretations and mobilizations of the facts, and these are often usefully set in relation to each other rather than to some presumed reality that exists *out there*.

9.6 Preliminary Situational Map

Preliminary Situational Hydropolitical Map of South Africa

Individual Human Elements/Actors: Minister Municipal Managers Heads of Water and Sanitation, Activists Traditional Leaders, Councilors	**Implicated and Silent Actors/Actants** Children, AIDS-HIV, indigent, environment, pollution, gender politics, politics at the interface of overlapping categories of diversity, interface between water availability and other opportunities (i.e. home-based industries), time
Collective Actors: CSIR DBSA WRC INTERWATER AWIRU NCWSTI WISA SAAWU SAWAC SANTAG SA Red Cross WIN – SA DWAF WRIA – LHWP R and Water Umgeni Water BloemWaterWaterwise Siza Mvula Trust AWARD World Vision SUEZ SAUR Biwater Vivendi PDG WZC MSP AMREF WHiRL AFRICON CONCOR ERWAT	**Key Events** Demonstrations (Ladysmith, Port Elizabeth), cholera outbreak, typhoid, Delmas, conferences, networks, summits, droughts
Discursive Constructions: Water as a human right, as scarce resource, as economic good; People as clients, as citizens, as poor and vulnerable	**Discursive Constructions of Non-Human Actants** Race, class, gender and ethnic biases in technologies, water as symbol of new 'class apartheid', systemic clash between traditional/modern governance structures, 'alternative technologies'
Political and historical Elements: Legacy of apartheid, redrawing of municipal boundaries, Decentralization, 'appropriate technologies', RDP to GEAR, constitution, capacity (lack of human resources, corruption, governance) infrastructure	**Socio/cultural and Symbolic Elements** Water for rituals and funerals, water as 'life',
Major Issues and Debates: FBW, appropriate technologies, privatization, water rights, poverty alleviation, service backlogs, accountability, conservation, prepaid meters, commodification, cost recovery	**Spatial Elements** Apartheid era spatial planning, move to catchment management areas, rural, urban and sprawl, population distributions, city geographies, areas of water scarcity, new gated communities
Non-Human Elements: City geographies, climate, drought, technologies, water and sanitation infrastructure (dams, treatment plants, etc.), bulk supply (source, delivery, costs), white paper	

10 Evolving Water Governance Framework

By Dr Zoë Wilson, Horacio Zandamela with general project research assistance from Eleanor Hazell, Chitonge Horman, Amanda Khan, Emeka Osuigwe, and principal advisor, Patrick Bond
Research Director: Dr Julie Trottier

10.1 Introduction

A number of factors have contributed to the evolution of South Africa's water (and sanitation) context. Most notable are the legacies of apartheid; the transition to democracy and adoption of one of the world's most progressive constitutions; the adoption of the Reconstruction and Development Plan, superseded by the Growth Employment and Redistribution (GEAR) plan in 1996; the creation of wall-to-wall municipalities, including a number of boundary demarcations and official de-centralization of water provision responsibilities to local government; the co-evolution of a progressive policy and legal framework; the adoption by municipalities, within that framework, of a wide variety of institutional and technological approaches to water service delivery, and environmental constraints including areas of absolute water scarcity. The transition process resulted in the establishment of municipalities (6 metropolitan, 41 district, 231 local) and over 11 000 democratically elected councillors. In the last ten years, across both South Africa's well-established and fledgling municipalities, a complex new water service delivery terrain has emerged. Municipalities are in many ways free to determine how best to meet their obligations and to date this has included a range of institutional arrangements and technological options. Backlogs and capacity deficits remain among the serious issues yet to be resolved. In poorer areas, especially, the lack of coherent service delivery plans and implementation strategies have seen conflicts flare, exacerbated by apartheid era grievances and new political divisions alike.

10.2 Legacies of Apartheid

From 1795, water rights in South Africa were linked to land ownership, with private rights taking precedence over public. In 1910, with the formation of the Union of South Africa, new laws did not make any provision for government control over the resource. Similarly, the Water Act of 1954 included the public private distinction, favouring the riparian principle of water rights inhering in land ownership (Malzbender *et al*. 2005: 4). In that the majority of land – especially fertile and water-resource linked land was white-owned, access to water of the majority of South Africa's population had long been subject to the interests, sometimes capricious, of the elite minority.

Public water tended to play a role mainly in urban water provision, through water boards (bulk suppliers). Today, South African cities retain hydropolitical features more or less similar to most African municipalities, whose flavour was imparted through colonial era planning:

> It was the systemic function of the apartheid cities to ensure that white residents had all the social benefits of living in the city, and to deny black residents equal access to urban social goods and opportunities. The result is cities where very large proportions of the population are not included – materially or psychologically in urban life (South African Cities Network 2004: 77-78).

Unlike many African countries, South Africa is highly urbanized, with over half of its approximately forty million citizens living in urban areas. In the coming years, migration from rural to urban areas is expected to increase, partly as a result of expected slow growth in rural areas and partly as a result of their poor service delivery and lack of other amenities. South Africa's rural poor rate along-side the most vulnerable and disadvantaged in Africa. Urban areas, however, remain segregated along racial lines and new settlement patterns tend to contribute to increasingly

fragmented urbanscapes, whose water and sanitation backlogs present increasingly complex problems, especially for fledgling municipalities:

> The contemporary South African city is reflective of a discourse of apartheid era urban planning characterized by racially fragmented and discontinuous land use and settlement patterns, haphazard, dysfunctional and inefficient spatial ordering, land used mismatches, low level population density, the concentration of poor in relatively high density areas on the periphery and the rich in the core intermediate urban areas (Maharaj 2002: 1).

South Africa remains a country of contrasts. Thus, challenges range from previously unserviced rural areas with little if any modern economic activity, to long term tenancy on rural farm and increasingly urban slum lands, to new and decaying community-managed mission and development water schemes, to leaky and decrepit urban and apartheid-era housing unit infrastructures in both former township and modern city settings, to former township areas accustomed to free and unlimited water, and so on. Reponses have included experimentation with a range of institutional partnerships, alternative technologies and cost recovery methods, from the Suez/Johannesburg municipality partnership and pre-paid meter technology in Soweto to eThekwini Metro's (Durban) turn to urine diversionary toilets and Free Basic Water innovation in recently acquired rural areas, such as the Valley of a Thousand Hills.

Such wide-raging experimentation is the result, in part, of municipalities exhibiting substantial variations in their capacity and resources. Taxable economic resources remain concentrated in former white areas, and while local government receive government grants known as 'equitable share' to roll out services and satisfy rights - such as the right to 'Free Basic Water' - these grants are untied, and struggling municipalities are often unable to direct funds to water and sanitation issues. While the mission and goals of the municipalities today should align with the new South African dispensation, about one-third of all municipalities are facing serious financial difficulties or administrative problems. Exacerbated by costly and complex administrative re-organization, and the need to put in place a new democratic and equitable governance process, municipalities' have focused their capacity inwards, often leaving few resources for basic service delivery. This places an enormous challenge on municipalities to fulfil the developmental mandate provided by the new constitution – and water services are one such critical service.

Even where funds are available, capacity deficits often give rise to the search for water service provider (WSP) to whom to contract both infrastructure construction and management. The role of the private sector in water service delivery has been a contention one in South Africa over the last ten years. Despite political debates, increasingly the landscape is populated by an emerging brain trust of consulting and engineering firms – often local – stepping in to fill the gaps. Questions of quality and accountability remain central unresolved concerns. It is not expected that South Africa's municipal capacity level with be sufficiently high across the board to effectively manage water and sanitation autonomously. As a result, DWAF is currently developing a Vision 2025 for municipal capacity-building and taking on new regulatory powers.

10.3 The Constitutional Context

The South African Constitution, *inter alia*, provides for the right to sufficient water (section 27 (1) (b)) and an environment that is not harmful to health or well-being (section 24 (b)). It also establishes that all spheres of government are mandated to observe the principle of co-operative governance, rather than hierarchical or centralized government. Thus, in a move to disrupt the logic of the highly centralized, authoritarian Apartheid state, the constitution establishes local government as a sphere of government in its own right. Therefore the country should function with three spheres of government, national, provincial and local. Local government is no longer a function of national or provincial government, but an integral part of the democratic state. For local government the constitutions establishes the following mandate: a) provide democratic and accountable government for all communities, b) ensure the provision of services to communities

in a sustainable manner, c) promote social and economic development, d) promote a safe and healthy environment, e) encourage the involvement of communities and community organizations in the matters of local government.

Thus, while national government develops broad policy pertaining to water and sanitation, implementation is the responsibility of local government, otherwise understood as a Water Service Authority (WSA). National policy admits the possibility of a wide variety of governance and technological options. WSAs may contract out to water service providers (WSP), who may be public or private sector actors, national or international.

Broadly, then, municipalities have the mandate to govern, to provide services and to promote social and economic development. The Department of Constitutional Development promotes the use of Integrated Development Planning (IDP) by municipalities, and this is likely to shape the actions of local government in implementing policies intended to reduce poverty and inequality. The department of Water Affairs and Forestry (DWAF) is also gearing up to play a stronger, overall, regulatory role.

10.4 The Policy Context

On the eve of the first racially-inclusive democratic elections in 1994, the ANC drafted its vision to transform the country: The Reconstruction and Development Program (RDP). According to the ANC: 'The RDP is an integrated, coherent socio-economic policy framework. It seeks to mobilize all our people and our country's resources toward the final eradication of apartheid and the building of a democratic, non-racial and non-sexist future' (ANC, 1994).

The RDP emphasized the developmental role of local government as follows: a) Integrating areas which were once divided under apartheid, b) providing and maintaining affordable infrastructure services, c) strengthening the capacity of local government to provide services, d) ensuring a more equitable role for women, e) ensuring meaningful participation by residents and stakeholders.

The initial policy framework document spelled out the vast number of changes the future ANC-led government would seek to effect. The central theme was reducing poverty among the majority of South Africans, thereby redressing the inequalities and injustices of colonialism and Apartheid. Access to water, jobs, land, education, and health care, were among the priorities highlighted.

While the RDP was closed in 1996, it set the institutional framework for the reduction of poverty and inequality playing an initiating role, raising the 'development literacy' of South Africans and launching projects and research. An RDP Fund still exists, and RDP structures at a provincial level remained in place in a revised form.

Subsequently, South Africa adopted the Growth, Employment and Redistribution Strategy (GEAR) as a socioeconomic framework for development. GEAR places greater emphasis on market-oriented strategies, such as export-led growth, increasing openness and competition fiscal restraint, inflation controls and looser foreign exchange controls. The context GEAR establishes for local planning puts the emphasis on a) planning through investment, b) broader investments in infrastructure, c) more effective local spending and reprioritizing of budgets, and d) rationalization of local government personnel. It is unclear that many of South Africa's fledgling municipalities – at least in the short term - have the capacity to effectively manage open, dynamic and complex global/local opportunities.

The adoption of GEAR as the blueprint for South Africa's economic policy outraged many observers and strained the tripartite alliance between the ANC, the South African Communist Party (SACP), and the Congress of South African Trade Unions (COSATU). Among the more controversial aspects of GEAR were the recommendations that the public service is down-sized and state-owned enterprises are "restructured". Critics consider GEAR a 'neoliberal' compromise through which few redistributive benefits can be realized (e.g. Bond, 2000; 2004). Social

Movement activity tends to mobilize around anti-globalization and anti-privatization debates. The strength of such movements is unclear.

10.5 Wall to Wall Municipalities

Since assuming the mantle of decision-making power, the ANC has taken significant steps towards dismantling apartheid era decision-making structures and relocating power at the local level. Local government is now charged with responsibility for provision of water services. The de-centralization of responsibility to the local level was undertaken in two stages. Under the Local Government Transition Act of 1993, the first step was to unify black and white local government areas. In the metropolitan areas, in particular, this meant the unification of widely differing communities and political and technical infrastructures, sometimes over geographically extensive areas. The new Local Authorities were known as "Transitional" as the constitution had not been finalised at that stage, and the final nature and legislative framework of local government had yet to be determined. The progression of this process, it is worth quoting municipal services expert Glen Robbins (2004: 6) at length.

> After the 1994 elections the Government determined that a radical overhaul was required of apartheid local government systems. A host of different types of local authorities existed resulting in many hundreds of municipalities, health committees, town councils or related township administration structures existing side-by-side characterised by severe fragmentation within the approaches of local authorities themselves and between local authorities. In order to enable democratic local elections to take place a set of interim local government arrangements were established which brought various types of local authorities under a handful of new municipal categories and initiated the process of integrating local governance institutions within newly defined transitional local authority areas. The White Paper on Local Government produced in 1998 defined a further process of systems rationalisation and redefinition of roles and responsibilities which culminated in the promulgation of new demarcations in line with the Municipal Structures (1998) and Municipal Systems Acts (2000).The combined effect of these processes was to create so-called wall-to-wall municipal government in the country.

The process has not been uncontroversial with its most severe critics arguing that the process amounts to the decentralization of responsibility and the abdication of the values associated with the immediate post-apartheid redistribution plan, the RDP, and state responsibility and redress, more generally (see Bond 2002; 2004; forthcoming). Habib and Padayachee (2000), argue, for example that the ANC's policy concessions over the last decade have been largely to foreign investors and domestic capital. In its defence, however, government has 'estimated that 9 millions people have been provided with basic water supplies during the last nine years. This is an impressive achievement. Nevertheless, inequality in access to basic services is still a stark reality and progress with sanitation has been much slower.' (DWAF 2003: 1).

What is clear is that the decentralization process, characteristically, has been fraught with contradictions and complexities. On the one hand, devolution to the local level has often meant devolution to subset hierarchies. Local authorities have generally recognised the need to change existing mindsets and institutional arrangements in order that development goals might be met. On the other hand, genuine devolution has not always been met with genuine capacity. Many local governments have encountered problems, including lack of economic viability due to a rent boycott culture, inadequate private sector investment and insolvency of former black authorities; absence of local administration in some areas; poor service provision in townships; and community suspicion of government due to past experience with apartheid structures.

In order to provide the legislative framework for the new local Government system to govern water services two key Acts were established the National Water Act (Act 36 of 1998) and the Water Services Act (Act 108 of 1997).

10.6 The Legal Context

Water Services Act (Act 108, November 1997); the National Water Act (Act 36 of 1998) and Free Basic Water

South Africa's Water Services Act and National Water Act provide the legislative and policy framework for water allocations. They constitute a general framework, not a set of detailed guidelines for implementation. The details of Implementation are left to local government to decide upon and administer.

The **Water Services Act** provides for the right of access to basic water and sanitation, and was designed to transfer implementation power from the Department of Water and Forestry (DWAF) to the newly created decentralized municipal system. The Act established new structures in the form of Water Services Authorities (WSA) and Water Services Providers (WSP). The Act makes provision for WSA – typically the municipality – to make decisions about and manage the delivery of water. The WSP, which may be the same body as the WSA or may be a contracted body, supplies water to domestic and industrial users. The WSA is to play the regulatory role while the WSP role was mandated to local authorities, communities themselves (who may contract to the private sector.) Typically District Councils (after the 2000 elections known as District Municipalities) would be the WSA, and either District or Local Municipalities would be the WSP. The Act also specifies the principles by which standards and tariffs are to be set. The Act further introduces the requirement for all Water Services Authorities to prepare Water Services Development Plans, and notably, to develop comprehensive data on demand and supply for water and sanitation services. This was the first step in positioning the Department of Water Affairs and Forestry as an overall national regulatory body rather than a supplier of water services.

Today, the relationship between DWAF and local government in South Africa is unique as is the only sectoral department which does not have corresponding provincial structures. As a result DWAF has a direct relationship with the organs of local government responsible for water, in particular the Water Services Authorities. As noted, DAWF is in the process of developing a Vision 2025 capacity building programme and adopting new regulatory responsibility. DWAF works at provincial level through the Department of Provincial and Local Government.

According to Muller (2005, p.4) the timing of this Act, just over three years before the coming into effect of the new Local Government system on 5th December 2000, was such that little was done to implement it until after the new municipalities were constituted. The subsequent hand-over of the retail water distribution services to municipalities by DWAF have left some unresolved issues. Among these include: a) The terms and conditions under which DWAF staff would be transferred to municipalities; b) the poor cost recovery record of many DWAF schemes which would be likely to impose a burden on the receiving municipality; and c) lack of agreement on how assets would be valued. Further, in that South Africa's rural water schemes tended to fall under a number of complex ownership arrangements, in many areas, very little is known about the actual existing hard infrastructure. Either no comprehensive plans and maps exist, or they reside in private hands and no onus is put upon private actors to make this maps and plans available to public officials.

The **National Water Act** deals with the uses and allocation of water resources, specifically in terms of abstraction, storage, stream flow reductions, recreational use, discharge of waste, diverting and impeding flow, controlled activities and altering the bends, banks or characteristics of a water course. The National Water Act replaces the apartheid era system of riparian rights whereby water rights inhered in land ownership. An on-going process of water allocation reform is gradually replacing Existing Lawful Use entitlements with temporary licenses. These are not renewed in perpetuity. The approach aims to introduce regulation at pace, so that consumer and public interests are protected by: a) ensuring compliance by WASs and WSPs with minimum

national norms and standards; b) ensuring good performance and the efficient use of resources; c) ensuring good contracting practice. It relies on a system of Compulsory Licensing, a mechanism to review water authorizations are regular intervals. Allocation considerations include a wide and progressive set of considerations, from past racial and gender discrimination to international obligations to economic development.

Water resources management is in the process of being transferred from DWAF to the local level. There are a number of local levels which have been established as appropriate, and provision has been made for corresponding management units. 1) Catchment Management Agencies (CMA), 2) Water User Associations (WUA), and 3) Other institutions in water management. Briefly, there are 19 water management areas and each of these will have a CMA. These are responsible for both the development and execution of water resource management in their areas, as well as overall institutional coordination. WUAs are independent and typically special interest associations, coordinating issues of interest to their members, such as irrigation or water quality. They are self- supporting and adhere to a set of guidelines prepared by DWAF. Other institutions include, for example, the Water Tribunal set up to hear challenges to decisions rendered by water management institutions, and special advisory committees.

10.7 Free Basic Water

FBW is a national policy to be implemented by local government, which is responsible for the delivery of basic services. It is based on provision in the Water Services Act for people who cannot afford to pay for water. It applied to a basic lifeline amount, and there is much debate in South Africa in the definition and understanding of 'free'. The official commencement of implementation began in July 2001. The recommended amount is 6000 litres per household per month. This is based on 200 litres per person per day for a household of eight. However, local authorities determine how much water the municipality can afford to provide free.

The following matrix from the DWAF website provides the up to date national official figures for FBW:

View : ***National*** , Western Cape , Eastern Cape , Northern Cape , Free State , Kwazulu-Natal , North West , Gauteng , Mpumalanga , Limpopo

Perspective : Households , ***Population***

National View

11 November 2005

Summary view

Population	Total	Poor
Total	48,081,483	22,441,317
Served	34,840,619	14,851,449
%	**72.46%**	**66.18%**

Source: http://www.dwaf.gov.za/FreeBasicWater/

10.8 Partnerships and New Technologies

Municipalities received grant transfer payments – called equitable share – to pay for the costs of running municipal services. No restrictions or conditionalities are placed on how this money is spent. Constitutionally, local government is responsible for the delivery of basic services. It is up to the local authority to decide how it will provide services, such as water and sanitation.

This has encouraged the growth of a wide variety of institutional arrangements and delivery systems in South Africa. These range from public/private partnerships (i.e. Nelspruit, Johannesburg), community and traditional water governance systems (i.e. Tshikombani and Tzaneen), Public systems (i.e. Ethekwini Metro), other hybrid systems, such as municipal contracts with corporatised parastals (i.e. contract to Umgeni Water for service provision by Msunduzi Municipality), and largely dys- or non-functional municipal structures (i.e. Ngqusha). Tariff structures also vary widely, often with little to no substantive research available to justify tariff curve options (i.e. Msunduzi Municipality's two block tariff), as do the application of administrative charges and the bundling of municipal services bills.

The prevalence of weak, deteriorated, and/or non-existent delivery infrastructures has also meant that municipalities – often with few technical and financial resources – are charged with creating new municipal infrastructures or grafting them onto deteriorated and not well documents historical systems. This, in conjunction with the RDP guidelines for water service delivery and the 2001 commitment to Free Basic Water (FBW), has contributed to the development of a number delivery system 'tiers', each with their own technology bundle. Notably, FBW intensified this trend as the promise to provide FBW came with the associated problems of actual delivery of a limited amount, thus requiring sophisticated systems of both water delivery and flow regulation.

There are typically four levels of service available, with Level one being a standpipe more than 200 meters from dwelling and no sanitation; Level 2 representing a standpipe within 200 meters of dwelling and no waterborne sanitation; level 3, representing a semi-pressurized water system and onsite not-waterborne sanitation (urine diversion or pit latrine); and level 4 representing fully reticulated and pressurized water and sanitation on site.

Ethekwini Metro (Durban) has been South Africa's leading innovator in using new technologies for roll out of water and sanitation to previously unserved areas and the delivery of free basic water. In some areas (i.e. Valley of a Thousand Hills), it has combined low-pressure 200kl drums that re-fill each night with Urine Diversion toilets. To date, approximately 30,000 units have been deployed. A number of other municipalities have followed suit. Key attractions of the UD/FBW package include the delivery of a limited FBW water amount, none of which is diverted to toilet flush. It is also a system that guards against cholera and other water borne diseases by providing only as much water as plot size can absorb safely without causing stagnant pools and excessive runoff. It also inexpensive, allowing the metro to provide water and sanitation immediately where the capital infrastructure costs of level 4 service are not justified (i.e. not justified because settlement patterns are in flux). It also provides a level of service which may encourage rural livelihoods and decrease rural/urban migration.

Figure 10.1Urine Diversion Toilet and 200KL drum, rural and dispersed area in eThekwini Metro

Source: site visit Oct 2004

Elsewhere, such as Johannesburg, municipalities have opted to combine the provision of FBW, water services more generally and cost recovery with pre-paid metre technology. These are used equally at the household and standpipe level and householders are issued a card (often with surcharge) loaded with units sufficient to cover the FBW amount. Once this is exhausted, householders must purchase additional units to access water. Pre-paid meters have met with organized resistance, especially in Soweto and Orange Farm, and there are high levels of mistrust of the technology. Because the household infrastructures in these areas are level four, much of the FBW amount must be used for toilet flush. This is not well understood uniformly by users.

Where municipalities have not adopted pre-paid meters for cost recovery and flow restriction, a number of flow limiting devices are used when households fall into arrears. The most common of these to date is the trickler. This is a small disc inserted into the household water main, with small pinprick hole in the centre. This device literally restricts the flow to a trickle, so that no more than the FBW amount will trickle from the taps. Not surprisingly, these have been the subject of much controversy and DWAF is currently reviewing the possible regulation of their use at the municipal level (i.e. Grabouw).

10.9 The Ecological Reserve

The National Water Act makes provision for only one right to water, the Reserve. This represents the water required for basic human needs and ecosystem functions. The priority allocation goes to the reserve, and thus, its health determines how much water is available for other uses.

11 Case study selection and methodology

By Dr Zoë Wilson with Kea Gordon, Eleanor Hazell and Karen Peters with general project support: Chitonge Horman, Mary Galvin, Amanda Khan, Emeka Osuigwe, Horacio Zandamela
Research Director: Dr Julie Trottier

11.1 Introduction: Development of Typology

The information landscape upon which to draw to develop a preliminary typology for the identification of standard and distinctive hydropolitical geographies in South Africa is fragmented, dated, and in most cases, does not correspond to meaningful hydropolitical boundaries. This is the most important finding of this portion of the study. In part, this is due to the prolonged process of institutional transformation from apartheid to post-apartheid state, and the relatively recent re-demarcation of both municipal and provincial boundaries. Thus, in general, what comparative data is available does not map well onto other data, and data representation on a whole seems designed to assert political boundaries and dilute stark demographic differences, rather than illuminate meaningful variations or locate local trends. There is no standard unit for which data is available, and often the unit for which it is available is not meaningful for interrogating the water sector, or the effects of other socio-political and economic factors on water governance.[1] As a result of re-demarcations and the collapsing of previously disadvantaged communities, home lands and traditional areas with former affluent white areas for reasons of wealth sharing, information available tends to obscure rather than illuminate stark variations of municipal wealth and poverty within units of measurement. For example, South Africa is one of the most unequal countries in the world, but this is not captured in the available quantitative data. Another critical shortcoming of the data is that much of it exists at the provincial level, which is the weakest and most controversial level of government, and doesn't correspond to water management boundaries. Again, the data seems to be assertion of boundaries rather than the illumination of demographic patterns. The debates about abolishing the provincial layer of government altogether and/or re-drawing provincial boundaries is an on-going.

Politically, water authority rests a national level with Department of Water Affairs and Forestry (DWAF) and at the municipal level with district municipal authorities. In many cases, district municipalities have devolved authority to the local municipal level (6 metropolitan, 41 districts, 231 local). These, in turn, have partnered with a wide variety of water service providers, from private sector to community or remain traditionally or communally managed. In terms of the latter, meaningful information, at this stage, appears to be available mainly through patchy local qualitative assessments. As a scarce natural resource, water will also and simultaneously to be managed at the catchment level, ultimately, by Catchment Management Authorities (18 in total), only two of which are nominally operational.

In addition, there are a wide variety of transboundary issues that may come into play, including conflicts between provincial and municipal boundaries[2] as well as between traditional and formal systems.

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[1] See for example 'General Household Surveys' available as most recently as 2005, http://www.statssa.gov.za/publications/publicationsearch.asp?PN=fqtry&PM=&PY=&PS=1, access Dec 06, 2005.

[2] For example, *The Citizen* (Dec 15) reported that 'Violence flared in Khutsong township yesterday…It was all-out war as residents went on a rampage, vowing not to accept the decision to move Merafong municipality from Gauteng to North West's Jurisdiction. The National Council of provinces (NCOP) endorsed legislation abolishing cross-boundary municipalities during yesterday's special sitting in Cape Town.' P. 1-2.

Province	Number of district municipalities	Number of cross-boundary district municipalities (CBDMs)
Eastern Cape	6	-
Free State	5	-
Gauteng	1	1 with North West 1 with Mpumalanga
KwaZulu-Natal	10	-
Mpumalanga	3	1 with Gauteng 2 with Northern Province
North West	4	1 with Gauteng 2 with Northern Cape
Northern Cape	3	2 with North West
Northern Province	4	2 with Mpumalanga
Western Cape	5	-
Total	*41*	*6*

Source: http://www.demarcation.org.za/Demarcation/about_demarc.html#9

A further complicating factor is that provincial and municipal boundaries and authorities are young and unsettled, as is the development of catchment level management. Thus many political boundaries that exist on paper are not or are only partially operational in practice. Capacity among nascent institutions, also, appears at times to be very low.

Overall, much of the qualitative and quantitative data is fragmentary and dated. The most recent census was conducted in 2001. Data sets are limited and exist for the national, municipal and provincial levels, but as case study briefs testify, appears critically outdated and, in some cases, highly inaccurate, as does more recent data sets. Some information also exists for biomes and average rainfall and so on, and tends to be available, variably and in variables forms, by national, provincial, municipal and to a certain extent, catchment levels. The best resource for the water sector available is Statistics South Africa's "Non-Financial Census for Municipalities[3], which has a wide variety of tables by delineated by various political boundaries for the years ending June 2004 and June 2003. It represents data at provincial levels and as number of local municipalities within district municipalities, without identifying which local municipalities. For example, figures exist for the number of local municipalities that have commercialized or outsourced water services, without naming which ones. As noted, the city of Johannesburg does not qualify, despite its highly controversial partnership with French water company Suez. It also at time uses raw numbers making inter-table comparisons difficult.

Given the limitations of the data at this stage, the ability to generate a meaningful typology and an accurate set of distinctive and standard cases is limited. Thus, the goal has been to get a general sense of what type of information is knowable about a given-context prior to field research, and

[3] http://www.statssa.gov.za/publications/information.asp?ppn=fzrrv, accessed Dec.06, 2005.

also to provide a crude benchmark for assessing how reliable meso and macro –level existing data is for understanding the hydropolitical context. That is, we will ultimately be able to compare what is knowable through information available in the public domain with what would need to be determined through in-depth case study in order to construct a useful hydropolitical map. In the final analysis, the process will be recursive. After the field assessments are complete, the usefulness and reflectiveness of indicators chosen to create a preliminary and highly proximate typology (see below) will be assessed in light of the case study data.

The usefulness of, despite the limitations of the data, proceeding with a proximate comparative exercise is to identify –to the extent possible - broad trends in South Africa's hydropolitical geographies in order to best select *significantly different* cases. In order to do this however, the clustering – and the meaning of clustering – of different socio-political-economic and cultural groupings has to be more or less imagined, as the official data and maps clearly work to erase these clusters and depict poverty as more equally dispersed along the multi-scalar landscape. Thus, for example, provincial HIV-AIDS statistics must be seen in light of demographic spatial clusters that do not exist in that data *per se*. As discussed in the case study methodology section, other factors, such as existing or on-going relevant research on the field study area have also played a role in ultimate case study selection (i.e. Bushbuckridge).

The variables listed below provide information for the metropolitan, district municipal and provincial levels, into which most official water service authorities fit, in one way or another. As noted, it is also common to find data presented as number of local municipalities within a province or district municipality, without the naming of the local municipality (see Table 1 below). Provincial data was used where no comparable municipal level data is found to exist.

There are also a number of variables available for the Water Service Authority level or Local Municipality, for example, free basic water, incomes, level of schooling, etc. Yet again, the case study briefs tend to indicate that information available is dated and otherwise inaccurate.

Table 11.1 Estimate of Local Municipalities (LMs) adhering to drinking-water quality issues

Province	Number of LMs	Number of LMs Complying	Percentage
Eastern Cape	25	5	20%
Free State	7	3	43%
Gauteng	9	5	56%
KwaZulu/Natal	34	13	38%
Mpumalanga	15	4	27%
Northern Cape	19	7	37%
Limpopo	14	7	50%
North West	11	8	73%
Western Cape	21	14	67%
South Africa	**155**	**66**	**43%**

Source: http://www.competition-regulation.org.uk/conferences/southafrica04/mackintosh.pdf

Thus, the lack of information pertaining directly to water service authority or local municipality as well as the way existing data is represented remains a handicap for hydropolitical mapping more generally, indicating that a methodology for determining the hydropolitical constellation in specific situations will be an important asset to organisations seeking to intervene in water service delivery or draw upon local water resources.

11.2 Proximate Variables for Typology of Hydropolitical Geographies

Data was reviewed from a variety of sources, including the 2004 'Non-financial Census of Municipalities', the '2001 Census' (most recent) via the South African Demarcation Board[4] and Statistics South Africa Online[5], and other water data available via the Department of Water Affairs and Forestry, such a current Free Basic Water statistics[6]. These data sets will be supplemented by comparisons with thematic maps and tables available through, for example, the Department of Environmental Affairs and Tourism[7] and as well as more general Catchment Management Area features available in the National Resource Strategy, First Edition 2004[8]. Qualitative data has also been used to inform and challenge statistics.

To facilitate the case study selection, then, we selected proximate indicators for five community features. Since much of the available data, especially the census data is so fragmentary, we specifically chose variables that might be able to tell us something about the deeper fabric of communities rather than hard water and sanitation infrastructure, which may have changed significantly in the interim (more recent data is available with in the 'Non-financial census' – but only as raw numbers, and without accurate population numbers, are not useful for these purposes). Thus, we selected proximate variable for the following:

1) Health and Well Being
2) Capacity
3) Intra-community Trust
4) Environmental Sustainability
5) Local Livelihoods

Enumeration and some explanation of the variables chosen are provided below, as well as some sample tables.

11.2.1 Overall Health and Well Being

There are four variables chosen to represent overall health and well being. These are: 1) life expectancy at birth, 2) hunger in household, 3) estimated HIV prevalence, and 4) percentage of poor receiving free basic water. These variables are all available at the provincial level, and the final variable is also available at the Water service Authority level. These indicators are taken from a variety of sources, calculated from between the years 2002 and 2005.

Variable: Life expectancy at birth

[4] http://www.demarcation.org.za/, accessed Nov 14, 2005

[5] http://www.statssa.gov.za, accessed Dec 06, 2005

[6] http://www.dwaf.gov.za/, accessed Nov 14, 2005

[7] http://www.ngo.grida.no/soesa/nsoer/general/about.htm, accessed Nov 14, 2005

[8] http://www.dwaf.gov.za/Documents/Policies/NWRS/Default.htm, accessed Nov 15, 2005

These indicators are extracted from the *South African Health Review*[9] and related publications.

Data available for the following levels: Province

Source: http://www.hst.org.za/healthstats/82/data

Latest year: 2002

Table 11.2 Life expectancy at Birth

Life expectancy at birth	EC	FS	GP	KZN	LP	MP	NC	NW	WC	ZA
1996	60.4	52.8	59.6	53.0	60.1	53.5	55.6	53.3	60.8	[1] 57.0
1996 rural	-	-	-	-	-	-	-	-	-	[2] 58.0
1996 urban	-	-	-	-	-	-	-	-	-	[3] 56.2
1999	-	-	-	-	-	-	-	-	-	[4] 53.9
2000	56.2	55.1	58.0	51.6	57.1	53.1	60.5	55.9	63.4	[5] 55.2
2000 ASSA2000 change / no change	57.0	56.0	59.0	53.0	58.0	54.0	61.0	57.0	64.0	[6] 56.0
2000 HDR	-	-	-	-	-	-	-	-	-	[7] 52.1
2000 female	59.0	57.9	61.0	53.8	60.1	55.5	63.9	58.8	67.0	[8] 58.5
2000 male	53.3	52.4	55.1	49.4	54.3	50.7	57.2	53.1	59.8	[9] 52.4
2002	53.5	51.7	54.8	47.5	54.4	49.5	58.8	52.7	62.7	[10] 52.5
2002 HDR	-	-	-	-	-	-	-	-	-	[11] 48.8
2002 female	56.0	54.1	57.4	49.2	57.0	51.4	61.9	55.2	66.1	[12] 55.0
2002 male	51.1	49.4	52.2	45.9	51.9	47.6	55.8	50.3	59.3	[13] 49.9

Variable: Estimated HIV prevalence among antenatal clinic attendees
Based on a sample of more than 16,000 women attending antenatal clinics across all nine provinces, the South African Department of Health Study estimates that 29.5% of pregnant women were living with HIV in 2004**.** The provinces which recorded the highest HIV rates were KwaZulu-Natal, Gauteng and Mpumalanga.[10]

Data available for the following levels: Province

Source: http://www.avert.org/safricastats.htm (South Africa Department of Health Study, 2004)

Latest year available: 2004

[9] http://www.hst.org.za/generic/item.php?item_id=29

[10] text excerpted or paraphrased from source

Table 11.3 Estimated HIV prevalence among antenatal clinic attendees, by Province

Province	2000 prevalence %	2001 prevalence %	2002 prevalence %	2003 prevalence %	2004 prevalence %
KwaZulu-Natal	36.2	33.5	36.5	37.5	40.7
Gauteng	29.4	29.8	31.6	29.6	33.1
Mpumalanga	29.7	29.2	28.6	32.6	30.8
Free State	27.9	30.1	28.8	30.1	29.5
Eastern Cape	20.2	21.7	23.6	27.1	28.0
North West	22.9	25.2	26.2	29.9	26.7
Limpopo	13.2	14.5	15.6	17.5	19.3
Northern Cape	11.2	15.9	15.1	16.7	17.6
Western Cape	8.7	8.6	12.4	13.1	15.4
National	24.5	24.8	26.5	27.9	29.5

Variable: Hunger in household
The 2003 (most recent) National *Human Development Report* for South Africa provides statistics for % of households with one or more persons suffering from persistent hunger over the last year.

Indicators disaggregated by under and over the age of six.

Data available for the following levels: Province

Source: http://www.undp.org.za/NHDR2003/chap12.pdf

Latest year: 2001

Variable: Percentage of poor population served with Free basic Water

The Water Services Act 108 of 1997 made provision for a basic lifeline amount of water for those people who could not afford to pay. Implementation started July 2001. Government supports an amount of 6000 litres per person per month based on an eight person household. However, local authorities determine how much water and who qualifies for the subsidy.

Data available for the following levels: Province, WSA

Source: http://www.dwaf.gov.za/FreeBasicWater/

Latest Year: 2005

Table 11.4 Percentage of poor population served with Free basic Water

Province	Population	Served	%	Poor Population	Served	%
Western Cape	4,969,300	4,295,451	**86.4%**	753,757	668,668	**88.7%**
Eastern Cape	6,530,550	3,646,169	**55.8%**	3,659,276	2,157,332	**59.0%**
Northern Cape	898,493	652,005	**72.6%**	287,556	234,605	**81.6%**
Free State	2,762,704	2,481,498	**89.8%**	1,510,874	1,454,169	**96.2%**
Kwazulu-Natal	10,198,613	7,036,381	**69.0%**	5,645,684	3,651,307	**64.7%**
North West	3,267,595	2,197,451	**67.2%**	1,607,039	1,165,849	**72.5%**
Gauteng	10,585,400	9,032,851	**85.3%**	3,739,580	2,587,927	**69.2%**
Mpumalanga	3,092,517	1,750,145	**56.6%**	1,699,412	850,686	**50.1%**
Limpopo	5,776,311	3,748,668	**64.9%**	3,538,139	2,080,906	**58.8%**
Total	48,081,483	34,840,619	72.46%	22,441,317	14,851,449	66.18%

Source: http://www.dwaf.gov.za/FreeBasicWater/scripts/Frm_ProvinceSummary.asp?serviceType=1

11.2.2 Capacity

It is recognised that some of South Africa's municipalities have neither the institutional, technical nor financial resources to provide safe and reliable water and sanitation services. Recent interviews[11] indicate that DWAF now expects full capacity across the municipal landscape to require 20 years of sustained developmental input. Capacity, therefore, remains a key limitation of –especially – understanding the relationships between and among formal water management institutions.

Four variables, taken from the tables provided in the *Non-financial census of municipalities provided for the year ended June 30 2004* (statistical release P1115), were used: 1) infrastructure to provide services, 2) free basic water policy, 3) monitoring of water quality, and 4) commercialized or outsourced services. All of these variables are available by province and number of local municipalities within district.

Variable: Number of municipalities in each district/metro with infrastructure to provide services

South Africa's history of largely private land owner water rights (riparian) means that a variety of water and sanitation systems in an equally varying state of repair have been transferred to municipalities over the last 10 years. Various incentive schemes were initiated to incentivize municipal take-over of uneven water schemes, and this has often combined with capacity deficits and multiple financial pressures to militate against the development of better infrastructure. Reportedly, many rural areas have no clear sense of the history and maintenance record of the infrastructure they have inherited.[12]

[11] Meeting with the Minister of Water (with South African Water Caucus), Cape Town Wed. November 9, 2004

[12] Interview with Award Representative, Cape Town, Tues, Nov 8, 2004

Table 11.5 Number of municipalities in each district/metro with infrastructure to provide services

District/ metro municipality	Total number of municipalities	Water	Electricity	Sewerage and sanitation	Solid waste management	Other
Metsweding	3	2	2	2	2	0
West Rand	5	4	4	4	4	4
Sedibeng	4	3	3	3	3	0
Ekurhuleni	1	1	1	1	1	0
City of Johannesburg	1	1	1	1	1	0
City of Tshwane	1	1	1	1	1	1
Total	15	12	12	12	12	5

Data available for the following levels: Province and number of local municipalities within district

Source: www.statssa.gov.za/publications/P9115/P9115**2004**.pdf

Latest year: 2004

Variable: Number of municipalities in each district which have implemented free basic services policy

Data available for the following levels: Province and number of local municipalities within district

Source: www.statssa.gov.za/publications/P9115/P9115**2004**.pdf

Latest year: 2004

Variable: Number of municipalities in each district/metro that have a monitoring system in place for drinking water quality

Data available for the following levels: Province and number of local municipalities within district

Source: www.statssa.gov.za/publications/P9115/P9115**2004**.pdf

Latest Year: 2004

Variable: Number of municipalities in each district/ metro that have commercialised or outsourced services

While municipalities tend to be the water service authority, they are free to contract out service provision or invest the responsibility in local or civil society organizations.

Data available for the following levels: Province and number of local municipalities within district

Source: www.statssa.gov.za/publications/P9115/P9115**2004**.pdf

Latest Year: 2004

11.2.3 Community Trust

There is no central clearing house for information about civil society and other non-governmental and associational activity. As noted elsewhere in the chapter, the strength of the 'social movements' and independence of the NGOs sector, more generally, are the subject or much speculation. Nevertheless, both social capital and level of trust remain important, if difficult to measure, aspects of the hydropolitical context. Thus, a number of proximate indicators have been selected: 1) presence of key water NGO, 2) selected crime statistics, 3) recent flashpoints reported in the popular news.

Variable: Presence of mvula trust

According to the Mvula Trust website: 'The Mvula Trust is the largest water and sanitation non-governmental organisation (NGO) in South Africa. It has a proud history in terms of the contribution it has made in the water and sanitation sector in South Africa and internationally. The Mvula Trust has a Head Office and Policy Unit in Johannesburg, and eight Regional Offices in Durban, East London, Empangeni, Kokstad, Nelspruit, Polokwane, Rustenburg and Umtata.'[13]

Mvula Trust is not an uncontroversial NGO – particularly due to its close working relationship with government - with a general reputation for engaging a wide variety of stakeholders effectively, including government. Its strong track record and longevity, however, also speak to its ability to work effectively with communities and to generate conditions for sustainable partnership.

Data available for the following levels: Local municipality

Source: http://www.mvula.co.za/pages/who.html

Latest year available : 2005

Variable: Conflict

Conflict is both the cause and effect of uncertainty and contributes cyclically to the break down of trust and community cohesion. Communities with high levels of conflict will have difficulty addressing broader social goals. Levels of crime remain one of the key challenges facing the South Africa. It is widely recognized that crime statistics and actual levels of crime do not necessarily correlate well; nevertheless we used 'The serious crime ratios during the 2003/2004 and 2004/2005 financial years per province' for:

Murder
Rape

[13] http://www.mvula.co.za/pages/who.html, accessed Jan 02, 2006.

Malicious Damage to Property

Data Available for the following levels: Province

Source:
http://www.saps.gov.za/saps_profile/strategic_framework/annual_report/2004_2005/part5_pg33_81.pdf

Latest Year: 2005

Variable: Recent flashpoints (local crises; demonstrations)
South Africa is prone to 'flash points' and capacity and infrastructures crises. Recent estimates suggest that there have been over 4000 demonstrations this year[14]. Another area of contention is municipal service decay. For example, throughout November 2005 (Nov. 11, 16, 24 and 25), Cape Town experienced a number of 'abnormal' power outages, attributable to 'procrastination of re-structuring…inadequate planning and infrastructure.'[15] Similarly, in September, the Local Municipality of Delma's experienced a deadly outbreak of cholera now believed to have been caused by neglect of water treatment procedures. [16]

Data Available for the Following Levels: Various

Source: Scan of news sources

11.2.4 Environmental Sustainability

Scarcity can be both a natural and a human-made condition. Due to poor rainfall, absence of river and ground water, for example, areas can be absolutely water scarce. Water scarcity can be also be caused by drought, lack of ground water due to forest plantations, over-use, pollution, etc. A key element of apartheid's spatial planning was the displacement of people into water scarce areas. Conservation helps encourage the preservation of existing water resources and the ecological systems that depend on them. In that many areas of South Africa are water scarce, conservation and protection of the ecological reserve are cornerstones of water policy. The future vibrancy of many areas depends on the implementation of reliable conservancy methods and institutions. South Africa's National Water Act makes provision for this.

In order to proximate scarcity and conservancy activities, several variables have been selected: 1) annual surface runoff, 2) total dissolved solids, and 3) the presence of national parks and Ramsar sites.

Variable: Distribution of annual surface runoff
South Africa is an arid country with only 8.6% of the rainfall available as surface water. This is one of the lowest conversion ratios in the world. The mean annual runoff (MAR) for South Africa is estimated at some 50 million m^3 a^{-1}. This is not distributed evenly throughout the country, with the Eastern seaboard having some 80% of the country's runoff, whilst the western regions tend to

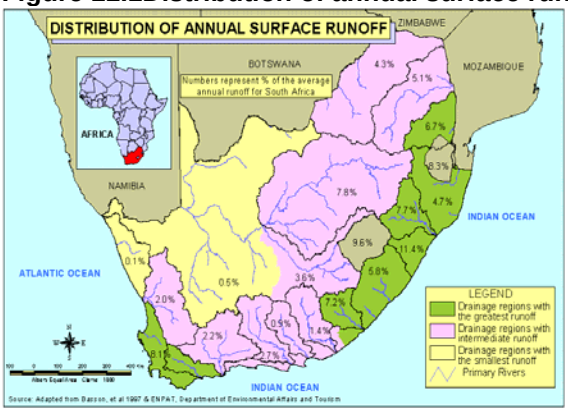
[14] Interview with Patrick Bond, director of the Centre for Civil Society, University of KwaZulu Natal. Jan 11, 2006.

[15] *Mail and Guardian*, 'Running out of Juice', Dec. 2 to 8, p.7

[16] The Sunday Independent, 'Delmas is tip of local government crisis iceberg', Sept. 25, p. 3

have low runoff. Nor is it consistent over time, with great variability between years. Similar to surface waters, South Africa's groundwater resources are relatively limited compared to world averages.[17]

Figure 11.1Distribution of annual surface runoff



Data Available at the following levels: Water Management Area, province (approx)

Sources: http://www.ngo.grida.no/soesa/nsoer/issues/water, National State of the Environment Report, 1999 (most recent)

Latest Year Available: 1999

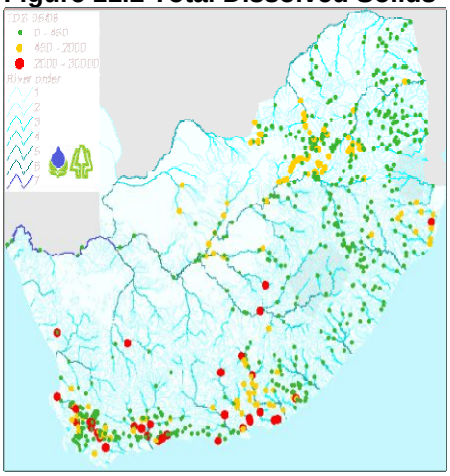
Variable: Total dissolved solids

The scarcity of water is compounded by pollution of the surface- and ground-water resources. Typical pollutants of South Africa's freshwater environment include industrial effluents, domestic and commercial sewage, acid mine drainage, agricultural runoff, and litter. As many of these sources are spreadout across the country, it is difficult to estimate the magnitude of the pollution problem. However, Western Cape, Eastern Cape, KwaZulu-Natal and the Vaal rivers have major problems with Total Dissolved Solids (TDS), and most of South Africa's rivers have eutrophication problems[18]

[17] Quoted or paraphrased from: http://www.ngo.grida.no/soesa/nsoer/issues/water, National State of the Environment Report, 1999 (most recent)

[18] ibid

Figure 11.2 Total Dissolved Solids



According to the 1999 National State of the Environment Report: "Coverage of data on TDS is extensive. Figure 3.17 indicates that major problem areas, where TDS exceeds 450 mgR^{-1}, are the Western Cape Rivers, the Eastern Cape rivers, northern KwaZulu/Natal and the Vaal River. High TDS levels in the Cape are probably naturally occurring and no cause for alarm."

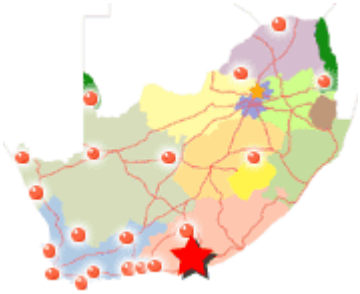
Data Available at the following levels: General Areas

Sources: http://www.ngo.grida.no/soesa/nsoer/issues/water, National State of the Environment Report, 1999 (most recent)

Latest year available: 1999

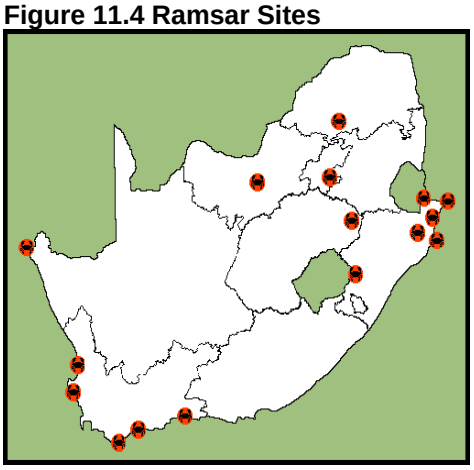
Variable: National parks and Ramsar sites
South Africa has more than 20 National Parks, including some of the world's most renowned wildlife reserves such as Kruger and Kgalagada Transfrontier park. The Protected Areas Act No. 57 of 2003 gives SANParks its legal mandate. The Protected Areas Act establishes that the conservation and sustainable use of biodiversity are important objectives to be achieved in national parks. Biodiversity is defined as the variability from among all sources including terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part and also includes the diversity within species, between species and ecosystems.[19]

Figure 11.3 National Parks



[19] Quoted or paraphrased from: http://www.sanparks.org/conservation/

Figure 11.4 Ramsar Sites



Data Available at the following levels: Specific area

Source: http://www.sanparks.org/conservation/;
http://www.environment.gov.za/soer/nsoer/resource/wetland/ramsar_map.htm

11.2.5 Livelihoods and Growth

The availability of clean water and reliable sanitation have always mapped well onto the social landscape, with those who are relatively well-off having better access and services and becoming healthier and better off, in part, because if it. Conversely, those who are worse off become less healthy and less well off for lack of adequate water and sanitation options. Access to water can also be a limitation on economic growth, in that many businesses at multiple scales rely on the availability of abundant and inexpensive water resources. This applies equally to the growth of micro-enterprises and sustainable livelihoods where cost of basic water or the burden of erratic or distance supply is too high. Several Variables have been selected: 1) unemployment, 2) people over 20 with no schooling, 3) lack of monthly income, 4) price per Kl of water.

Variable: Unemployment

Table 11.6 Chris Hani District Municipality
Labour Force

Persons	2001	1996
Employed	68712	74967
Unemployed	98382	87503
Not Economically Active	273854	-
Total Labour Force	167094	-

Source: http://www.demarcation.org.za/infoIndex.aspx?type=PROVINCE&Prov=Eastern%20Cape&frm=home

Data Available at the following levels: Provincial, district municipality
Source: http://www.demarcation.org.za

Latest Year Available: 2001

Variable: People over 20 years old with no schooling

Data Available at the following levels: Provincial; district municipality
Source: http://www.demarcation.org.za

Latest Year Available: 2001

Variable: No Monthly Income

Data Available at the following levels: Provincial municipality; district municipality
Source: http://www.demarcation.org.za

Latest Year Available: 2001

Variable: Average cost per unit bought R/kl

Data available for the following levels: Province and number of local municipalities within district

Source: www.statssa.gov.za/publications/P9115/P9115**2004**.pdf

Latest Year Available: 2004

Variables selected were reviewed with an eye to surfacing patterns in the data across various scales. Several of those are noted in the following section, as well as their relationship to more standard distinctions inherited from the apartheid era, most notably race and ethnicity

11.3 'Standard' and 'Distinctive' Cases to Complete the Hydropolitical Map

It is inherent to the way data tends to be collected in post-apartheid South Africa – and the data structuring properties of major data sets such as the Census - there are no *highly* distinctive cases. Rather it would be more accurate to suggest that *potential* hydropolitical geographies pivot along a number of axes, many of which are not available in a form that allows for comprehensive or meaningful comparison in the absence of texturizing qualitative data.

Nevertheless, from the proximate variables selected, the Western Cape stands out for having comparatively high life expectancy (62.7 compared to the lowest at 47.5 in KwaZulu Natal). It has high rape and murder ratios as well, with Limpopo having by far the lowest. KwaZulu Natal standouts out with a comparatively high HIV-AIDS rate, low life expectancy, high murder rates, a comparatively low number of poor served by Free basic Water – next to Mpumalanga - and the best overall natural water resource endowment in the country, with Northern Cape suffering with the worst. It also has a significant number of Mvula Trust projects. Limpopo stands out for having a comparatively low murder and rape rates, and a high number of National Parks, including Kruger, as well as having some of the highest incomeless rates in the country.

Other variables that make communities distinctive, not listed in the previous section, include the predominance of coloured or black populations (former white and Indian clusters were merged with other groups in the re-demarcation process and thus do not show up well in the data) and language – English, Africaans, Zulu or other African language, such as Tswana or Sepedi), although information is only available from the dated 2001 census.

As noted in section one, however, existing representations of data, on a whole, have the effect of asserting political boundaries – some of which are contested – while and diluting stark demographic differences, rather than illuminating meaningful variations or local trends. Existing data sets tend to standardize – to the extent possible – and to aggregate with the effect of obscuring clusters of patterned lived experience. Further, the fragmentary nature of the data, particularly the use of a variety of scales, representation techniques and data sets, from raw numbers to households to ratios and percentages, tends to make data mining for the purpose of surfacing clusters at scales that meaningfully map onto other scales and data sets is unworkable.

In this light, we have selected two case studies (as per scope of work) – and a possible third - in order to capture a range of complexities and textures from South Africa's difficult to delineate scapes: one in KwaZulu Natal (Umkhanyekude), one in the Western Cape (Theewaterskloof) and one cross boarder municipality, between Mpumalanga and Limpopo provinces (Bushbuckridge). In depth descriptions of these cases are provided below. In addition to the differences noted above and the challenges launched at the integrity of available statistical information already by the case study briefs below, it is also worth noting that both the KwaZulu Natal and cross border cases are predominantly black communities, with very different cultural bases, with KwaZulu Natal being primarily Zulu, and Bushbuckridge Sepedi speakers. Further, the former is relatively isolated having experienced few NGO interventions, while the latter is relatively close to Kruger national park and has been the subject of a significant number of fairly large interventions by USAID among others. In contrast, the Western Cape case is predominantly a 'coloured' community, which is comparatively *well off* – at least according to the statistical data - and a municipality which nominally has the resources and infrastructure to deliver both water and sanitation services – although the case study brief brings both of these claims made in the official data into question.

It cannot be stressed enough, however, given the limitations of the data at this stage, the ability to generate a meaningful typology and an accurate set of distinctive and standard cases was

limited. Thus, the goal has been to get a general sense of what type of information is knowable about a given-context prior to field research, and also to provide a crude benchmark for assessing how reliable meso- and macro –level existing data are for understanding the hydropolitical context. That is, we will ultimately be able to compare what is *knowable* through information available in the public domain with what would need to be determined through in-depth case study in order to construct a useful hydropolitical map of any given context. In the final analysis, the process will be recursive. After the field assessments are complete, the usefulness and reflectiveness of indicators chosen to create a preliminary and highly proximate comparative typology will be assessed in light of the case study data, as well as the overall relationship between formal information and data sets and lived realities. This should provide some important caveats for future researchers to take onboard when setting out to map hydropolitical constellations in South Africa.

Thus, the lack of information pertaining directly to water service authorities or local municipalities as well as the way existing data is represented remains a handicap for hydropolitical mapping more generally, indicating that *a methodology* for determining the hydropolitical constellation in specific situations will be an important asset to organisations seeking to intervene in water service delivery or draw upon local water resources.

11.4 Case Study Motivations

11.4.1 KwaZulu Natal, Umkhanykude, Mseleni

The Mseleni Water Project case study would make an important contribution to South Africa's Hydropolitical Map. The community is almost exclusively Zulu. This remains one of the most politically influential and coherent ethnic groups in South Africa. It also a group that remains wedded to traditional authority structures, more so than other tribal groups. In terms of community dynamics in the case study, religion and traditional authority are important sources of cohesion; these are the institutions that bind.

Yet, traditional governance structures are not 'officially recognised' in frameworks for water resource management and service delivery, but they *are* deferred to by municipal and other actors in development. In terms of formal capacity, Umkhanyakude District Municipality (the Water Service Authority) is less capacitated than many other municipalities. Water and sanitation services are provided in only 3 out of 6 local municipalities; the infrastructure to provide them exists in only 4 (Non-financial Census of Municipalities for year ending June 30 2004, avail at www.statssa.gov.za). WSDP's have only been produced for 2 municipalities, 3 municipalities have water quality monitoring of some sort in place. A Free Basic Water Policy has not yet been produced for or implemented in the Case Study area. Umkhanyakude has the lowest number of households receiving free basic services of any district in KZN (Ibid).

Also, as is characteristic of other former Zulu homelands, the area is very poor. Unemployment and underemployment is high; over 90% of households are believed to be indigent. Households make use of multiple livelihoods strategies, including subsistence agriculture and informal vending. Water is not widely available for productive use. HIV/AIDS is also a major concern. KZN has the highest HIV prevalence rate in South Africa. Diseases associated with malnutrition and unsafe water are reported in the case study area. Additionally, a locally specific condition Mseleni Joint Disease causes considerable pain, discomfort and disability for women, with significant impact on their traditional responsibility for household water management.

Health concerns are addressed by the Mseleni District Hospital in Myanduya and weekly clinics in other isigodi. The hospital (itself, perhaps, the only formal and externally-linked institution of major importance) began as a mission hospital; Christianity is a motivation for professionals who live/work in the area and religion has been one of the driving forces behind the history of 'development' in the community. Community cohesion around 'issues' is low and not particularly

effective, there have been no demonstrations/protests around service delivery and community organization does not appear to have found a supportive environment.

Water is a source of considerable community conflict (e.g. between old and new water committees, between people who pay and those who do not, between people who have piped water and those who do not). Additionally wealth, gender (women are underrepresented in traditional governance structures and although responsible for providing water they have less control than men over its allocation and management) and differential access to technology/infrastructure (itself related to wealth) are key drivers of conflict.

However, unlike many parts of South Africa, the case study area does not suffer absolute water scarcity. Rainfall is moderate and groundwater is above average (for South Africa). The Mseleni Water Project extracts water from a freshwater lake – Sibaya – which is a national park. The lake is an important source of livelihoods (fishing, reed collecting) for local people and also a protected reserve but there does not appear to be conflict between users; tourism is minimal due to lack of infrastructure (roads, facilities). A Catchment Management Agency has been established to cover the case study area, but is not yet operational.

Finally, the researcher has spent 1 month living in the community, has developed trust and gained access to 'gatekeepers' of knowledge; she intends to spend 6 weeks in the community carrying out her own Msc research, which would provide useful contextual background.

11.4.2 Western Cape, Theewaterskloof, Grabouw

The dynamics of water provision in Grabouw, outlined in the Brief above, reflect on problems at a national level, as well as on levels specific to service delivery in peri-urban and former coloured township areas. 'Water' at the peri-urban level has yet to be fully explored in South Africa, although there are numerous towns with a similar context to Grabouw (Peters, 2005), particularly in the Western Cape. These towns tends to have indicators that suggest that their residents are much better off in comparison to their rural counterparts, yet in reality the poverty can be just as grinding, if of a different nature. Further, these communities tend to be able and ready to mobilize, and often comprise a number of competing and highly politicized factions. As a result, competition and conflicts over scarce resources tend to more fractious and constant than in other areas.

The community in Grabouw is predominantly coloured and black, although coloureds outweigh the number of blacks. This makes Grabouw an unusual demographic profile compared to the rest of South Africa, but comparable to the Western Cape (particularly its agricultural areas). There is noted disharmony in the community (IDP, 2005/6:12). The Grabouw community is highly politicised and different parts of the community mobilise quickly around issues that affect them in the form of demonstrations or marches. Water and housing are particularly contentious issues. There is racial tension around access to water, the implementation of water restricting devices (drips), and service provision. Ward councillors and the municipality have the most bearing on these conflicts, with churches and other structures playing limited roles such as aiding the poor. Drivers of conflict include the way in which the municipality manages water services; the conflict between people who feel they pay for water vs. those that get it for free; and, the conflict between those that have access to it and those that don't. Poverty is inherently related to the racial conflict around water. Gender is another potential driver of conflict – women are primarily responsible for household tasks that involve water and therefore bear the greater burden when access is denied. Other potential drivers of conflict are political power struggles, where some areas are developed above others; insufficient community representation, to the perceived exclusion of certain areas; apartheid planning and geography, preventing the development of some areas; and, environmental issues such as scarce water resources in competition with human needs.

In Grabouw, a large proportion of households live on or below the poverty line. An accurate representation of the number of poor households is difficult to gauge because of the constant

migration to Grabouw of people in search of seasonal employment in the farm and fruit sectors (IDP, 2003:29). During season, fifty percent of Grabouw's population is estimated to earn between R1001 and R1500 per month (IDP, 2003:45). Out of season, households rely on those members of their family that can receive social grants or subsidies, with many households surviving on a hand-to-mouth basis (Peters, 2005). Municipal officials estimate that there are 26 000 people living on the poverty line in Grabouw, which is well above the total number of people recorded by Census 2001.

Unemployment is one of the biggest challenges in Grabouw. The seasonal nature of the economy, based on the deciduous fruit farming and fruit-juice producing sector, means that the earning period is limited to five to six months of the year from January to July (IDP, 2003:45). There is a sharp post season decline with municipal interviews suggesting a high unemployment rate of 70 percent after the fruit season (Peters, 2005). Another common form of employment is construction, which is sporadic work, with workers earning mainly during the summer months as there is little work during winter (Peters, 2005). Households struggle to afford water for their daily use and are excluded from using it productively.

The prevalence of HIV/AIDS, and consequently TB, is high in the case study area. The IDP (2005/6:25) reported HIV/AIDS cases as reaching "alarming proportions". There are HIV/AIDS action groups as well as health facilities in the area. And the municipality has provided more resources to tackle health issues. Conditions affecting children under 5 years include poor nutrition and Foetal Alcohol Syndrome.

Grabouw gets its water supplied from the Groenveld Irrigation Scheme (Peters, 2005: Municipal Interview Data). The latter means that Grabouw does not have to negotiate its water supply with a water board. It reports directly back to the Department of Water Affairs and Forestry. In terms of capacity, water supply is listed as one of the key infrastructural issues that needs to be addressed in Grabouw. This includes a host of water provision related issues: the identification of water resources, creation of purification works, consumption analysis, water demand management, meter management, water loss management, implementation of new infrastructure to name a few (IDP, 2002:79). Infrastructure, such as water pipes, are more than 30 years old, but cannot be upgraded due to resource constraints (Peters, 2005: Municipal Interview Data).

Nevertheless, according to municipal officials, everybody has access to water, whether it is water supplied directly inside houses, water stands on people's plots or access to a pipe that is within 50m to 80m walking distance from their houses (Peters, 2005). However, Census 2001 indicates that 1246 households have to walk further than 200 metres to access potable water, and at least 9 households rely on unhygienic sources such as dams or stagnant pools, which does not meet the Free Basic Water (FBW) mandate of potable water within 200 metres (Peters, 2005:38). Furthermore, it was suggested that there are small areas that are not fully serviced, where it is unclear how many people live and/or need services (Peters, 2005). Although Grabouw implemented FBW as early as 2001, the FBW mandate of 6000 litres of free water per household is limited to those that have accounts (Peters, 2005:39). These households have individual water meters on their erfs and receive individual household bills allowing the FBW supply to be measured and administered.

On an environmental level, Grabouw is in a water scarce region. However, according to the Overberg District IDP (2002:70), the district municipality under which Theewaterskloof Municipality falls, Grabouw uses twice the amount of water it has been allocated. The anticipated building of another 3 500 houses in Grabouw will further increase water demand. The Groenveld Irrigation scheme can supply 2 650 megalitres per year, but Grabouw will need 5 000 megalitres per year. Surprisingly, the WSDP (2000) does not acknowledge the necessity of a water saving scheme, suggesting only that one will be introduced "when necessary". The Overberg District IDP (2002:72) acknowledges that demand management is under-emphasised, however in Grabouw it appears to be absent.

Grabouw has also been the focus of the researcher's Masters degree and subsequent research since 2003. She has developed an extensive knowledge and relationship with the role players and the community in Grabouw providing useful access and background for this case study.

11.4.3 Limpopo/Mpumalanga, Bushbuckridge

Despite the comparatively robust interest taken by national and international NGOs and the area's proximity to a world class safari park, Bushbuckridge remains one of the poorest, least developed areas in South Africa. These factors, alone, make the case distinctive, but another important variable is the contentiousness of the provincial border dispute. Many areas in South Africa have border and boundary disputes of various kinds, but the clearly delineated nature of this one can provide critical benchmarks for assessing boundary disputes more generally.

The case also provides an important counterpoint to the two other cases, being both a non-Zulu area and intrinsically linked to international perceptions of South Africa via traffic from Kruger in a way that the other two cases are not (perhaps explaining the comparatively high level of interest). In other respects, the case reflects many of the conditions seen in other rural areas more generally, from weak capacity and infrastructure deficits, to extremely low employment rates. Yet, important differences remain to be interrogated, such as the comparatively low incidence of violent crime and seemingly robust local-level organising.

Further, the number and scope of academic studies and project documents provides and important baseline, as will the research partnership with AWARD. In dialogue with the comparatively rich body of information, this study will pay special attention to mapping political configurations that may influence water competition. By looking at new different actors both internal and external to the state, this case study will map both the centers and peripheries of power that create the disfunctioning of water supply in the Bushbuckridge area, and may offer a new reading of the ways in which resources, politics and democracy fail to map onto one another to produce problematic outcomes.

11.5 Case Study Methodology

11.5.1 Building and Testing Hydropolitical Mapping Methodologies

Drawing from the PRA tools described below, researchers will deploy different research strategies towards the creation of four types of map. The first three maps are: Situational, social worlds, and positional. These are mainly tools to illuminate the hydropolitical situation for researchers. The fourth map, or series of maps, is one that community members help identify and craft as visual tools that best aid them to: a) perform searches through unfamiliar patterns and landscapes, b) anticipate and verify their position in the hydropolitical constellation, and c) strategise around future goals. Each case study will be undertaken separately so as to create three independent assessments of the PRA toolbox and the situational mapping exercise and a field of comparison for the community maps. This will contribute significantly towards the creation of a rich and textured data landscape from which to build a robust methodology for future hydropolitical mapping in South Africa.

The methodology chapter unfolds in nine sections, taking us from a concise description of South Africa's hydropolitical context and its discursive dimensions, to the proposal of critical ethnographic, grounded theory and various mapping methodologies, to finally providing a brief of research activities.

In South Africa, there has been a dramatic shift in the hydropolitical imaginary, from a complex and decentralized apartheid system backed by the power of a coercive, highly centralized and authoritarian state, to a largely decentralized system, with few policy or regulatory dictums emanating from central government. In the face of an aspirational decentralization process, however, today, various and not always well understood logics operate differently in different functional sub-systems, involving complex and tangled causal hierarchies rather than simple linear bottom-up or top-down management processes. In many areas of South Africa, the dominant trend to date appears to be a disordered proliferation of threats and opportunities for economic, political and social forces. Within, who gets water and why? Struggles over access to water and basic services are struggles over emerging representations of reality within post-apartheid decentralization process that is/ has disrupted previous, and often precarious, balances of power. In their wake remains an uneven landscape of new and experimental strategies vis-à-vis constellations and coagulations of power, both embedded and alterian (see Scoping Chapter and Preliminary Hydropolitical Map). In particular, the taken-for-grantedness that politics could be re-naturalized at the local level appears to remain unstable and provisional, giving way instead to convoluted mix of interscalar (complex mixes of local, regional, nation and international) strategies deployed by various types of actors – from industry and government to conservationists and social movements. At multi-scalar levels, then, a complex re-ordering is taking place, characterised by conflict and competition as the hydropolitical regimes struggles to re-regularize.

11.5.2 Discourse as Political Practice

What if, as Foucault argues, features of the discourse space systematically produce, *not progress towards solving the second order water scarcity conflicts*, but some other political effect (Foucault 1977)? '[F]or example, the way people are positioned into roles through discursive practices, the way certain peoples' knowledge is disqualified or is not taken seriously in contrast to authorised knowledge, and so on' (Mills 1997: 149). In this context, discourses are not simply epiphenomena of external political processes that constitute, constrain and challenge them, but rather political practices and boundaries in their own right, with consequences in the real world. That is, discourses do things; they have effects. Or, more strongly, '[p]eople use discourse to *do* things – to offer blame, to make excuses, to present themselves in a positive light, etc.' (Gill 2001: 175). Or, as Ernesto Laclau has argued, people use discourses to define the limits of what constitutes legitimate debate; what options are *sayable*, even *knowable*.

> The notion of construction emphasizes the fact that we deal with the world in terms of constructions, not in a somehow 'direct' or unmediated way; in a very real sense, texts of various kinds construct our world…The notion of construction, then, clearly marks a break with traditional 'realist' models of language, in which it is taken to be a transparent medium, a relatively straightforward path to 'real' beliefs or events, or a reflection of the way things really are (Gill 2001: 175).

Discourses are central to understanding outcomes, they effect outcomes. From this perspective it is important not only to look at how accounts relate to the world, but also what functions they perform - whether original to intent or not. *As a methodology, discourse analysis does not seek answers about the reality that is assumed to lie beyond understandings of the social world, but about the functions of these understandings themselves.* Thus, the methodological approach described below has not been designed for the researchers to discover truth, but rather to explore the political implications of the way the (constructed) *world* of second order water scarcity in South Africa 'hangs together' (Ruggie 1999). To this end, the goal is to solicit perspectives from multiple sources and levels, attempting to 'fit' accumulating nuances into 'something that works cognitively, that fits together and handles new cases' (Schwandt 1994: 127).

11.5.3 Critical Ethnography

Post-positivist research blends both critical epistemology and methodology. As an epistemology, critical theory rejects the three basic claims of positivism: that there is an objective view from nowhere to be discovered; that the social sciences are value-free; and the researcher can represent the subject as they *are* (rather than how the researcher *sees* them). In response, qualitative methods work to reveal how knowledge is constructed, contingent, and power-laden. Getting beyond surface level assumptions and readings of more conventional research is one of the key objectives of critical qualitative field research.

> The approach to field research taken here is critical ethnography:
>
> - Informing culture bound theories, meaning to find out how participants in the culture define the world rather than imposing the researcher's own theories on those being studied;
> - Discovering grounded theory, meaning the development of theories grounded in the empirical data of cultural description, rather than the testing of formal theories;
> - Understanding complex societies, meaning the recognition of the complexity of modern life, the range of cultural differences and how people with diverse perspectives interact;
> - Understanding human behaviour through what the participants themselves know and how they define their actions; and
> - Strategic research begins with an interest in human problems. These problems suggest needed changes and information needed to make such changes (Spradley cited in Tricoglus: 2001: 139).

The advantage of this approach is that 'critical ethnographies offer vantage points for generating new understandings by illuminating power-laden processes of constitution, connection, and disconnection, along with slippages, openings, and contradictions, and possibilities for alliance within and across different spatial scales.' (Hart 2004: 5) This is achieved partly by treating social constructions (i.e. discourses) as data.

11.5.4 Grounded Theory

Grounded theory is a theory-building methodology. It explores the expression of a phenomenon at multiple levels and from multiple perspectives to see how the various pieces of the puzzle fit, how they might fit, and how they might not fit. It is also recursive, in that it seeks as much data as possible from multiple levels and scales and perspectives, in a process of continually coming back to and challenging the integrity of emerging patterns. Although early versions of grounded theory had positivist roots, Charmaz (2003) and others argue that these are usefully modified by constructivist insights, that put the:

> emphasis on the world of experience as it is lived, felt, undergone by social actors…[Constructivists] emphasize the pluralistic and plastic character of reality - pluralistic in the sense that reality is expressible in a variety of symbol and language systems; plastic in the sense that reality is stretched and shaped to fit purposeful acts (Schwandt 1994: 125).

Traditional grounded theory is based on ethnographic methods of observation and interview, but still seeks to render social worlds data as though it has an uncomplicated correlate to material conditions. Further, traditional grounded theory 'privilege[s] the researcher over the subject,

method over subject matter, and maintains commitments to outmoded conventions of validity, truth, and generalizability (Denzin in Charmas 2003: 271). Constuctivist grounded theory seeks to build theory and demands a commitment to the 'forever provisional character of theory.' (Strauss and Corbin 1994: 279). Thus, a grounded theory approach is recursive and unsettled; elaborated upon during the course of research and 'grounded directly and indirectly on the perspectives of the diverse actors towards the phenomena studied' (280). It is concerned primarily with meaning –and the political effects of meaning - rather than truth.

Constructivist grounded theory is also ideal for building methodological tools, as Charmaz (2003: 273) notes:

> A constructivist grounded theory seeks to define conditional statements that interpret how subjects construct their realities. Nonetheless, these conditional statements do not approach some level of generalizable truth. Rather, they constitute a set of hypotheses and concepts that other researchers can transport to similar research problems and to other substantive fields.

Codes can be transformed as the research and reflection process continues, but helps the researcher to perform qualitative research methods in a more consistent, organized manner.

11.5.4.1 Grounded Theory, Institutions and Mapping

As noted, second order water scarcity is the enmeshed within decentralization processes within which water institutions, organizations and strategies are struggling to re-regularize, re-institutionalize. Institutional critique is a methodology that bridges the interrogation of institutionalized and contingent worlds, while also activating concerns for empowerment and change. Porter et al.(2000) argue that institutions are rhetorical constructions that have real world manifestations, and through deconstructing their methods of operation and finding where there are disjunctures or rips in the seams of operation procedures, one may locate space and manner in which to alter and reconstruct the form of the institution. The authors posit that this work must be done with a perspective that takes into account the physical, temporal and cultural space of the institution. Activities of daily life are actively controlled at both macro and micro-levels by institutions that can be best understood through a spatial analysis that looks at a number of elements of the social, economic and physical environment which shape quotidian experiences. Grounded in the materiality of the space, going beyond the physical to the political, economic and historical location of the institution, the researcher can cast light upon the fissures that run through it, which then can be 'expanded and exploited for positive change' (615).

In addition to arguing for a materially and spatially situated analysis, the authors call for action-oriented research. They write: 'There exists a gap between global ideals and either local or systemic institutional change. Somewhere between the macro-level national critiques and the micro-level practices…is space for an action plan informed by critique yet responsive to local conditions (616). Agency is located in micro-level analyses, as are mechanisms of control.

The actual methodology of institutional critique occurs through post-modern mapping and boundary interrogation. In postmodern mapping, the authors write (623):

> There is always play among a number of elements: the uniqueness of a particular map playing against the global quality of the types of elements such a map normally includes; the static quality of a particular map playing against the dynamism it gains through comparison with other maps, other historical renderings, and other symbols standing for the space; the theoretical allegiances of certain mappings playing against the evidence of such relationships; the relationship depicted playing against the ones unvoiced.

Using mapping techniques, differences in perception can be detected, places of contestation are revealed, and borders that are indeterminate become those spaces in which change is possible.

In locating the boundaries of power, and in identifying the ways in which those boundaries are maintained, policed, or challenged, the power of an institution and its processes are better understood. The researcher can look to, for example, funding sources, histories of policy-making, the interaction and communication between lines of authority, etc., and from this information, an understanding may be gained regarding the non-static, non-monolithic, constructed nature of the institution. The authors argue (627): "In addition to examining discursive bureaucratic practices, institutional critique focuses on the physical structures—economies, architectures, bureaucracies, inter-organizational relations, and physical locations—supporting discursive practices."

The article recommends specific mapping techniques that can be employed to conduct institutional critique, including maps of decision making and legislation, maps of authority (including organizational charts), maps of narratives which may reveal mismatches in perspectives and experiences, and physical maps with macro and micro perspectives (630). (see also the Preliminary Hydropolitical Map) Mapping these heterogeneous, contested environments will help to articulate the ambiguities, fissures and codification processes of institutions.

11.5.4.2 Situational, Social Worlds/Area, and Positional Maps

Postmodern social cartography is a method described by Paulston and Liebman (1994) as a means to visually represent relationships and changes in the social world in a manner that avoids concretizing these relationships by recognizing the fluid, constantly reconstruction of the networks that incorporate a space. If a reader finds the representations and symbols in the map problematic, the reader 'need only redefine the space' (225). This raises the issue of the utility of the map, as the map is constructed and reconstructed per the understanding and framework of reader. The authors write, 'While we find maps can shape the system of objects, we suggest that, rather than carve out a truth, they portray the mapper's perceptions of the social world, locating in it multiple and diverse intellectual communities, leaving to the reader not a truth but a cognitive art…' (223).

The validity of the map, then, is decided by the viewer, as there are no absolute claims to truth made by the visual representation. Forms of power that wind into the construction of the map can be undone by recognizing the information it presents as contingent and fluid – re-arrangeable. The authors claim, 'Social cartography has the potential to be a useful discourse style for demonstrating the attributes and capacities as well as the development and perceptions, of people and cultures operating within the social milieu' (232). Participatory methods can further enhance the joining together of plural perspectives in representing the social, political and economic landscape of their own community (see below).

In particular, as noted in the Preliminary Hydropolitical Map (excerpts below), the project will make use of situational, social worlds/area, and positional maps to surface and sift for key drivers of hydropolitical conflicts. Such maps have proved useful in making complexities, heretofore unstudied –even unseen – visible, and amenable to intervention. They help to elucidate complexities and fluidities within the shifting and unstable empirical world, and have the ability to capture complex and interpenetrated scales. That is, unsettled multiscalar activities and conflicts can be represented, while information is presented in such a way that assumptions about the limits and meanings of physical space are suspended.

Situational Maps

To create a situational map, first, a list is complied of as many as possible of the obvious and implicated individuals, collective, discursive, political, spatial, temporal, symbolic/cultural and

other elements (actants), such as technologies, informations systems, infrastructure, capacity, etc. The boundary of the map is 'the situation', and the aim to provoke the relationships among them to be revealed. Key questions are: 'Who and what are in this situation?' 'Who and what matters to this situation?' 'What elements make a difference in this situation?' 'What seems present but unarticulated?'

After an extensive search that nears completion (but is always open to revision and additions) once the same actors and elements systematically re-appear and new search terms and methods have been adequately explored, the map typically takes the form, first of a brainstormed space, then gradually of an ordered space, where terms come to rest in like-groups.

Social Worlds/Arenas Maps

The social worlds mapping process begins with a search for all the groups engaged in collective action. It then proceeds to make available select information about those actors. Specifically, it is interested in how they represent themselves and the arena in which they are involved. 'How do they interpret the situation?' In order to surface this information, the researcher 'codes' what the actors say about themselves or other key features of the situation (see list of questions below). In this case for example, we look to how the actors characterized water and water users; what scale they implicitly or explicitly argued was the most appropriate, and so on.

The key is to uncover the negotiation/ meaning space between actors. This is known as the discourse space; the limits of what constitutes the legitimate terrain of debate; what is 'sayable' about the situation. 'Negotiations of many kinds from coercion to bargaining are the "basic social processes" that construct and constantly destabilize the social worlds/arenas maps" (Clarke 2003: 560) Things could always be otherwise and these maps express the interfaces between partially-structured possibilities.

Positional Maps

Once the discursive axes have been identified through social worlds mapping, the positional map works to lay out the major positions taken and not taken by both collective and individual actors, including types of actors, such as women, youth, etc.

The key objective is to identify full range of issues at play in any situation and then to position differences and the various configurations of relationships in relation to each other. This map will make apparent 'the multiple positions and even contradictions within both individuals and collectivities' (Clarke 2003: 560). In that it can illuminate the social field, the relationships of which it is constituted and the range of contradictions it embodies, this final map is critical to identifying the crux of conflict in the situation.

11.5.5 Participatory Research Methodology

Participatory Research Methodology encompasses a range of practices, or tools, that the researcher may use to achieve the project goals. Robert Chambers is often associated with the establishment and ongoing refinement of these tools, which have been usefully expanded by other critical theorists. Critical and feminist approaches, for example, insist on including overlapping categories of diversity, such as gender, race, age, etc., as categories of analysis. Similarly, they insist that not only to *in situ* power relations need to surfaced and linked to process and meaning, but the relations of power between the researcher and community must also be understood and factored. Other practitioners of PRM assert that research must be *action-oriented* for the goals and objectives of this type of qualitative methodology to be achieved. From these varying standpoints, three types of PRM can be discerned: standard PRM, critical PRM and action-oriented PRM, which share similar research tools and strategies.

The objectives of PRM are to promote community empowerment so that development can occur primarily from internal rather than external catalytic sources. The activities of PRA are purposefully constructed to include the diverse demographic voices of the community, and to place community knowledge at the forefront of the development process. The African Network on Participatory Approaches sets out a useful guide, delineated by diagnosis, setting priorities, problem analysis and creating an action plan. Within there are a variety of tools that can be chosen according to the circumstances of the research (WTI/World Bank 2000). All of these will be useful for collecting the data needed to complete the social worlds map, and as discussed later, other visual tools designed to be of use to community members for understanding the hydropolitical constellation, setting goals in relation to it, and formulating strategy.

The first stage of diagnosis endeavors to encourage assessment and consideration of the community environment, including social, physical and institutional layers, using tools such as area mapping, semi-structured interviews, transect walks, trend graphs and Venn diagrams. Area mapping fosters communication amongst the various participants about the features of their community and encourages contemplation on the meaning and consequences of physical placement of developmental accessories in their community. Semi-structured interviews deepen dialogue amongst community members regarding socio-economic, political, historical and institutional characteristics of the community. Transect walks through the *situation*, especially to areas that are farthest from resources or community centers expand inclusion of voices outside of the immediate participant circle. Trend graphs identify changes in characteristics of the community, such as population, education, housing, water access, and health over time. Venn diagrams allow community members to consider the different actors and institutions involved with development in the community, and to visually represent the relationships between these actors.

These diagnostic techniques involve large, small group and one-on-one communication, visual representations and physical experiences of the community, all means of gathering information with and through the community that go beyond typical quantitative data gathering methods, such as questionnaires and surveys.

The second step for PRM involves prioritizing knowledge from the diagnostic exercises. One tool that can be used to identify conflicting priorities involves a nominal group ranking activity. During nominal group ranking, participants list their main concerns regarding development and place this list in a ranked order of their prioritized concerns. From the diagnostic exercises, a set of issues and concerns that face the community is drawn up. This activity also encourages visualization of conflicting priorities by, ultimately generating the data for the creation of a chart or map that represents the amount of votes that the participants have awarded to their diagnosed issues.

The third step in the PRM assessment involves problem analysis. The tools that can be used for problem analysis include creating a problem tree and an institutional communication chart. A problem tree lists one by one the problems at hand, and each problem's causes as the roots of the problem and its consequences as the branches. An institutional communication chart ranks the importance of the actors involved in community development and the strength of the relationship measured by the quality of communication between the actor and different parts of the community.

The last step for the participatory research process is to draw up an action plan. The action plan is a way of encouraging forward-oriented thinking, and aims to keep the community organizing momentum going. A planning table is one tool that can be used to create an action plan. A planning table lists the objective, action, responsible group, time frame, partnerships, and indicators of success for the particular issue at hand.

11.5.6 Caveats

Both academic and policy documents tend to combine water using and decision making communities into one unitary and fairly idealistic bounded unit. We would like to dispense with

the following myths up front: the unitary community, the capacitated community, and the equitable community. For example, Cleaver and Elson argue (1994: 10-11):

The gender profile of each community is likely to be very different. In practice,

> the water-using community is likely to be predominantly women, whereas the decisionmaking community is far more likely to be male dominated. Furthermore, patterns of water use rarely fall conveniently into simple administrative boundaries, traditional or modern.The establishment of waterpoint committees or water user associations (even with a majority of women members) may be unsuccessful precisely because they comprise the water-using rather than the decision-making community, and because their remit is so limited.

At times, the main obstacle to functioning decentralized, people-oriented development is the politicized contestation that occurs when the different layers of actors claim credit for various development projects. Party-politics enters into the terrain of development, even when the focus is supposed to be on the needs of the people and their participation in local-level planning, not on the strategic goals of the parties. Thus, the local political leadership must be made aware of the PRM activities, and should themselves participate when possible, but should not depend upon their initiative or involvement. Because PRM is designed to generate the input of communities in their own needs assessment, prioritization and planning, a high level of local autonomy and decentralized governance is important.

Further, we expect the process to also illuminate what skills require further elaboration for mapping to be an effective tool for empowerment at the local level – especially in developing areas where problem solving skills and analytical and synthetic literacies are expected to be uneven.

11.5.7 Cases, Questionnaires and Outputs

Based on this document and its goals, researchers will formulate their own action plan, and ultimately test it. Thus, in part, the research itself is the subject of research, as researchers seek to evaluate what works. The field research period will last from between three weeks to a month, followed with a report back to communities, including verification exercises, action plan building, and ultimately, dissemination. In all cases, prior relationships are well-established. Thus research is building existing layers of highly contextualised knowledge about the case studies and well-established relationships. In the Umkhanyakude case, the researcher has recently spent two months living and observing the hydropolitical context; in the Grabouw case, the researcher has recently completed an MA thesis on the effect of water on the impacts of the Free Basic Water' and cost recovery on low-income households; in the Bushbuckridge case, the project is partnering with a longstanding NGO resident AWARD (Association for Water and Rural Development). Having access to this level of *ground work* and trust is critical to the success of the PRA methods we propose.

Drawing from the PRA tools described above, researchers will deploy different research strategies towards the creation of four types of map. The first three maps are described above: Situational, social worlds, and positional. The fourth map, or series of maps, will be ones that community members help identify and craft as visual tools that best aid them to: a) perform a search through unfamiliar patterns and landscapes, b) anticipate and verify their position in the hydropolitical constellation, and c) strategise around future goals. Each case study will be undertaken separately so as to create three independent assessments of the PRM toolbox and the situational mapping exercise and a field of comparison for the community maps. This will contribute significantly towards the creation of a rich and textured data landscape from which to build a robust methodology for future hydropolitical mapping in South Africa.

Researchers will bring with them All researchers will use the same basic questionnaire to solicit open-ended qualitative reflection. The questionnaire will have seven main questions:

1) What are your main concerns with respect to water
2) What does water mean to you?
3) How do you access water?
4) Who has access to sufficient quantities of water and why?
5) What, if any, are the main barriers to access?
6) What can people do if they cannot access enough water?
7) Rank the concerns offered in response to question #1

These can be asked to both individuals and people speaking in organizational roles to create the social worlds and positional maps. Situational maps should emerge recursively throughout the entire research process.

Throughout the process, researchers will iteratively create their situational, social worlds and positional maps, while also developing a strategy for developing local user maps. It is envisioned that the research team will bring various maps to the site as well as make available newly developed situational maps for both South Africa and the case study areas. Every effort will be made to gather a broad set of maps that pertain to the landscape upon which community member goals might be appropriately set. At some stage, a workshop will be held to deconstruct and reconstruct these maps until they reveal all the relationships constituted by the interplay of data. Key questions include: What are the critical points and silences? What are the rules and conventions that seem to guide synthesis? What other ways could the data be presented? And so on. Participants will be asked to interrogate what tends to get generalized in and out of the mapping process? Is there a pattern? This will be a key process in developing local user maps and community action plans.

Finally, participants may be asked to think through and create their own maps; maps they feel will be useful for decision-making and reaching their water-related goals; maps that represent their world. They may select an already existing map or attempt to recombine useful elements from the various maps as well as the outside verification process into a decision-making map. In addition to basic artistic ability, key issues that may arise include desire to omit important features of the landscape because they are seen as negative influences, difficulty generalizing, weak reflection on silences, and so on. It is expected that the exercise will yield important insights into what mapping elements and skills require further elaboration for mapping to be an effective tool for empowerment at the local level – especially in developing areas where problem solving skills and analytical and synthetic literacies are expected to be uneven.

At a minimum, researchers will synthesize data and describe 1) the hydropolitical constellation, 2) which representations of water were found, and 3) which underlying strategic logic and productive logic were found. This will include reference to all the maps created (situational, positional, social worlds and end user). Finally, the case study chapter will also provide a reflexive evaluation of the tools and strategies deployed and the lessons learned for hydropolitical mapping in general.

12 Grabouw case study

By Karen Peters and Dr J. Zoë Wilson Research Director: Dr Julie Trottier

12.1 The hydropolitical constellation

The hydropolitical mapping of Grabouw, a small peri-urban area in the Western Cape, proved to be a complicated case to study. The literature suggests that "…academic and policy documents tend to combine water using and decision making communities into one unitary and fairly idealistic bounded unit" (Gordon and Wilson, 2006:68[20]). Instead, the Grabouw case study demonstrates the complex nature of communities and challenges the notion that communities are unitary, capacitated and equitable (ibid). The situational map outlined below reveals the numerous actors, actants, discourses, historical and political elements which form the boundaries of this situation. Actors and actants and their relationship to each other, is the concern of the first section of this chapter, which seeks to identify the hydropolitical constellation. Subsequent sections deal with the representations of water which were found - including the discourses of water - and the drivers of conflict, co-operation and competition around water, within the community.

Table 12.1 Situational map of Grabouw

[20] Building and testing hydropolitical mapping methodologies.

Individual human actors: Mayor, Head of water and sanitation (TWK); water reticulation manager (Grabouw), water reticulation plant operator (Grabouw), sanitation plant manager (Grabouw), water meter readers (Grabouw), debtor clerks (Grabouw), farmers, farm management, ward councillors, Community Development Workers, people within households from different neighbourhoods and farms, businesses, industry	Implicated and silent actors/actants: Gender, poverty, environment/drought, lack of education about water saving, health/disease – diarrhoea, HIV-AIDS, TB, stomach cramps, youth (=waste), expense/cost of water; quality of water; constant immigration to Grabouw/influx of new job seekers; boundaries around land such as farms, forestry and reserves, unemployment, crime, darkness and night time, municipal corruption, bad infrastructure, lack of services, the bushes are exhausted; pollution/sewerage running into the rivers and water supply; power failures cause sewerage plant to fail and then pollution, lack of monitoring/evaluation of water use and allocation (farmers); sharing toilets but not cleaning of them.
Collective actors: Groenland Irrigation Board (farmers), TWK municipality, municipal council/ management, DWAF, Working for Water/Hottentots Holland Nature Reserve (Conservation), Breede River water user association (catchment based), Cape Town water use and management	Key events: Cut-offs, water restriction devices/drips, water restrictions during drought, rescinding debt, drought, N2 fire, displacement from N2 to Iraq, influx of black people 1994, amalgamation of municipalities, change of management (sewerage plans incomplete), FBW, DWAF act nationalising water sources - NWA; lack of consistency/continuity between various DWAF ministers' agendas.
Discursive construction: Water as basic need; as a human right; as a scarce resource; conserve water; management of water/education about water; people as customers and as citizens; water managed as an economic resource; households use water properly if they pay for it; water is an economic resource; water essential for business discrimination in access to water; water has always been/ is plentiful.	Discursive Constructions of non-human actants: Race; class; gender impacted by types of water and sanitation provision; (poverty = lack of sanitation?); water (restrictions) as a symbol of discrimination
Political and historical elements: Apartheid legacy; distorted service provision based on race; amalgamation means more resources shared between areas to address backlog but also more responsibility for financial self sufficiency; constitution and responsibilities it implies (most municipal staff refer to it); lack of capacity – money, human, infrastructure, water sources.	Socio/cultural and symbolic elements: Water as 'everything', water equals 'life', water for spiritual cleansing, water is health, water is freedom (old people felt free in water use in old days) but now self restrict use; NWA traumatic experience for farmers.
Major issues and debates: Cost recovery, non-payment, cost of water/services, water quality, FBW, water restrictors, unemployment, poverty alleviation, service and infrastructure backlogs, increased need for access to water and sanitation (increased pressure from houses built), water restrictions, conservation, infrastructure problems (no water for hours); influx of outsiders for jobs; discriminatory behaviour; 'boetie-boetie' system.	Spatial elements: Apartheid spatial planning (lack of) – need to lay down more infrastructure/pipes to previously non-serviced areas, farms distant location in relation to potable water supply (means supplying purified/ potable water for farm workers is expensive), urban explosion (increased need to provide housing and water), water scarcity of the Western Cape region, reliance of cape town on catchments management in this area

Non-human elements:

Nature/Climate change – less rain, snow, frost and water, technology (water and sanitation purification plants failing in duty), sanitation infrastructure melt down, bulk supply (problematic once demand exceeds GIB/Eikenhof dam capacity and expensive); the reservoirs have a limited carrying capacity (reserves for purified water)

Theewaterskloof (TWK) municipality is responsible for the provision of water and sanitation services to 7 small towns, including Grabouw, and outlying rural areas within its jurisdiction. TWK municipality sets the tariffs for all municipal service provision. TWK municipality determines the cost of water and sanitation services. The tariffs for water and sanitation service provision include monthly operational and maintenance charges for an assurance of supply. The Grabouw local authority, the administrative arm of TWK in Grabouw, is directly responsible for water purification and reticulation to households, businesses and industry in Grabouw. They are also responsible for sanitation and there is a sewerage treatment plant in Grabouw. The sewerage treatment plant needs to be upgraded, yet the decision to upgrade the sewerage plant is reliant on TWK.

Debtor clerks process payments for water and sanitations services; reconnections fees; and, disconnections. They are the 'face' of the municipality – the side the broader Grabouw community have the most contact with at the municipal offices. Water meter readers are tasked with checking meters, for households that have them, readings forming the basis for their monthly water bills, however huge questions have been asked about their accuracy in measuring.

Whilst Grabouw's administrative staff represent the municipality, they also express the sentiments of their household/neighbourhood social worlds. For example, frustrations with the water restrictions: Engelbrecht as head engineer and water reticulation manager acknowledges DWAF's conservation mandate during drought but as a resident is frustrated that he is not able to water the garden or wash his car when water restrictions are in place.

The Groenland Irrigation Board (GIB) "owns" the Eikenhof dam[21], completed in 1977 by farmers in the Grabouw area for irrigation and domestic consumption. Prior to the Eikenhof dam, water was not distributed easily to the farming community, particularly those on land locked farms, and pumping water out of rivers was expensive. Raw water is now provided to 140 members (comprising farmers (95%), industry, and Grabouw municipality) through an irrigation system, one of the cheapest prices in South Africa (SA) (8c/m3). The dam was raised in 1988 and 1998 in response to predictions of increased need for raw water. GIB's role in water use and allocation in Grabouw and the surrounding farming areas is extensive, particularly as the Eikenhof dam is the last remaining major water source in Grabouw. Their role includes determining the cost of supplying raw water to the municipality and surrounding farms and, maintaining infrastructure. Specifically, the GIB's functions are to "Prevent water wastage; protect water resources and water works; prevent unlawful use of water; remove unauthorised impediments; prevent unauthorised degradation of water quality; maintain water distribution system… keep records of water users and water consumption; construct, obtain, manage, operate and maintain waterworks

[21] The walls and piping or infrastructure.

for raw water; temporarily suspend water supply for …maintenance and/or protection of resources; assistance to members with regard to change in water use rights required by the NWA" (GIB, Annual Report 2004:6).

The municipality relies on the GIB scheme for a significant portion of raw water. Grabouw municipality purification works were opened in 1984 supplying 1100 residential plots (roughly 12 000 people, mostly residing on farms in the outlying areas, and predominantly coloured). At this stage water was retrieved from the Wesselsgat Dam. In 1998, with the influx of job seekers from the Eastern Cape into Grabouw, a huge increase in water consumption demand occurred, resulting in the extension of the water purification and sewerage works. The Wesselsgat dam supplies 580 megalitres of water per year. Eikenhof dam supplies 909 mega litres to the municipality per year. The municipality is entitled to 909 mega litres because of financial aid that the council gave the GIB to build the Eikenhof dam. In 2004, negotiations took place between the GIB and the municipality for the Eikenhof to supply another 3 500 mega litres to the local authority at the cost of R3.5 million (per year). Currently, there are 5500 erwen recorded in Grabouw and 5 squatter camps[22] with an estimated 50 000 people living in Grabouw (Personal Communication, Water Reticulation Manager, 2006). The Eikenhof dam is the last remaining source of water in Grabouw. If more water is needed, the municipality will have to buy water from farmers that do not use the portion they have. The GIB cannot meet crisis/peak demands for water during the short term.

The Department of Water Affairs and Forestry (DWAF) have rescinded water rights through the National Water Act, nationalizing water and allocating water according to use and agricultural/industrial needs. They have also reallocated water from the catchments area that services Grabouw to Cape Town (CT) during the recent drought and water scarcity period. Water restrictions were imposed on Grabouw owing to the reallocation of water from this area to CT and have been felt by the surrounding communities. (People felt that even during the dry season Grabouw has enough water, so restrictions are directly a result of CT (Personal Communication, Water Reticulation Manager, 2006). There is mis/information that water restrictions are still imposed on Grabouw although the municipality has indicated that water restrictions are no longer in force).

The rescinding of water rights has been described as a traumatic experience for farmers. Most farmers have their own dams, but rely on water from Eikenhof dam/GIB scheme to irrigate their crops. Farmers rely on water for irrigation of their crops during summer and rainfall during winter. Farms are a major source of employment in Grabouw during harvest season – 6 months of the year from January to July – and boost the local economy. Farmers are responsible for the supply of potable water to farm workers living and working on their farms. This is costly and there is no consistent approach to the purification of water. The farmers we spoke to rely on farms dams for the supply of water for household use, including drinking.

Similarly, small businesses and the major deciduous fruit based industry in Grabouw rely on water for production and cleaning purposes. They also provide employment opportunities in Grabouw, impacting positively on the local economy. They have always had access to sufficient water, sourced from either the municipality, or the GIB, or both, dependent on need. Two-a-day, Elgin Fruit Juices, the Grabouw Abattoir and two chicken abattoirs are the major water users. (Abattoir: The quality of water has been questionable, however not a problem if used for cleaning

[22] (Waterworks; Beverly Hills; a small camp next to Snakepark; Rooidakke; Hillside – a camp next to N2 – and Zweyelitsha/Iraq, comprising people who have been moved from Hillside, although a portion of people have rebuilt there or remain there).

purposes only). However, according to the Grabouw municipality, household users have increased pressure on the water supply.

The Hottentots Holland Nature Reserve is focused on conserving water and aligns itself closely with DWAF objectives. It implements the Working for Water Programme with the goals of saving water in Grabouw by uprooting/slashing pine trees[23], educating those in its employ about conservation and the water cycle, and providing poverty relief locally through employment. According to the reserve, the Working for Water programme has increased the amount of water flowing into the Palmiet River Station. SAFCOL shares the boundaries of its plantations with the reserve and these areas need to be deforested of young pines. However, it has handed over some areas to the reserve. The nature reserve plays a further role in the community through educating school children about water saving techniques and conservation. The reserve 'manages' catchment areas which supply CT with the majority of its water. According to the reserve catchment management requires little work in such an environment – the water manages/regulates itself naturally because it comes from areas in high proximity in the mountains which are unaffected by pollution.

The municipality, GIB, DWAF and farmers are capacitated in varying degrees as key decision makers on water use within Grabouw. However, the communities that are served by them are water users that are not (do not feel) part of these decision making structures. Furthermore, communities within Grabouw are neither homogenous nor organised (racial, rural-urban divides).

There is a distortion in service provision based on race that reflects the apartheid legacy. White households have a history of access to convenient and accessible water and sanitation infrastructure inside homes and in gardens. Established coloured households, living in Grabouw for decades have similar access to water and sanitation infrastructure[24]. Lower income coloured and black households live in "RDP" (Reconstruction and Development Programme) houses – low income state subsidised housing – which have a tap and toilet in their yards, and closer access to water than their predominantly black counterparts living in informal settlements. Apartheid planning combined with the recent migration of people and, limited resources within the municipality, impacted on the extension of bulk infrastructure to previously un-serviced (and predominantly black) areas. The amalgamation of 7 areas/ former municipalities and their resources into TWK has allowed Grabouw to utilise resources to build infrastructure for these 'peripheral' (marginalised) communities, constructing communal taps and toilets. Access to sanitation is particularly problematic in these areas and people resort to using the surrounding bushy areas.

Rooidakke, Waterworks and Zweyelitsha (also called Iraq by the locals) are three areas where access to sanitation continues to be problematic. In Rooidakke, households are meant to access communal toilets via keys, but households are unclear about who owns keys. (The locks in Rooidakke were broken.) The limited numbers of communal toilets are compounded by criminal activity – locally known as "skollies"– at night which prevents people from using the water and sanitation provided. The old and the sick suffer in particular (Waterworks – old man). Stagnant water lying in pools near the communal tap and toilet points smells, and is considered a health risk by the local community. Outside toilets are problematic in other communities, where there are external toilets on erfs, too. Infrastructure breaks easily causing toilets to overflow.

[23] A fully grown alien tree consumes 300 litres of water per day.

[24] Can one claim this? That one is an old grabouwer does not necessarily imply access to these kinds of services eg. pineview.

Iraq is the newest squatter camp which accommodates people displaced after a fire in a squatter camp settlement next to the national N2 highway. Households were placed on land in further proximity from the main town and without access to water or sanitation infrastructure. Initially, water tanks serviced the area, but complaints arose about the tanker water causing illnesses. There were no toilets to begin with and households dug holes in the ground. This situation has recently been rectified with the allocation of a few communal taps and toilets. The communal taps do not function effectively and often water does not come out of them. This is due to the steep incline up to Iraq and difficulty pumping water up this hill. Iraq households believe that Rooidakke, the squatter camp below, is responsible for the loss of water due to their overuse of it.

There are a number of issues that seen present but unarticulated. There is a lack of knowledge about how to approach actors with the power to improve the situation and, how to hold these core people accountable. Households in certain areas feel that there is no way out of situation. People have given up and don't know how to solve their problems. In the coloured communities there is an underlying tension between those who pay for services (established households; whites, coloureds) and those who do not (squatters; blacks; Xola Naledi, RDP houses; 'boetie-boetie' system). The municipality is required to maintain financial self-sufficiency. This results in households that have water metres on their properties being held to account to pay for their services through the use of water restricting devices or 'drips'. Access to water has become a symbol of discrimination because in squatter neighbourhoods where there are communal taps water continues to flow freely. Households with meters feel targeted with high bills and threats. Unemployment contributes to the incapacity to address arrears. Ward councillors are largely mentioned as absent, although it is their role to represent problematic issues for the community. Subsequently, there is much antagonism towards the municipality.

There is a high unemployment rate, yet there seems to be an absence of innovative small businesses using water, except for the Siteview area. Households attribute the latter to the expense of water in the area.

Farm workers in the area do not see themselves as part of the monetary processes that form part and parcel of town dwellers lives. They rely on farmers to supply potable water to their houses, which is often supplied directly from dams on the farms to these houses. Farm workers have taps and sanitation inside their houses and, taps outside for their gardens. The quality of the water is unregulated, and farm workers complain about their young children having stomach cramps. However, the water provided to them is free and they have accommodation on the farms and therefore, farm workers feel they are not in a position to complain to the farm owners and managers. Farm workers use the amount town dwellers have to pay as a reference point for their situation.

The quality of water and how it has been allocated has been questioned in response to residents experiencing diarrhoea and stomach complaints. The role of accessing water during time of ill-health is another implicated actor. TB and HIV/Aids is prevalent in Grabouw, however there has been an absence of discussion from the community on the impact of access modalities on people with these illnesses. Residents in town and municipal staff working in the municipal buildings have also complained about the colour of the water. Wealthier households hold the municipality responsible for what they feel is the low quality of water. While a major business in the area argued that it was the decline in qualifications and experience of the staff working in the water reticulation plant (they made a causal link between decline in water quality and staff experience with government employment policies such as affirmative action, but this seemed implied).

There are several sources of pollution of water sources that have the potential to harmfully affect downstream users and need to be addressed. Point source pollution occurs when pollution enters the river from an identified source at a particular location (Gale, "The Palmiet River Catchment Status Report", 2000). The sewerage treatment plant in Grabouw is not functioning optimally and it has been suggested that the wastewater released into the Palmiet River is not of a sufficient standard. Farms situated along this river draw water for the irrigation of their crops and water supply. The power disruptions in the Western Cape extended to the sewerage plant in Grabouw and have also played a contributory role to point source pollution in the river. According to Gale (2000:13), the fruit industry releases "…small scale agricultural waste…predominantly juice plant effluent" at known points in the river. A second source of pollution is non-point pollution: "…pollution resulting from seepage and runoff entering the river directly from their source as opposed to being channelled to stormwater or drainage channels or treatment plants" (Gale, "The Palmiet River Catchment Status Report", 2000:12). Iraq is situated near the border of the nature reserve on a hillside with no drainage systems and, similar to the other squatter camps in Grabouw a limited number of communal toilets which do not meet demand with a consequence that people use the surrounding bush area. Subsequently, it is reported that runoff from these low infrastructure areas is polluting the river. Pollution occurs below Grabouw and the dams/catchment areas, impacting on downstream users. Squatter communities have identified pollution, dirty water, in the vicinity of their service points and homes as problematic. (In the most affluent area, one interviewee experienced the death of the fish life in the pond on his property in previous years.)

The discourses found in these varying communities is dealt with in the subsequent sections of the chapter, where the conflicts, co-operation and competition over water are discussed with reference to the situational, positional, social world and the end user maps created during community feedback meetings. Section 3 analyses hydropolitical mapping as a methodology and its limitations and advantages.

12.2 Representations of water in Grabouw and drivers of conflict, competition and co-operation

The second section of this chapter describes the different representations of water found in Grabouw. A semi-structured questionnaire pursued in individual, group interviews and transect walks was used to elicit different representations of water in Grabouw. The questionnaire was based on the hydropolitical landscape determined by the focus of the study and comprising 8 core areas. The core areas around which the representations of water are deconstructed are: representation of self (in relation to water use), representation of people (in relation to water use), the dominant scalar level at which water is thought about, representation of water, perceived drivers of change, water use, perceptions of access, and perceptions of allocation or transmission of water.

The representations of water are further analysed in relation to situational, social worlds and positional maps which have been constructed with a view to identifying the underlying political and material drivers of conflict, co-operation and competition in Grabouw. The map of Grabouw's Social Worlds indicates the discourses around water that are present, whilst the positional map identifies the different positions taken by participants, demonstrating potential areas of conflict, competition or co-operation.

The following maps will be referred to and explained in this section, culminating in an overview of the material and political drivers found within Grabouw.

Figure 12.1 A map of Grabouw's Social Worlds

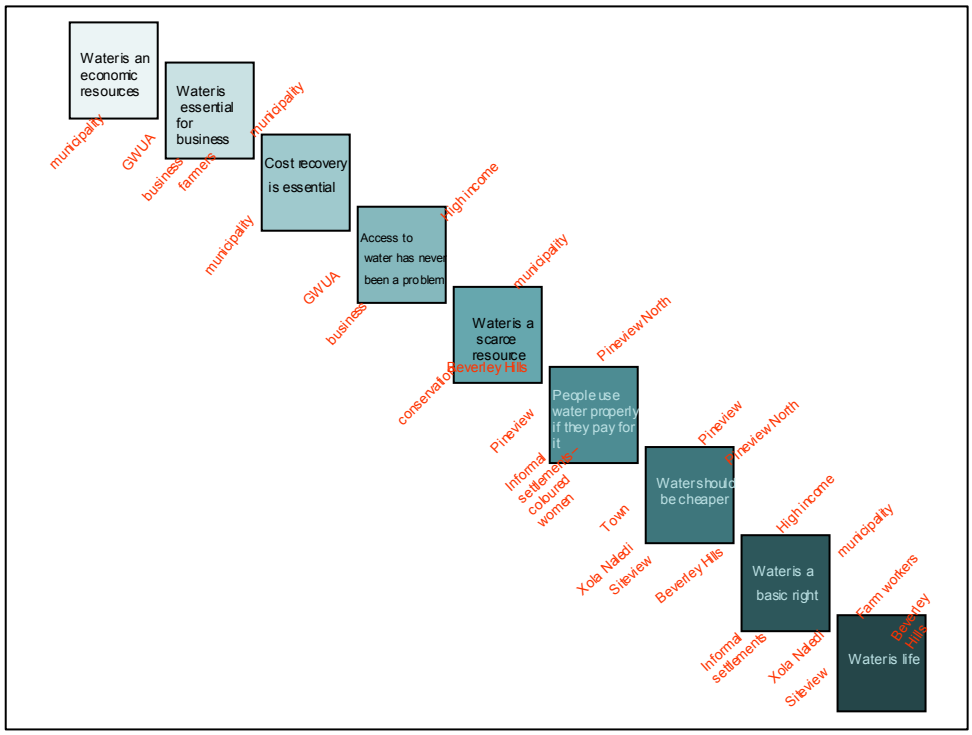
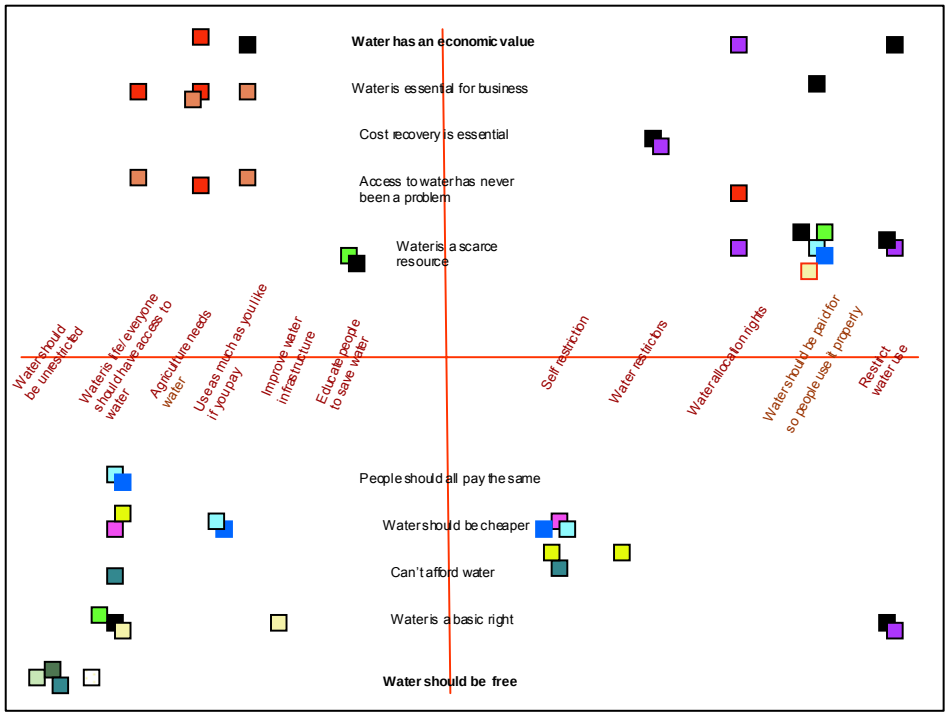
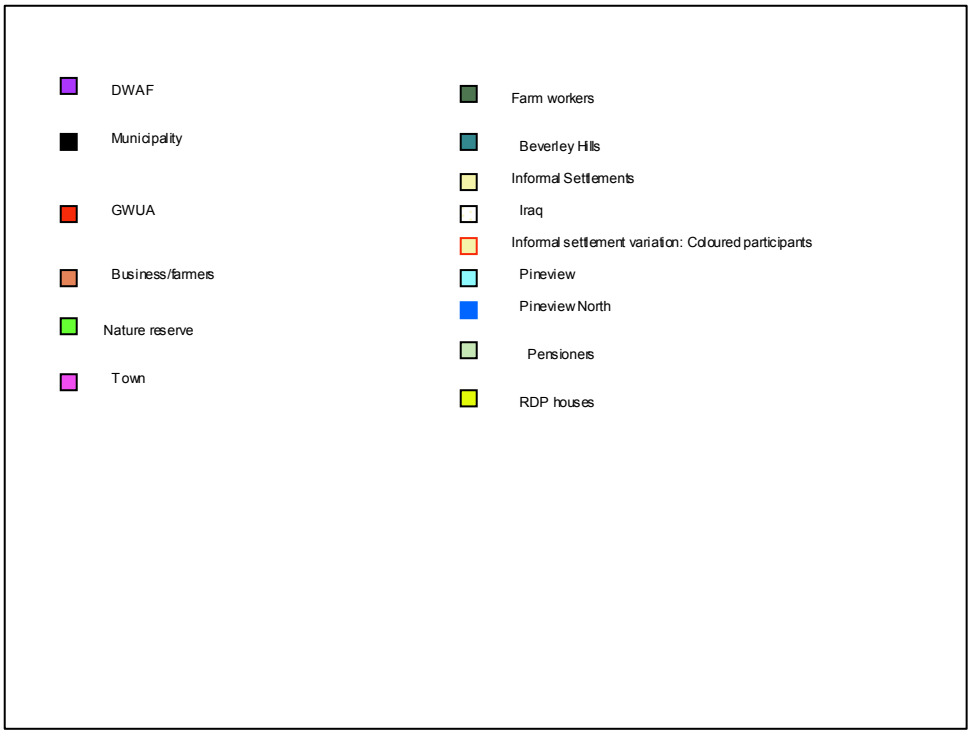


Figure 12.2 Grabouw's Positional Map





The analysis begins with Theewaterskloof municipality, the main provider of services in Grabouw, and then considers the representations of water of different areas in Grabouw. These areas are divided into RDP houses; old and new informal settlements, low to high income communities - Beverley Hills, Pineview and Pineview North, Town, farm workers, Hottentots Holland Nature Reserve and finally, the Groenland Irrigation Board and the farming community.

12.2.1 Theewaterskloof/Grabouw Municipality

The municipality's representation of water links closely with how they perceive their roles. Grabouw municipality **represents themself** as a water provider with a delivering mandate, and are proud that 'everybody has access to water in Grabouw'. The debtors clerk argued that people are fortunate for living in the Western Cape because of it service delivery record of people walking the least distances to access services such as water (Debtors Clerk, 2006). Part of its service provider role is also to remain financially viable and as the Theewaterskloof end-user map indicates non-payment for services is a huge problem which is crippling the budget allocation for much needed infrastructural upgrades. The end–user map links non-payment for services to a limited budget and insufficient sewerage treatment facilities.

The municipality's representation of water reflects their role. The social worlds map indicates that **water is perceived** as a basic right and it is also seen as an economic good. Municipal staff at the water reticulation plant argued that the cost of purifying water services is high and therefore, it should be treated wisely. Furthermore, the process of purification and providing water is seen as a business (Water reticulation manager, 2006). The municipality's **representation of people** conceptualises them as consumers and as people with basic needs (citizens).

Water is further represented as a scarce resource, although the end user maps did not reflect this. The municipality reports to DWAF about water loss and there is awareness of water as a scarce resource which needs to be managed. However, as the social world map indicates, the discourse that water is scarce resource is combined with the discourse that water has an economic value. There is a need to change people's attitudes towards using water and increase awareness about water use to prevent wastage, and water is costly to purify. In this manner, water shouldn't be wasted and people must pay for what they use. The municipality's **representations of water** therefore include water as an economic resource, water as a business, water as something that must be managed and conserved and, as an essential human need and basic right.

Water is used to provide households with access to potable water and sanitation thereby meeting the national frameworks for and constitutional obligations of the municipality. Water is also used for the major industries in the area indirectly boosting the economy. Although the municipality recognises industry as water users, the role of water in Grabouw's economy is unarticulated and absent on the end-user map. This is a silence given the role of industry, largely based on the deciduous fruit farming of the surrounding area, in creating employment for numerous residents in Grabouw.

The municipality's understanding of where water comes from or **dominant scalar level** used is a result of its role as service provider. It provides water by ensuring a continuous water supply from two different access points. Wesselsgat dam is a 580 megalitre reservoir and Eikenhof dam has recently been sourced to provide 909 megalitres per year. The municipality provides water and sanitation services through a number of access modalities: dams, reservoirs, bulk infrastructure, purification and reticulation systems, sewerage treatment plants, pipes, and different levels of households plumbing/infrastructure – toilets and taps inside or outside houses and communal taps and toilets. The municipality maintains existing infrastructure.

Perceived **drivers of change** around water use can also be considered the potential political or material drivers of conflict. The collapse of apartheid is a huge driver of change, highlighting a gap in the provision of essential services to previously disadvantaged households which needed to be filled. The constitution and the introduction of basic rights, the FBWP guaranteeing access to water, meant the huge backlog in service provision had to be addressed. Increased household demand, combined with constant migration to Grabouw in search of employment, compels the ongoing provision of water services. Because of the influx of people and the sudden post amalgamation obligation to deliver service water needs to be secured through reservoirs. Currently, the emphasis of the water provision mandate is to secure sufficient water through the extension of reservoirs to supply the increasing number of households in the area. As will shown through out this chapter, the increase in demand for water services has created a potential conflict between water as a finite resource (the environment) and human needs for access to water. As one employee pointed out – the municipality cannot afford squatter camps because they will run short on raw water. He argues further that communal management of water in squatter camps is not working. The positional map juxtaposes the municipality within two oppositional quadrants – water use needs to be restricted because it is considered scarce and is posited as an economic value and water is a basic right. This is a political driver of conflict which is drawn on by numerous communities throughout their representations of water. However, the end-user map (drawn line department officials as opposed to management) indicates that education about saving water in daily use is vitally important in the context of numerous and increasing numbers of water using households. The latter could be considered a step forward in the context of increased pressure on the water supply and expense of services.

Figure 12.3 End user map, TWK municipality, Photo: Karen Peters

The need for financial sustainability has also meant that the municipality pays increasing attention to issues such as recovering costs – another potential driver of conflict within certain communities. The end user map refers to funding as a major issue, which prevents the improvement of infrastructure such as the sewerage treatment plant. The municipality determines household's access to water beyond the initial free 6000 litres through cost. The end user maps of Pineview, Pineview North, Siteview and Xola Naledi all identify the cost of services and punitive action taken against non-paying households as a contentious if not conflictual area – a point which was raised in the community mapping process.

Interestingly, and opposed to current practice, the municipal end user map identifies national government, DWAF, and Theewaterskloof as a wish list of actors responsible for helping the municipality with funding. A key relationship is with the head office of the municipality – Theewaterskloof – which determines the redeployment of human resources and funding to operational services, including the sewerage treatment plant.

Water scarcity is also identified as a material driver of change in water use and/or conflict, competition and co-operation. The municipality co-operates with DWAF to provide Cape Town with a reserve water supply during drought. However, in an effort to conserve water, strict restrictions have been placed on Grabouw residents. There is increased awareness through imposed water restrictions, such as minimum watering times for gardens or washing cars, during periods of drought. Members of the municipality, as residents of Grabouw, are unhappy that Cape Town's water use is impacting on their water use. Concern about saving water is further complicated by another discourse which argues that if households pay for water it doesn't matter how much they use. The positional map indicates these apparent contradictions.

12.2.1.1 RDP houses: Xola Naledi and Siteview households

Xola Naledi and Siteview participants comprise black households living in low cost housing government based initiatives.

Xola Naledi households **represent themselves** as not being free to use water and finding it difficult to pay for high service provision bills. As such, they feel they cannot use water the way they would like to. The Xola Naledi end-user map demonstrates that unemployment is linked to inability to pay the bills (Unemployment did not feature in the initial semi-structured questionnaire. The end-user map has clarified the link between no work and no water for these households).

Xola Naledi **represents other people**, such as the neighbourhood of Rooidakke squatter camp, as in a worse situation. Xola Naledi's water **access modality** occurs via toilets and taps inside their houses. They feel they have a better system of access than Rooidakke who use communal toilets and taps. Other people in Xola Naledi are perceived as not wanting to share water – expense of water therefore becomes a potential **driver of conflict** and competition over water resources. Farmers, churches and women are perceived as using a lot of water.

Xola Naledi's **representation of water** is a common one amongst households - water is seen as necessary for survival and health. The apparent dominant discourse as indicated in the social worlds map is that water is life. However, households find it very expensive. The social worlds map demonstrates that they are closer to the discourse that water should be cheaper and water is life (a basic right/should be free). High service bills have **changed the way households use water**. While some households are placed on water restricting devices, others find that self restriction of water usage occurs. The predominant **uses for water** are cooking, washing, cleaning, and maintaining health. Xola Naledi households are aware of people in their area using water for religious reasons particularly the St Johns church, requiring a lot of water which is problematic in the context of its expense. Households' perception of a **scalar level** of where water comes from did not go beyond the household level. They did not know where water comes from.

The municipality is perceived as responsible for these household's water **allocation** because their access to water is controlled by the municipality. However, households feel that the municipality is unresponsive and obstacles to water such as broken taps or pipes remain unfixed, impacting on how or whether these households access water. Some households have been left without connections to toilets, and have to use buckets to flush toilets. The end user map links the municipality to broken pipes. The arrow in the direction of the house with a broken pipe emphasises that the municipality built the house that way, and the arrow towards the municipality indicates that they have complained to the municipality. The end user map isolates the lack of communication as a key problem, whilst the households still hope they can work "hand-in-hand" with the municipality. Households articulated that they would like bills to be lower and water arrears to decrease so that they could appreciate water.

12.2.1.2 Siteview Households

Siteview households **represent themselves** as predominantly unemployed and poor. The representation in relation to access to water and sanitation implies again that expense of water services is a core concern. The end-user map makes clear that people here do not have IDs with which to access grants or jobs, and in turn with which to pay for water bills. There is a direct relationship drawn between employment, Identification Documents, money (umsebenzi) and no water because of inability to pay the municipality.

Their **representation of people** includes the feeling that they are the same as town people except town people have water inside their houses. Similar to Xola Naledi, these households use areas that have worse water access as a reference points. Rooidakke in their view only has access to water in tanks. Youth are criticised for preening and using too much water. Wealthy people are perceived as having more appliances that use water compared to poor people who "have less and use less water". An apparent nuance is the perception that black people use more water culturally, but these households also consider themselves as poor and therefore use less than town.

Dams (Steenbras), rain and underground water represent **the scalar level** at which Siteview households think about water. Their **representation of water** revolves around their historic use of it - water was used freely in the past from rivers and dams. These households did not articulate water in terms of 'life' but this is implied. The expense of water – and having to pay for water – is a clear **driver of change**. Like Xola Naledi, self-restriction occurs. The cost of water means it is not enjoyed freely and households "are afraid to use water" and use less than needed. However, living in homes with toilets and taps inside their yards has made water and sanitation more accessible. Households have relocated from informal settlements where water was accessed at a distance using buckets.

Households **use water** for drinking, cooking, washing, cleaning and gardens. Gardens is a significant addition indicating the slight extension of use beyond that of Xola Naledi's. Siteview is also one of the only neighbourhoods which have mentioned water use in local businesses – for hair salons; African beer; and washing cows intestines.

The municipality is perceived as responsible for the **allocation** of water. Households mention random days when water does not flow out the tap without explanation. (Other neighbourhoods are aware of pipe bursts as the reason for water stoppages). This is perceived differently from other municipal actions such as the implementation of water restrictors which households are fearful of. The end-user map indicates a relationship between a symbol of a gun and no water. Households are prevented from using water services at night by crime in the area. They retrieve water in buckets for the night time so they don't have to go outside their houses and, they are afraid of using the toilet at night. Crime was used as a motivation for sanitation and water inside their houses to be placed inside houses.

Participants from RDP houses are conglomerated at the bottom of the social worlds map that find services expensive and represent water as necessary to life. Unlike Xola Naledi, where households complained that people did not share water with one another, households in Siteview did not identify the expense of water services as a **potential driver of conflict** within the community. However, in their view cost of services did need to be addressed in conjunction with getting Identification Documents, which would enable households to access grants and employment. Therefore, the municipality or "expense of services" were not the only factors which could facilitate increased access to water services – Siteview households also considered their own capacity to improve their situation.

12.2.1.3 Informal settlements: old and new

Waterworks and Rooidakke are two of the oldest informal settlements in Grabouw. 'Iraq' is the most recent informal settlement, created for fire victims of another informal settlement along a national highway (N2). Iraq is the nickname given to the area by residents because of its distance from Grabouw.

Rooidakke households **represent themselves** in relation to water as unemployed people who suffer a lot. They are "heartbroken" that they still have to use buckets to fetch water from communal taps while other neighbourhoods have taps inside their houses. Their representation of **other people's use of water** uses rich people and poor people as two reference points, with rich

people having access to taps and toilets inside houses, in contrast to poor people who have to go outside to access service points. The irrigation of gardens in Siteview and coloured people, conceived of as rich people, are used as examples of areas that use lots of water. Contrary to other areas, the youth are not blamed for wasting water. Older people have more chores and use more water.

Rooidakke's **representation of water** as necessary for life represents a common discourse amongst the broader Grabouw community. The Social World Map emphasises the latter through the placement of many household towards the lower end of the spectrum. However, households felt that water flowing out the taps was dirty and that it was important to drink CLEAN water, to clean themselves and cook with clean water. The **scalar level of water** was identified as dams, mountains and rivers. **Uses for water** included drinking, cooking, washing, growing corn and there was an awareness of water being used in the area in home based businesses making African beer or growing spinach and cabbage.

The **drivers of change are** linked to the transformation of service provision. Access modalities include using buckets to fetch water from communal taps, retrieving water from broken pipes, using communal toilets or the surrounding bushy area. Households perceived that there are an extremely limited number of toilets for a huge number of people and that for some the bush was closer to shacks than the toilets. Service has been changing in the area. Households were used to one tap in the whole area, and some sections of Rooidakke have had taps for just two months. The initial semi-structured interviews indicated that some households were unclear about what drives change in service provision or determines their access to services – people don't know why taps appear or don't. However, the end-user map articulated the municipality and councillors as responsible for service provision. Allocation or transmission is therefore the municipality's responsibility. Limited services affect access to decent sanitation and there is competition over toilets. Rooidakke households suggested that there were 7 families per toilet in one part of Rooidakke and, that these toilets were not shared.

Households identify improved technology as another way in which services could be improved. Bad technology is blamed for water flowing out of broken taps and they suggest cemented taps which are less easy to break. Broken taps affect these households water supply – if one tap is broken all are. Water supply sometimes stops for hours and people don't know why. The end user map identifies broken infrastructure as a concern, leading to pollution and ill health.

Another potential driver of change is bad health attributed to water. Many people suffer from stomach bugs in the area. Women feel their area is stagnant and dirty – and are disturbed by smelly water lying in stagnant pools behind toilets or near taps in area. Water is also represented by colour – sometimes it comes out the tap a reddish brown colour. Households request 'clean' water that does not make them ill. The end user map creates a relationship between a hospital, the municipality, pollution/dirty water and broken infrastructure. People want taps and toilets in their yard so they can avoid criminal elements that harass them if they go to the bushes at night. The end user map confirms the feeling that households aspire to having their own plots with services to keep their areas clean and avoid criminal elements. Toilets are further associated with health improvements.

The cost of services does not feature within this community. Their discourse remains that water is a basic need. However, there is still competition over limited toilet provision. One **variations** within the interviewees in Rooidakke arose from a young coloured woman who included references to being in a better position in relation to water than people living in Iraq. She also refers to youth as wasting water and that people who don't pay for water don't care about water

use – both common arguments amongst coloured households – low to middle high income. The divergence from other Rooidakke participants is indicated on the positional map.

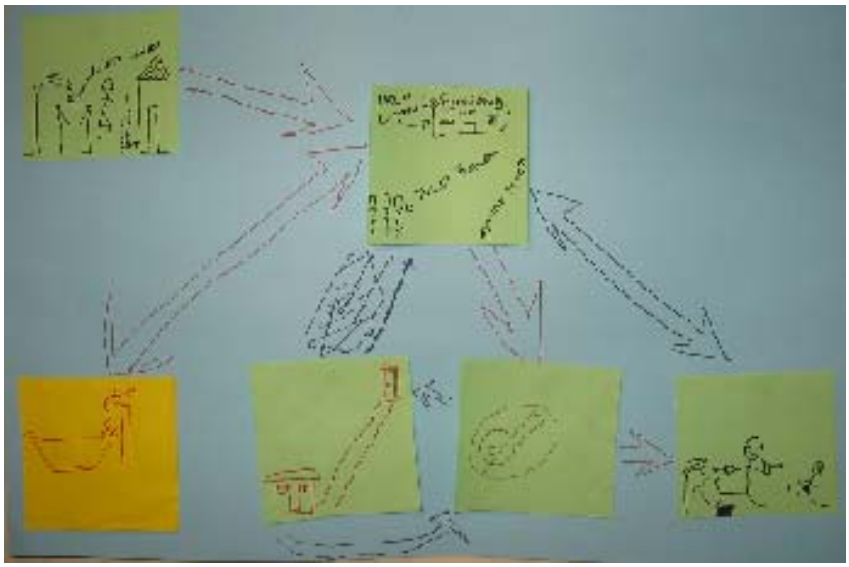
12.2.1.4 Waterworks

Waterworks **representation of self** alluded to wealthier neighbourhoods' perception of squatter camps as wasting water. They represented themselves as not using more water than other places. They felt that they had huge problem with accessing sanitation, but were disillusioned and had given up approaching the municipality. Like Rooidakke, their **representation of people** was in opposition to other areas, arguing that older people use more water because they have more chores to do. Town people are conceived of as using more water because they have "everything" for example, cars to wash and appliances. Waterworks households suggests that Xola Naledi don't feel like them because they pay rent for their services. Xola Naledi is used as a dissimilar reference point for households that have to worry about the cost of services. Again, neither Rooidakke nor Waterworks end-user maps identify cost as an obstacle to water use or as a potential driver of change or conflict. The end user maps also did not represent other people's relationship to water but rather the services these communities wished for. This is dissimilar to coloured households, who refer to these informal settlements as impacting on their access to water – a point is discussed later. The Positional Map and Social Worlds Map indicates limited conflict in Waterworks as discourse is relegated to water as life and as a basic right – cost does not feature in this community.

At a **scalar level** water is perceived to come from the ground. Water is **represented** as life and especially important for washing and drinking. The colour of water is related to its cleanliness Households argue that the water is dirty on some days because it comes out of the tap brown and grey sometimes. They would like clean water. **Water is used** for washing, cooking and drinking. Households very specifically mention that there are no gardens in Waterworks. Although households say that water is not used for home businesses, they mention the slaughtering of sheep and making African beer uses a lot of water which seems an indication of business in the area.

Access modalities include communal taps and toilets, but people use the bush for the toilet too. Households in this section of Waterworks walk 30 minutes to the toilet. The end-user map emphasises the amount of time it takes to walk to the toilet with a long road. Sometimes toilets are locked, and then households have to go elsewhere hence the symbol of a crossed out key. Buckets for fetching and carrying water are common place. Waterworks symbolised their desire to have taps by their houses as a picture of a bath on the end user map.

Figure 12.4 End user map Waterworks Photo: Karen Peters



Drivers of change are vague but include change in technology from when people were young, a long time ago, and had access to press taps outside their houses. The elections were potential drivers for improving access to sanitation, but households feel that councillors don't really care. This is not represented on the end-user map. The municipality is drawn as the source of improvement and meant to "help community".

While the municipality and ward councillors are seen as responsible for the **allocation/transmission** of water and as role players in determining their access to water and sanitation, these avenues have not made a difference to Waterworks households. Crime also impacts on households being able to safely access their water and sanitation facilities. The distance to toilets leads to sick and old people struggling to use them at night. Those that hold the keys for the toilets prevent households from gaining access, forcing them to go elsewhere. Criminal elements that steal taps further impinge on access to water. Crime is a material driver of conflict as Waterworks residents perceive the municipality as punishing them for stolen taps by not fixing these taps quickly. Crime is not represented on the positional map but is rather contained with the situational map. The positional map recognises that infrastructure requires improvement.

The discourse that water is used properly only if people pay for it is absent amongst black households in squatter camps. A variation of discourse exists in Coloured households living in Waterworks, who argue that squatters can be very wasteful – the same rhetoric as their counterparts in wealthier predominantly coloured areas. This variation is presented on the Positional Map. These households also suggest that the youth use more water – walk, play, wash and preen themselves a lot. They compare Waterworks with Xola Naledi, suggesting the latter have to pay for water and are therefore more stingy water users. Coloured households are also more aware of municipal actions. They know that water is disconnected when the municipality is cleaning the dams and says the municipality warns them to fill up buckets. Coloured households in Waterworks identify with similar experience of other coloured households of feeling free and clean in water and swimming in rivers and dams in their youth.

12.2.1.5 Iraq

Iraq residents **represent themselves** as displaced fire victims who have difficult access to water**,** but no alternative because they have been placed on this piece of land. Iraq residents compare themselves with their **representation of other people's** access to water. Town and RDP houses are represented as always having water and not worrying about water – they can rinse their clothes as many times as they need to in comparison to Iraq residents who can rinse clothes only once. They feel bad that they have been excluded from the type of water provision that other areas have and from good memories of water. Other areas are perceived to get water in the right way, with taps nearby or inside their houses. The Iraq end-user map indicates the importance of nearby access to water – a picture of houses with toilets and taps within the yard is placed at the centre of the map. All cultures use water for the same reasons and they feel they also need access to water. Increased access to potable water is attributed to wealth and, rich people are perceived to use more water than poorer people because they have more accessories to use water with. Similar to Waterworks and Rooidakke, youth are perceived as using less water, while adults, especially women, use much more water for chores.

Dams, rivers and mountains are the **scalar level** at which Iraq households think about water. Some households are well educated on where water comes from, and the water cycle –– from the sea, to the clouds, to the ground then pumped to these households. Iraq's **representation of water** is one of survival – water is important to their health and they can't survive without it. **Water use** is limited to cooking food, drinking and washing. There is no direct knowledge of livelihoods based on water use although there are people who are said to make African beer.

The fire which caused these households to move from the N2 to Iraq is seen as major **driver of change**. These households feel they were moved from an area with access to water to one without. Improved infrastructure has meant that they now have access to 6 communal taps instead of water tanks. However, households feel that these are far away and have to carry buckets long distances. Sanitation infrastructure has developed quickly from an absence of toilet facilities and hand dug holes in the ground for toilets to the implementation of communal toilets. The lack of sanitation is seen as the cause of children getting sick. The 'red cross' (a universal symbol) symbolises stomach complaints and people getting sick from water and sanitation problems in Iraq.

Water has become a material driver of possible conflict or division in Iraq. These households feel that Rooidakke households consume and use high amounts of water, denying their area water. There are long periods when water does not come out of their taps, or comes out slowly, and this is attributed to taps being open in Rooidakke. The burden of no water, symbolised on the end-user map as a cancelled tap symbol, is compounded by households having to ask people at Rooidakke for water. The latter is unarticulated on the positional or social worlds map except as the argument that everyone should have access to water, however the situational map does account for bad infrastructure. Other people's use of water determining this community's access is a theme that does not appear in the other informal settlements.

Boundaries around rivers and dams have are also changed the ability to collect water freely from these sources. Households have also reported being chased away from rivers that are part of the nature reserve. It is evident that their historical conception of water has changed – it is no longer free.

The end user map does not clearly articulate who is responsible for the **allocation** of water services to Iraq. These households did not know who affects their access and believe that other areas have been provided with water and eventually they too will get easier access to water.

Other **drivers of change** include drought and crime. Risk of criminal attack at night prevents households from fetching water or going to the toilet in the bush because it is dangerous. There is an environmental awareness that drought will lead to no water. These are environmental factors that are positioned on the situational map as part of a broader context rather than as part of the social worlds and positional maps.

A variation in assumptions is evident once again from coloured households – in the minority in this area. Coloured households similarly suggest that Iraq is excluded from services but argue further that no water to clean themselves contributes to social exclusion. Such limited access to water prevents people from cleaning themselves and in turn they are too embarrassed to meet other people. Once again coloured households adopt the argument that payment for water leads to responsible water use and that youth use more water. The municipality is identified as a key actor, but labelled corrupt and uncaring about these households situation.

The positional map indicates limited conflict in informal settlements as discourse is relegated to water as life and as a basic right – cost does not feature in this community. The obstacles that arise are instead located in the situational map as implicated or silent actors or actants which include crime and limited and bad infrastructure. Common areas in informal settlements include water is life; a limited knowledge of who should allocate services; problems with crime and low numbers of water services infrastructure; experiences of free water in the past. There is a noted absence about the cost of services as prohibiting water use and the discourse that responsible water use is dictated by economic value.

12.2.1.6 Low-income coloured RDP houses: Beverley Hills

Beverley hills households **represent themselves** as poor people struggling to survive amidst no work and the huge expense of municipal services. **Access modalities** in Beverley Hills are a combination of taps outside houses or taps inside houses and toilets inside yards.

Their **representation of other people** relates to the ease with which people access services. Town people are compared with squatters who, in their view, have to fetch water using buckets from far distances or queue for water. Town people are perceived as living in luxury because they have taps both inside and outside their houses. They water their gardens continuously because they can afford to – something these households feel they are unable to do. Access to water is directly equated with money. Gender impacts on the amount of water people use with women perceived as using more for chores, but age does not impact on use – young and old consume the same amount.

At a **scalar level** these households suggest that water comes from rain, Steenbras dam and God. Their **representation of water** is similar to other households – they feel people cannot live without water. These households **use water** for everything – “If you don’t have water, you don’t have anything”, and emphasized washing clothes and bathing. They suggested that no-one in the area uses water in business activities because of its expense. Households also feel that they shouldn’t have to pay for water – “Water falls from sky - why should we pay”. Beverley Hills

households articulate the discourse that water should be free and are positioned at the extreme end of the social worlds and positional map. There is dissimilarity between this low-income coloured community and others that advocate that water have an economic value, in order for it to be used wisely. Beverley Hills is similar to other black RDP house participants rather than their coloured counterparts identified as Pineview and Pineview North – light blue and dark blue respectively.

A change in living conditions has been one **driver of change** in the manner in which households' access water and sanitation. These households were living in the area in shacks with no access to water prior to houses being built. Water was fetched from a neighbouring area. Currently, households have easier access to water, however they find the cost of water prohibitive and households are often placed on drip. In these households' minds, the **allocation** of water is therefore determined by Theewaterskloof municipality. The end-user map represents the municipality as the central figure in addressing and causing problems. The municipality is identified through its position on the map and arrows as the most powerful actor. It has the capacity to stop the implementation of water restrictors or to facilitate indoor plumbing. Further, households feel that the municipality is often laying pipes in the area and disrupt their service without warning. These households wished the taps would never stop (sic). There are also technological problems - toilets are "useless plastic" which forever give problems – they break, get blocked, leak and overflow. There is also no two-way arrow as households feel that they can't approach the municipality – the moment the municipality hears about a march they "close their offices and go".

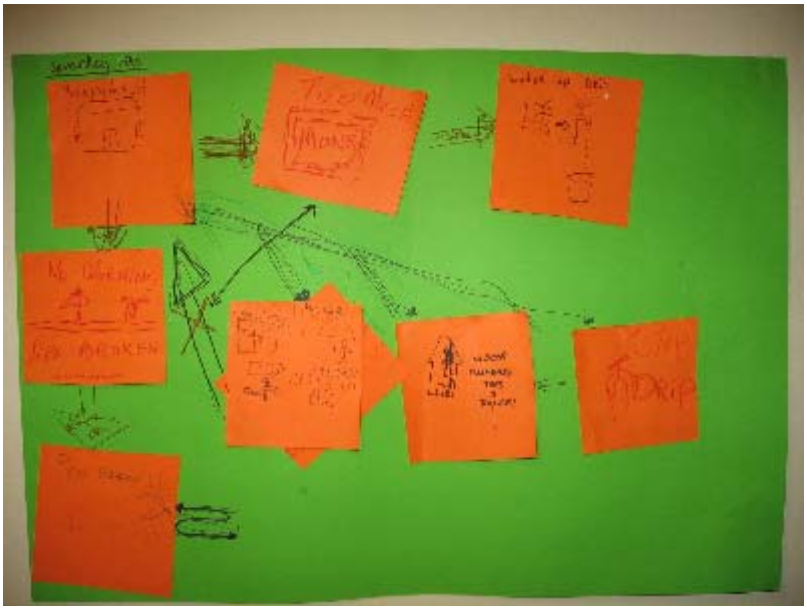


Figure 12.5 End user map, Beverley Hills
Photo: Karen Peters

Beverley Hills has a different representation of water compared to the other coloured households. In other areas access to water is a less contentious issue and there is a perception of squatters' access to water as difficult. The following areas have some of the most conflicting discourses.

12.2.1.7 Pineview and Pineview North

Pineview contains both low-income and established (low-middle income) households with different types of water connections. Pineview North comprises coloured people staying in larger established homes, with access to toilets and taps inside their houses. However, these households have a similar representation of themselves and understanding of water.

Households talk about themselves as poor people, some have given up hope about access to services. Low income households comprise 'train' houses, sub-divided homes where a number of households live on one property, which have access to outside toilets and taps, and houses that have inside toilets and taps. They demonstrate similar **representations of themselves** as conscientious users. Pineview's established households do not represent themselves as poor, but similarly feel they are responsible decent people and use water responsibly. They also feel that they have paid for "water all these years" and have a better appreciation for water than others. Pineview North shares the same **representations of themselves** as Pineview households - hard working people who respect water and pay for services. They feel that even though they watch their water use, they still pay high bills.

Representation of people is also similar. Categorisation of areas, race and form of access in relation to water use is evident. People who live in town (predominantly white) are classified as using as much water as they want. Coloured people are considered better water users because they must pay for water whilst black people use water freely. Informal settlements, especially children in these areas, 'waste water' and these households question who pays for that water.

The town area is also quoted as having sprinklers running all day, but the latter is not an issue for Pineview and Pineview North households. In these households' minds, town households are not 'wasting water' because they pay for it. Rather, their wastage is not problematic because it is not perceived to impact on the Pineview and Pineview North's households' cost of water supply. The Pineview group argued that "If everyone pays the price will go down". The end-maps express this concern through symbols of the influx of people into Grabouw. The migration of people to this area and their 'free water use' is seen as the cause of high bills. Furthermore, residents in train houses feel that the migrating people have more opportunities in Grabouw, and that these people are preventing the municipality from subsidising bathrooms inside their houses.

Residents argue that people who live in houses appreciate water more and use it wisely because they have to pay for water. Two squatter camps, Iraq and Rooidakke, are constant reference points. Households suggests that there is a cultural difference in water use – with black people washing clothes under a running tap as opposed to coloured people who use basins.

RDP households are blamed for being part of a 'boetie boetie' system, favours for people who know municipal officials, where there are claims of individual favouritism in relation to water use. There is a perceived discrimination by the municipality between RDP houses and Pineview where fines for violating water restrictions during drought are less in the RDP (black) areas by half (R500). RDP houses are also perceived as having their water arrears rescinded. Pineview North express corruption in Theewaterskloof municipality as the fundamental problem in Grabouw. They suggest via their end user map that the municipality favours certain families. All the arrows are emotionally drawn and leading from water restrictors, high bills and other problems to the municipality. Pineview North households emphasise race in their representation of other people's

use and access to water, like the households above that blame black households for their cost of their services.

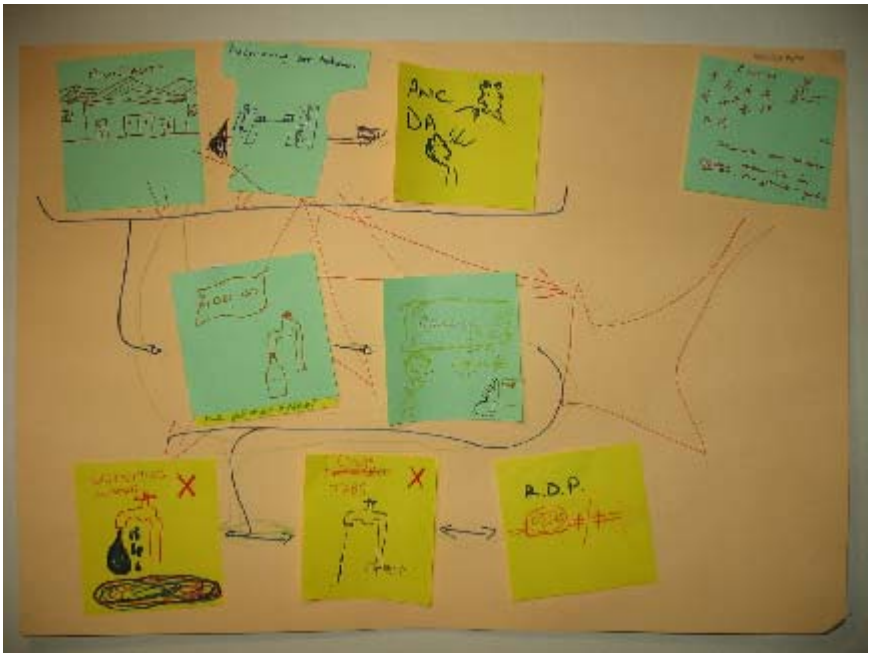


Figure 12.6 End User Map Pineview
Photo: Karen Peters

The positional map demonstrates the varying positions taken by these participants. Water is perceived as too costly however participants argue that water needs to be paid for in order for it to be used properly. On the one hand water is acknowledged as an economic value that needs to be restricted. On the other, there are arguments that sit between the discourse that self-restriction is problematic and tend towards the discourse that water should be free, or at least cheaper.

Areas outside of Grabouw, such as Cape Town and Mitchells Plein, are also used as examples of areas that receive cheaper water, even though their main water source is in Steenbras which is located nearer to Grabouw. One interviewee mentioned the role of the media in providing awareness of water issues in Kwazulu Natal and outbreaks of cholera. This group (train households) expressed that their situation is not that bad compared to areas where water not fit for consumption.

Coloured youth are represented as having less awareness of water and wasting water because of a lack of education about water scarcity. As one group said, “they don’t understand that we’re getting less water than before”. Women are perceived as using more because they use it for daily household chores.

The **scalar level** at which water is thought about are specific dams that are within the vicinity such as Theewaterskloof and Steenbras dam, reservoirs, rivers, rain and the mountain. Gender impacted on the perceptions of scale of water. Men explained where water comes from in mechanical terms – getting water through pipes and machines. Education also played a role in knowledge of the water cycle. Pineview North households also thought of water at the level of a reticulation system – specifically, that water needs to be cleaned to make it potable which is why it costs money.

Water is **represented** as life giving and necessary for survival, but poorer households feel they can barely stay alive because of the cost of water. At the same time poorer households believe sensible use is related to the cost of water. Although households struggle with the cost of water and would change the pricing structures of water, their discourse remains that water should not be free. Wealthier households feel like they are stealing water in their own backyard and always have water on their minds because of the cost. The latter households **use water** for gardening in addition to drinking, cooking and washing compared to other Pineview households who are silent about gardening. There is a notable silence about water use for money making activities in these areas.

The **drivers of change** overlap with Pineview's representation of people. The influx of people in to Grabouw is a perceived driver of change. Households explain that there was no issue with water 'back then' – it was good quality and one could use water as much as wanted for a small fee which wasn't charged very often. The town is viewed as overpopulated now and there are areas where people don't pay anything at all. Overpopulation is considered the main reason for the cost of water and households question why areas pay different amounts for water. The cost of water has also changed the way households use water and water restrictors (drips) prevent households from accessing water. Both Pineview end-user maps expressed drips as a consequence of migration to Grabouw and the high cost of services. Debt relief could change the situation of high arrears and threat of disconnection that low income households face.

The initial experience of the middle aged to older generations with water is on farms and in rivers as a free resource to be enjoyed. They express a desire for facilities for children to swim in to enjoy similar experiences. Households now recognise water scarcity as an issue and constantly hear dams are dry. Water restrictions have played a large part in informing households of water scarcity as households are fined if they use water outside the allocated times. Water scarcity is attributed to the change in climate and dry winters.

Again, **allocation** of water rests with the municipality and it is up to them to determine who gets water and how much water. The cost of water has also determined whether these households have access to water, and are placed on drip or not. The perceived discriminatory practice where some get more water for less is linked to how these households receive water in such an expensive form. However, there are huge questions about how they have calculated debt write offs. Although the amount one pays for water should determine how one accesses water, these households feel the billing system is unfair/discriminatory and treats different areas differently. Pineview North households articulate the latter by arguing that everyone should be on the same pricing system. Pineview and Pineview North represent the municipality in central locations on their maps, with a communication breakdown symbolised by people miscommunicating across a table and a crossed out ear respectively. It is clear that the cost of water is a material and political driver of conflict amongst the community that has become represented racially.

Amongst these metered households in Grabouw, the accuracy of water meter readers and whether they read meters at all is another contentious issue. Pineview North's end user map refers clearly to the absence of meter readers as a reason for the high cost of water.

Sub-divided homes are a source of conflict. One household receives the service bill although up to three households use water from the same meter. Unbilled households affect access because their use of water impacts on the household that has to pay the accounts. The latter means some households are more careful with use than others, and self restriction occurs because of cost.

Train households responsible for the water account argue for their own metered connection and separate accounts in order to control usage and make sure bills do not exceed their income. The end-user map clarifies that the current situation leads to the implementation of water restrictors inside metres.

Pensioners **varied** in the dominant discourse that people should pay for water. They argued that pensioners should get services free. Train households hope for inside toilets and taps and their end user map demonstrates how it is cold and dark going to toilet in winter. Pineview households proposed the inclusion of rain tanks on their properties as a form of allocation not reliant on the municipality and a personal solution to problem of expensive water, as well as educating people to save water.

Ironically although the coloured households argue that water should be paid for in order for it to be used wisely, they also argue that the cost of services are too high and find their own use restricted. Other areas perceived free use of water is blamed for their restricted use. This is substantially different from participants from RDP houses, conglomerated at the bottom of the social worlds map, that find services expensive and represents water as necessary to life, however, do not argue that other areas should be penalised like these coloured households do. Ironically, to a certain extent these households overlap with the municipality's justification for restricting water – that cost recovery is essential, water is a scarce resource and it should be paid for in order for people to use it properly.

12.2.1.8 Households living in town

Town households identify similar issues to Pineview households, although they do not represent conflict about the allocation of water racially.

People living in this area **represent themselves** as working people, who object to the excessive water charges. They recognize the need to save water and are aware of the saving water campaigns in the area; however, they limit their water use because of cost. **Water is represented** as life. Water is used for everything and people are conceived as being able to survive without many things but not without water. **Water is used** for drinking, cooking, washing dishes, the toilet, bathing, gardening, and washing pets. It is not significantly different from slightly lower-income areas except for the inclusion of animals. Some households in this area also had swimming pools. Water is **accessed** through taps and toilets are inside houses. The town group is divided between those who have memories of living on farms and fetching water from outside and those that have always have water inside. The **scale** at which town households think about water is at the level of rivers, dams, underground, mountains, water distributors and, more specifically, the Palmiet River.

Town households' **representation of people** differs from that of Pineview and Pineview North. Informal settlements are not blamed as clearly for wasting water and households argue that they don't have as many water facilities so cannot use as much water. For these households, water use depends on 'who you are' and some people just don't care. However, gender and youth impact on water use – women use more water than men for domestic chores and personal tasks and older people are perceived as using water more sparingly than unconcerned youth. Some interviewees felt the easier the access to water the more one uses it. Cape Town is seen as

having lower water bills than Grabouw. Interestingly, while water is life is a dominant discourse, there is an absence of the discourse that people only use water properly if it has economic value. Although these households limit their water use because of cost, they associate appropriate water use with individual characteristics which relate to caring about ones resources. Their discourse is situated closer to the bottom of the positional map that water should be free. High-income households overlap with business and are situated in a similar position as town households clearly articulating that everyone should have access to water.

Drivers of change include the cost of services, which in this area is not a material driver of conflict between neighbourhoods. The cost of services has impacted on these households water use and they now use less water. This is a stark difference from previous days when households had access to lots of water. The delivery of water has also shifted. Households feel pipes are often broken, leaving them without access to water. Some households have mentioned that the taste of the water is different – it smells and tastes bad and is yellow in colour. Water meters are problematic. Water meter readers are questioned about their accuracy or readings, and municipal staff change the position of meters without consulting the household concerned about the most convenient position for that meter.

The municipality, the mayor and cost determines the **allocation** of water. There is a feeling that there are "no ears open". Town households represent the municipality as inaccessible and lacking in communication. The municipality does not communicate with these households effectively and are incompetent. Again, the municipality is the placed in a central position on the end user map. Structured interviews revealed that the municipality is considered a 'headless chicken" with the main office based in Caledon, a town 40km away, but end-user maps did not articulate the latter. Pineview represented bickering inside the municipality as preventing the resolution of obstacles to water and town households also argue that the municipality is in a confused state and like other small towns, in need of a higher level of government to stabilize the situation.

12.2.1.9 Farm workers[25]

Farm workers **represent themselves** in relation to Grabouw residents. They feel they are in a better position than people who live in Grabouw because the only service they pay for is electricity. Although they don't earn much money, water is free. However, their residence and services are reliant on the good will of the farm owner.

Typically, they **represent water** as the source of life and as necessary for health. The **scale** at which they think about water is discussed in relation to their water provision – water comes from bigger dams to smaller dams to tanks and, from there, to their houses. Their **access modalities** include taps and toilets inside houses and have access to outside taps too. Farm workers **use water** for cleaning, gardening, washing, drinking and, food. Interestingly, they ranked their water uses according to how they get up in the morning.

Farm workers **represent Grabouw residents** as subject to having their water cut and a money oriented economy. They are aware of the seasonal nature of the economy and the difficulty of

[25] The category farm workers encompass both people who are retired farm workers living on the farm and people working on the farm.

survival for unemployed 'town' people. Squatters in Grabouw are also pitied because of the distance they have to walk to fetch water.

Drought is a huge **driver of change** on farms. The manner in which water is accessed direct from the dams on the farm means that when the dams dry up there is no water. Similarly, if a pipe bursts there is also no water.

Gastro infections and stomach cramps are a regular occurrence especially in younger children and have changed the way farm workers think about water. The tanks which water is stored in leak into the field, they feel this is unhygienic. These farm workers argue that their tanks need to be cleaned. That tanks are sealed is perceived as problematic because they cannot be cleaned. Instead, chlorine tablets are thrown inside, which is not considered to be enough action taken towards clean water. Their water has sand in it and it tastes like mud. Farm workers feel that "If it tastes bad, you're stuck" and that there is nothing they can do. They have to use dirty water in cooking and socks are placed around taps to strain the water or water is boiled.

In this case, **allocation of water** is the farmer's responsibility. The farm owner is considered the main source of water. However, the management of the farm also determine how these farm workers receive water (and its quality). The quality of water is determined by the farm owner – who is "unavailable and doesn't listen". Farm workers are in the tricky situation of not knowing who to talk to and also not wanting to upset their current residential and free water arrangements. There is a perceived gender inequality – "as a woman no-one listens". Men do not get much further. The end-user map demonstrates the lack of accountability about low quality water. Their representative does not relay the problems they have identified and there are unexpressed fears that if they complain to the farmer they are at risk of being thrown off the land.

Farm workers discourse of water is that it is essential for life and free. Their position on the Social Worlds Map and the Positional Map is similar to informal settlements. Although a potential driver of conflict remains the quality of water and that their complaints are not heard, they value their free water above the monetary economy in which town counterparts operate, regardless of its quality. Again, this driver of conflict is situated within the situational map because it relates to environmental factors such as health/dirty water.

Health was identified as an issue in informal settlements and on farms, but there was an absence of discussion about the role of water for people who are affected by HIV/AIDS and TB. There was one reference made to the dependence of an HIV positive child on sustained access to water to take medication in pill form. The discussion of water quality is limited to stomach related illnesses and environmental/infrastructure issues not represented on the discourse based maps but rather the situational one. In general there was also an absence of awareness about gender roles. Women were thought to use more water because they have more personal needs whilst the association with them using more water because they conduct the chores was often secondary.

12.2.1.10 Hottentots Holland Nature Reserve

Hottentots Holland **represents itself** in numerous roles including fire management; conservation; bio-diversity management; catchment management; and, conservancy management. Employees of the reserve also feel they contribute to poverty relief in Grabouw and ecological preservation through the Working for Water programme. They align themselves with DWAF, arguing that

DWAF and the reserve have the same objectives through the Working for Water and trying to make people aware of wise water use through education campaigns.

They **represent people** in the Working for Water Programme as focused on getting paid, which is in contradiction to the reserves roles of trying to educate people about conservation issues. The reserve strongly links water use to education and not gender, race, age or culture. However, they do argue that people who have easier access tend to waste water. They juxtapose westernised people, who use more water for swimming pools and big gardens against 'traditional' cultures that rely on fetching water from the river, and against squatter camps who are also perceived as wasting water. It is considered to be in youth's nature to waste water. However, they reiterate that water use relates to education.

The **scalar level** at which the reserve employees think about water is related to their environment within the reserve of catchment areas, rivers and dams. The Hottentots Holland reserve provides the catchment area that is the source of water for Cape Town and Grabouw. The Palmiet Catchment area and the Theewaterskloof Catchment area flow into Steenbras and the Palmiet River. The Wesselsgat River provides Grabouw with water and there are many rivers which flow from the mountains into dams. Employees also think of water on the scale of the water cycle of precipitation, evaporation, condensation, and rain.

They **represent water** as something which needs to be conserved and as life or everything. The reserves **water use** revolves around drinking, cooking, sanitation, washing cars and offices. Businesses in town which use water in money making activities include the Laundromat, hair dresser, take away shops and Appletiser. The reserve staff **access water** through taps and toilets inside their houses. The reserves **allocation** of water relies on pumps provided by Cape Nature Conservation, which distribute water to the houses from the nearby river. Accessing water is dependent on technology, as these pumps break down once a week preventing water from flowing out of taps. In the broader vicinity allocation of water is perceived to rely on the municipality, water users such as farmers and, different departments in DWAF.

Figure 12.7End User Map, Hottentots Holland Nature Reserve

Photo: Karen Peters

Climate change and drought are identified as **drivers of change** for **water use** in this area. They have an increased awareness of drought and water shortages because of their presence in the media. A change in volume of water has also been linked to a change in water use. Employees expressed how when growing up water was free. By comparison, water restrictions in Grabouw do not allow for washing cars or watering gardens. The increase in population is attributed to changing water use. The end-user map identifies that more people are dependent on water now. The end-user map articulated education as a crucial mechanism with which to encourage water saving and address increasing need. A symbol of the school forms the centre of the Hottentot Hollands end-user map. The map also identified actors that impact on water which were not identified in the initial semi-structured interview. For example, the role of national government in providing funding for water saving projects is identified.

Pine tree plantations have also affected water resources in the Grabouw area. SAFCOL plantations exceed their boundaries and draw on the water supply of the area. The Working for Water programme trains people to uproot these trees.

The discourse that water is scarce resource that needs to be saved intertwines with the discourse that water is life, the discourse that excessive use should be penalized through cost, and that education is the key to saving water. The nature reserve overlaps with the municipality on key areas as indicated in the positional map. A potential area of conflict is between the environment (scarce water) and a growing population with increased water needs. The latter refers to key events rather than discourse and is articulated in the situational map as impacting on water use. A further conflict can be seen between the economic needs of the poor in competition with conservation needs to educate and promote wise water use. While people focus only on getting paid in the Working for Water Programme, the reserve is trying to teach them to conserve.

12.2.1.11 Groenland Water User Association and farming community

The Groenland Irrigation Board, also referred to as the Groenland Water User Association, **represents themselves** as a service provider of raw water to farmers in the Grabouw/Elgin area. The Groenland Irrigation Board is privately owned. The Eikenhof Dam, financed mostly by farmers in the area, was built to supply surrounding farms with water for agriculture to counter the high costs of pumping directly out of the Palmiet River. The dam was extended for farm use in 1988 and then to meet the increasing population and water needs in Grabouw. The Groenland Irrigation Board also see themselves as having the potential to sell raw water to Cape Town.

People are represented as consumers in relation to water– all members of the scheme are paying customers. There are currently 140 accounts in the scheme – 104 are farm owners, 3 are industry and the municipality. DWAF is represented as trying to cater for responsible water use but with limited implantation of monitoring or evaluating such usage. (The perception of DWAF overlaps with comments made by a wealthier resident who suggests that the department has a ‘staccato’ approach to planning and with every new minister a different agenda is pushed.)

The **scalar level** at which the board thinks is the supply of raw water from the Palmiet River Catchment area through the Eikenhof dam and a series of pipe networks. **Water is represented** as an economic resource however no profit is built into the rates that scheme members pay for water. Profit would be made from supplying water to Cape Town. While most other irrigation schemes contend with scarcity, historically water in this catchment area is seen as a plentiful resource. **Water is primarily used to** supply the farming needs in the area. The water supplied is of a high quality and meets European standards with which fruit growing farmers have to comply. The latter is attributed to the absence of settlements above the Eikenhof dam. Water use also promotes industrial activity in the area. As such water use is a major economic driver in Grabouw. Therefore, the GWUA dominates the top of the positional and social world maps in conjunction with the municipality, DWAF and business.

Drivers of change include national legislation and urban development above the Eikenhof dam. Water legislation, the National Water Act (Act 36, 1998), has impacted on the GIB. The new water act led to GIB's conversion into a water user association, comprising stakeholders from the Breede Catchments area in which different stakeholders from Grabouw can make input. An executive committee comprises members from "all walks of life". The change in legislation has led to water resources being allocated to members of the scheme. The GIB now needs a permit from DWAF to supply water from the Eikenhof dam. Increased household need, declining water intensive agricultural/farm activity in Grabouw, and the drought that the Western Cape is experiencing, particularly Cape Town, are motivating factors for extending the GIB's role as a water supplier to stakeholders beyond the agricultural and farming community.

A further driver of change is proposals of land development above the Eikenhof dam to house the growing population. The latter could impact on the quality of the water in the dam and change the success of the scheme in providing a high standard of water.

GIB has a direct **allocation** role via ownership of damming infrastructure of a key water resource, the Eikenhof dam. The scheme owns the pipes and walls of the Eikenhof dam, which catches water from the Palmiet River. The scheme arose as a response to the water needs of landlocked farmers located away from the Palmiet River. The Eikenhof dam was built with some financial support from the municipality that has given the latter the rights to access 909 mega litres of water per year (Water Reticulation Manager, Grabouw). They supply water at 8c/m3 which, according to them, is the cheapest raw water in SA. The Groenland Irrigation Scheme at this stage has the only excess (raw) water in the Grabouw area aside from some members of the farming community that have private dams (Engelbrecht). In 2004, the municipality bought 3500 mega litres per year (R3.5 million per year) to supply additional households. The scheme also provides farmers (mostly land locked) with raw water via a pipe system during summer. (Grabouw is a winter rainfall area so farmers only need to irrigate during summer). The water belongs to the state, but every member/customer has an allocation of water calculated according to their usage and needs. Any surplus water or runoff, dependent on rainfall patterns, is transferred to DWAF catchment areas. Water is **accessed** by farmers, industry and major users through a series of piped networks.

DWAF has had a huge impact on how the GIB is run. It has determined that water users no longer have ownership rights, but allocation rights. Further, if a user does not use his/her water allocation in 5 years then that allocation can be reduced. The end user map demonstrates that there is lack of clarity on what regulations will be brought to bear on water use. The arrow between DWAF and the GWUA is multi directional arrow representing two way communications between parties. The heavier arrow pointing down towards the GWUA symbolises the powerful position that DWAF is in (allocating water). The introduction of compulsory licensing for water use could be an area of conflict or co-operation between DWAF and the GWUA.

The environment /climate is a further driver of change – drought in the area would impact on how the GWUA operates, agricultural needs and the quality of water which would lead to not being able to sell ones produce. However, the GWUA is silent on whether water is a scarce resource and the implication of this for water use. They are absent in this regard on the positional and social world maps.

Pollution in the water supply would also impact on water quality and farmers livelihoods. The end-user map draws attention to the role of electricity in keeping the sewerage treatment works functioning to prevent spillage into the river – a situation that has occurred previously

Areas of conflict include compulsory licences for water use that might be imposed by DWAF and as such the GWUA does not overlap with DWAF to a significant degree. The situational map makes reference to pollution as an environmental factor that could affect water use – in this case water quality affected by urban development above the dam, and water pollution.

12.2.1.12 Farming community

The GWUA representations of water overlap with representations of water of the farming community[26]. Farmers and the GWUA decided to combine their end user map because they felt that they represented similar issues. The dissimilarity between the GWUA and farmers is around the **allocation or transmission** of water. The allocation/transmission of water relies on DWAF, the GWUA and, in the case of farmers that do not receive water from the GWAU, ESKOM powered pumps[27].

The agricultural community **represent themselves** as having lived in Grabouw for a long time and being aware of water because of their reliance on it for agriculture. Their **representation of other people** include town people (Grabouw) who have to pay a lot for water and are therefore waterwise, squatters as fetching water from a distance and wasting water because it is free, and industry as a huge user of water. The discourse that water is used wisely if people pay for it is set is set against the **representation of water** as essential for business and for life. Water is also represented as expensive by a farmer that is not part of the Groenland Irrigation scheme. A **variation** in representations of water is evident with farmers that pump water directly out of the river. In this variation water is represented as expensive and Eskom, the national power distributor, becomes a major player in determining access to water. Water is also represented as employment – according to one farmer 40 hectares of water provides work for 40 people and keeps communities like Grabouw in work.

The **scalar level of water** is extended to include rain and underground supplies in addition to catchments areas and the Groenland Irrigation scheme as mentioned by the GWUA. Water is used for irrigation, human consumption, garden and industry in the area. Contrary to other descriptions of **water use**, irrigation was listed as the primary use of water followed by human consumption. Each farm has its own water distribution system trough which water is **accessed**.

[26] The farming community referred to in this report comprise agricultural farmers.

[27] Although we tried our best to contact personnel of ESKOM, our attempts were unrewarded and as a result the role of ESKOM and its representation of water is largely unexplored.

One example provided is water **accessed** through a gravity based system which brings water to the taps inside houses.

The population explosion in Grabouw is a **driver of change**. Seepage of pollution from informal settlements without proper sanitation that are located next to water sources harms the quality of water. One farmer argued that the cost of chlorine could be avoided if water quality was protected. The spread of urban developments and unplanned water use by national and local government is another problem – municipalities must plan water use. The damage to ecosystem of over drawing from rivers is also an issue. The situational map identifies these as key issues which are not posited on the positional or social worlds maps.

The Groenland Irrigation Scheme is perceived as a historic driver of change in the region because it provided farmers with a constant water supply during dry summer months. The NWA has impacted significantly on farmers who are apprehensive about legislation determining their access to water. Farmers now have to register water usage, including boreholes, justify this usage and pay a water tax.

Knowledge about water scarcity and threats of increasing drought in the Western Cape, and its impact on water supply/allocation, has propelled some farmers to employ water saving technology on farms. Cape Town's water shortage has threatened farmers in the past. This issue is represented through the DWAF argument that water is scarce discourse and that water should be restricted in opposition to the needs of farmers as indicated that water is essential for business and agriculture needs water. The two bipolar dichotomies are represented in the top half of the positional map and provide an area of huge difference between DWAF and farmers.

The positional and social worlds maps tend to refer to discourses while the situational map looks at external environmental factors such as crime, pollution, infrastructure. The political and material drivers of co-operation, conflict and competition have been identified in the last section in conjunction with representations of water. The chapter now turns to an evaluation of the hydro-political mapping as a methodology and the successes and failures of the approach.

12.3 Evaluation of tools and strategies deployed and lessons learned for hydropolitical mapping

One of the aims of the hydropolitical mapping exercise was to critically examine the effectiveness of participatory research methodology and mapping tools, as an exercise to empower local communities to navigate issues. The Grabouw case study drew from the participatory methodology outlined by Gordon and Wilson (2006). The compilation of social worlds, situational and positional maps was largely based on information collected during transect walks and semi-structured interviews with individuals and groups within various communities.

Transect walks within different communities is Grabouw were used as an orientation of the area and as the basis of initial situational maps. These walk identified various stakeholders that needed to be included in the hydropolitical mapping process and gave a visual representation of the geographical and infrastructural landscapes. Grabouw is located within the Hottentots Holland mountains and the N2 national highway – both of which create immobile boundaries around Grabouw concerning further urban development of land. Farms are located on land outside of

the Grabouw. Transect walks with active community role players, such ward councillors and Community Development Workers allowed an easier initial contact and introduction into parts of the community. Situational mapping also emphasised actants such as physical and institutional components that impact on water use encouraging us to physically visit the water reticulation plant and sewerage treatment plant. The latter revealing implicated actors/actants such as the impact of pollution running into rivers, which were confirmed in the farming communities and municipality's end user mapping processes.

However, the extent of communities and hydropolitical stakeholders within Grabouw was underestimated. One the one hand, the benefit of situational mapping is to reveal all the actors within a situation. On the other hand, hydropolitical mapping requires an exhaustive process of identifying stakeholders and with the variety of actors within Grabouw this was an elongated process. Population estimates of Grabouw suggest that 50 000 people are now living in an area comprising rural, agricultural, industrial and urban elements (Personal Communication, Head of civil engineering, 2006). One of the lessons learned include that the size of communities and their level of organisation or mobilisation affect the implementation of participatory research methodology (in relation to time taken during the research process and who participates).

A semi-structured questionnaire was created through the adaptation of the proposed questions in the guiding methodological chapter. These semi-structured questions were applied loosely during transect walks that gauged initial dynamics within the community, and then during semi-structured interviews. The transect walks were used to test this initial questionnaire and establish difficulties that communities might have in responding. For example, one of the proposed/guiding questions, 'who has access to sufficient quantities of water and why? (Question 4), evolved into a series of questions that tried to get participants to reflect on the social worlds they experienced. Questions included asking if there was a difference between how men and women; young and old; different religions; different cultures/ethnicities; town people/RDP houses/shacks or classes use water? Significant representations of how interviewees reflected on social worlds around them and their positions on water were more forthcoming when they were asked to take us on 'a mental map of the different communities and their access to water' in Grabouw. Rather than trying to analyse interviewees' perceptions in relation to our 'typical' categories, the latter question revealed categories of their own and their beliefs/value systems in relation to their categories. Furthermore, the mental mapping question worked well when people were reluctant to talk about other areas in relation to themselves.

The case study aimed to get a broad range of communities within Grabouw to participate in semi-structured interviews. In some areas, like Xola Naledi, groups were pre-arranged through contacts within the community such as Community Development Workers and, in other areas, the research team identified participants through transect walks within the community. Actors were also identified during interviews. The semi structured interviews were conducted with individuals and groups.

Local government elections prevented discussion with Ward Councillors, who were in the process of winning back or losing as representatives of the wards, and municipal staff at Theewaterskloof municipality – the overarching municipality rather than the administrative arm of Grabouw. An instance of the speed with which dynamics changed within the municipality over this period is indicated by the experience of interviewing the Rural Development Officer at Grabouw local authority and the next day he had been removed from office. There was a generally unsettled feeling in Theewaterskloof municipality during this period in which the dominating political party changed and many posts were replaced with supporting candidates. As such there is a lack of comprehensive analysis of Theewaterskloof municipality's representation of water. However, in

depth municipal interviews with Grabouw's key actors in water provision occurred and represent the municipality's representation of water.

The difficulty of the participatory method in Grabouw was to affect it in the size of an area such as Grabouw and the surrounding areas – farming and conservation – and in the number of different communities within it. Dynamics within group interviews where there were existing power relations were not conducive to participation of all parties. The semi-structured interviews in Rooidakke comprised one group where men dominated the conversation, whilst in another the women provided much of the feedback ignoring the men. In groups were coloured and black participants were mixed, coloured participants did not involve themselves in the process. It was for this reason, it was decided that the end-user mapping would occur with lots of small groups rather than groups comprising many different social worlds. Communities made us aware that they had been recipients of many broken promises regarding participatory meetings, necessitating that the research process comes to them.

The organisation within communities also facilitated different responses to the mapping process in general. Some communities, such as Siteview, were more articulate. The Xhosa translator/research assistant, Ndileka Ndabeli, suggests that this is a consequence of them being more organised as a community. Communities such as Waterworks comprising both black and coloured households had different discourses of water and were not a coherent community. In the end user mapping process the coloured participants did not participate vociferously although in they were expressive in the structured interviews. A dominant trend in Grabouw communities was the necessity of conducting workshops with lots of communities instead of one end user mapping session.

Grabouw comprises Xhosa, Afrikaans and English speaking communities. Language was barrier in a number of ways. Firstly, the semi structured interviews took longer to conduct as clarifications of meaning were part of this process. Secondly, although all efforts were made to gauge different representations of water there was the possibility that representations of water were being lost in the translation back to English.

Affirmation of the usefulness of participatory process was forthcoming from participants. Rooidakke interviewees expressed the feeling that there was no-one to help them tackle their problems and they were glad these questions are being asked. Unfortunately, a lack of community organisation meant that the initial participants did not follow through with, and benefit from, the end-user mapping process. Community Development Workers for the Rooidakke area guided us through this informal settlement during the semi structured interviews. The process of communities listing problems they were experiencing with water was beneficial for CDWs, who as part of their job description write reports on community issues that are sent to government structures. Waterworks residents also recognised the usefulness of research. Residents asked us a series of questions on our initial encounter trying to determine whether we were from national government, the municipality or researchers. Having established the latter they agreed to participate in the semi-structured interview because they identified us as asking these questions to help them. The latter experience indicated that this community distinguished between levels of government although in discussions about other decision making actors and who is responsible for the allocation/transmission of their water services, they did not.

The Waterworks experience is also indicative of the suspicion of our role and our relationship to the municipality which often emerged. Communities would firmly establish what our relationship to the municipality was before embarking on semi-structured interviews.

Regardless of the difficulties of participatory research methodology identified above, the semi-structured interviews and the transect walks facilitated the gathering and assessment of the community environment[28] within Grabouw. Furthermore, the emphasis on situational mapping including an array of actors/actants not normally considered in the research process lead to a fuller understanding of social, physical, geographical and institutional components of hydropolitics[29] in Grabouw and the surrounding farm area

The second, third and fourth steps of participatory research methodology while grounded in the semi-structured interview questions and material were drawn out in the end-user workshops. These steps will be discussed in the final section of this chapter.

12.4 End-user mapping

Once categorisation of the semi-structured interview material was complete, the end-user mapping was initiated. The creation of end user maps had the following objectives in mind – to find a visual way to help communities navigate "…unfamiliar patterns and landscapes, anticipate/verify their position in the hydropolitical constellation, and [finally] strategise around future goals" (Wilson and Gordon, 2006:62).

The second step in participatory mapping refers to "…prioritising knowledge from the diagnostic exercises…" (Wilson and Gordon, 2006:68). The prioritisation of concerns was gauged from the obstacles/challenges identified by interviewees in semi-structured interviews. It was further cemented during feedback in the end-user mapping workshops. These workshops began by confirming the categories into which community representations of water were located (Refer to the map of the End-user Workshop Plan, Step 1). The 8 categories have been identified through out the discussion of representations of water in section 2 of this paper. Through this process of confirming whether as researchers we had included all representations of water that were found, the key challenges and concerns within the community were raised.

This point in the workshop brought us to the third step in participatory research methodology – problem analysis by communities (Wilson and Gordon, 2006). Communities were asked to draw symbols of the challenges and hopes they had identified during their initial semi-structured interviews. They were asked to draw symbols focussing on size and colour to demonstrate their importance. The workshop referred to a variety of maps (See Water Cycle Map 1 and 2; Example Maps 1-3) that used symbols to demonstrate the relationships between key issues. Reference was made to both the use of symbols and the emphasis on links between symbols – arrows, or roads linking areas (Example Map 1-3). Participants were then asked to create their own map by place their symbols on a piece of cardboard paying attention to the location of these symbols in relation to each other and making evident the relationship between the symbols through the use of arrows. Like a problem tree, the end user map identified the causes of problems. In general, these maps identified actors/key decision-makers that impact on water and the relationships between these decision makers and the community. Iraq was the only exception in that participants did not symbolise the actor impacting on their water concerns/aspirations, but in this case they did not know who they could hold to account for their service provision. The maps also focused on what these communities aspire to in relation to water. Although the maps enabled

[28] (Wilson and Gordon, 2006)

[29] (Wilson and Gordon, 2006)

communities to clarify linkages between actors and decision makers they did not create an action plan or way specific way forward for communities.

Did we achieve what we set out to achieve in terms of helping communities negotiate the social worlds within Grabouw to find solutions or ways forward to achieve their identified goals? The case study revealed the difficulty of the hydropolitical mapping process. Even as a researcher, the lack of experience in relation to visual mapping and no geographical background made hydropolitical mapping process daunting in the beginning. The first end-user workshop conducted was conducted in Pineview. We soon realised that communities struggled to adjust to the idea of mapping. In many of the other workshops, groups had not even seen maps of Grabouw before. Communities created maps of their social world and the relations within it, rather than the relationships between multiple identified social worlds. A consequence of the need to introduce participants to basic mapping skills is that they did not reflect on what was generalised in and out of the mapping process in relational to situational, social world or positional maps.

Did the community develop action plans through their mapping process? The mapping process clarified relationships between actors and actants. Communities articulated the clarification of roles and problems in their worlds as beneficial, and this should be seen as the benefit of hydro-political mapping. Communities could build on the clarifications that occurred. For example, Pineview introduced suggestions such as rain tanks as an alternative for servicing their water needs. Others linked the solution of their problems to the municipality. For example Waterworks, whose map explains that the community should ask the municipality for help for more toilets. Iraq households who had not identified who the allocation/transmission of their water relied on were able to do so. Although the municipality is absent on their map, this was a result of the mapping process. Similarly, Siteview's end user map links accessing IDs to employment and accessing water as they would like to. These can all be seen as steps forward although not specifically orchestrating action.

Farm workers most specifically took this process forward. They felt that visual representation was the clearest way they could express to the person who acts as the go-between the farmer and themselves the obstacles they encountered on the farm. They further requested to keep the tools to recreate their map – cardboard, colourful paper, colourful pens and glue. The GWUA similarly asked to have access to the maps and to be able to show their members the different experiences of water within Grabouw communities demonstrated by the maps. These maps could be considered a basis for co-operation or understanding within the community.

The dynamics within the community delayed the end-user mapping process. Communities within Grabouw were uncomfortable with engaging with other communities, often who they held with suspicion or antagonism. As outlined in the representations of water in Section 2, Pineview and Pineview North residents blamed informal settlement residents for the charges they incurred for water services, and as experienced in the semi-structured interviews when people from these different social worlds were interviewed or work shopped together one of the parties would not participate. A second issue arose - people wanted to assemble in places they were familiar with. For example, Pineview North residents sidelined attempts to meet in a local hall preferring to crowd into a house. End-user mapping worked better when going to people's homes rather than trying to organise a central venue. Language was a barrier in the end-user workshops too. Organising some June end-user workshops to communities via telephone relied on Marcellino Jonas, the Afrikaans translator and research assistant, and Ndileka, to act as the intermediaries.

In the least serviced area in Grabouw the way in which communities accessed water changed through out the process. The absence of toilets was cited as an urgent need in Iraq in the first

interviews, but by the end-user mapping limited sanitation had been provided changing the dynamics identified in the initial semi structured interview. At the municipality workshop management were unable to attend and again, a slightly different end user map emerged than could be constructed from the initial semi-structured interviews with various levels within the municipality.

The important lesson learned is that communities are unfamiliar with the mapping process and extra time needs to be allocated to pursue mapping if we are to help communities understand and represent other social worlds and their position in relation to them and, plot a way forward. The mapping process is experienced as a fun process. Participants were eager to become involved in drawing symbols. Visual representation is also difficult and participants had to think through how to represent the key decision-makers and their challenges and aspirations. The benefit of visual representation is also that illiteracy becomes less of an obstacle for engaging in problematizing issues. Amazingly, similarities between communities could be seen in the use of universal symbols – for example, Iraq and Rooidakke used a red cross to indicate health problems that stem from access to bad water and sanitation. The language barrier was overcome through these visual representations.

13 Mseleni Case Study

By Elenor Hazell and Dr J. Zoë Wilson Research Director: Dr Julie Trottier

13.1 Overview

This chapter outlines the findings of 5 weeks research into the hydropolitics of Mseleni, a rural community in Northern KZN. The brief was to investigate the political constellation around water. This was achieved by interviewing almost 60 actors in the local water situation, from community members and small scale water users, through business and larger formal water users, to DWAF decision makers. Interviews aimed to solicit views on: water & water users, how and on what scale water resources should be managed, appropriate water uses, methods to access water and technologies used. A number of community workshops were organised to solicit more in-depth information. Data from interviews and workshops was coded and analysed and the key discourses drawn out. Discourses are the threads which bind actors 'social worlds' together. The data was examined for patterns in the way discourses were combined, to reveal the 'world view' of actors involved in the situation. Analysis led to visual representations of the data: First a situational map (p35) of everything contained in the hydropolitical situation in Mseleni; a process map (p39) which explains how various parts of the situation fit and work together; a social worlds map (p37) showing the different ways actors saw the world and made sense of the hydropolitical situation; finally a positional map (p38), plotting the axes of 2 major debates in Mseleni – whether water should be charged for or free, and whether water use should be restricted or not. After the data was coded and analysed we returned to the field for verification via community report backs, these sessions gave people the chance to comment on research findings, make additions and changes. We also organised end-user mapping workshops, participants were encouraged to use what they had learned from the report-back to create a map of a water-related problem and possible way they could overcome it.

The key discourses which describe the water situation in Mseleni are outlined below, followed by a sketch of the hydropolitics around access to water. The discourses and hydropolitical situation they reveal are elaborated a great deal further in the findings section 3. Visual representations are referred to throughout.

The research process formed part of the subject of research, as the brief included testing and developing a methodology for rapid hydropolitical assessment. The methodology is outlined in section 2 and reflected upon, with recommendations for future use, in section 4.

13.2 Key discourses

Data from interviews and focus groups was segmented into 9 categories: representation of self, representation of water users, scalar level, representation of water, drivers of change, water use, water access modalities and allocation/transmission technologies. After segmentation into categories the key discourses were distilled out. Initially each actor's discourses were displayed in a table highlighting key words and phrases (example below). From examining these tables, a

- **Representation of self**
- **Representation of people**

- **Scalar level**
- **Representation of water**
- **Drivers of change**
- **Water Use**
- **Access modalities**
- **Allocation/Transmission**

spectrum of discourses began to emerge on different issues. Analysis was informed by preliminary observations about water and conflict in Mseleni (Hazell, 2006:23-28) but the data revealed some of these to be more important than others. The key issues on which discourses diverged were: the value of water, water as scarce or abundant, responsibility for water management and technologies used to allocate water. Discourses on all these issues feature in the Social Worlds map. Ultimately, after recursive consideration of the data, it was decided the value of water and water as scarce or abundant are *the most important* conflicts in Mseleni, and thus they were selected for the axes of the positional map. Discourses on the key issues are now introduced below.

13.2.1 The value of water

From water as a gift from God, signifying life or death, to water as a commodity and costly product - these discourses reveal differences of opinion on whether water should be charged for and if so how much. As revealed in the positional map (p38), the Water Service Authority and Water Service Provider see water as having high monetary value, in contrast with the inkosi and community members viewing water as life.

13.2.2 Water as scarce or abundant

There was a great deal of difference of opinion on whether water is scarce or abundant; a variety of actors were positioned at each end of the scale (see positional map p38). These discourses were used to justify what constitutes a legitimate and/or reasonable use of water and whether water users should be restricted or not. Positions are however, complicated by a number of factors the most important being: there are many different *kinds* of water including piped tap water, river water, groundwater, spring water, blessed water and rainwater in Mseleni. Many actors believed different kinds of water should be subject to different rules and used for different purposes.

13.2.3 Responsibility for water management

The municipality has recently taken responsibility for managing water services in the district, in terms of the Water Services Act (1997). This appears to have impacted on the way people view responsibility for water management, as the majority of actors were of the opinion the municipality should provide. For this reason it was decided this was not one of *the most important* conflicts in Mseleni. There was however a significant number of actors who appear to have given up on the municipality and are taking matters into their own hands: sinking pipelines, adapting technology and connecting to alternative water supplies.

Water resources are currently managed by DWAF at provincial level, some actors - notably environmentalists and water resource developers such as SAPPI – are aware of this, and spoke of the need to consider the effects of other water users and manage water resources at catchment level. However, the majority of local water users visualise at a much smaller scale, that of the isigodi or Mabaso tribe.

The cause of difficulties accessing water was laid upon: Electricity cut-offs, poor engineering, poor social facilitation, lack of transport, lack of operations & maintenance, inappropriate technology, lack of finance, lack of capacity, lack of service delivery, an ineffective water committee and party politics (ANC vs IFP).

These various discourses reveal different views on where power should be located, decisions made and resources focused; issues which are explored further in subsequent sections of the chapter.

13.2.4 Technology

Discursive constructions of technology featured prominently. Technology of various types and on various scales was seen as helping and hindering people to access water: Trickle-feed tanks were introduced and rejected several years ago, by community members outraged at having their water supply restricted, pipelines were seen as both the problem and the solution, many community members spoke of going back to fetching water from rivers or switching to tubewells because “pipes are like toys” (interview, community member) as no water comes out.

Some actors are adapting technology to suit their own needs. Municipal managers and water service providers saw improved technology, upgrading water schemes and constructing new water schemes as the solution to water access problems.

Debates around what technologies are appropriate for bringing water to people are key to understanding some of the conflicts in Mseleni, they inform both the debate around the value of water (e.g. piped water is costly, income is needed to maintain infrastructure) and whether water should be restricted (e.g. piped water is scarce, priority should be given to drinking/domestic use). Debates around technology underpin both axes of the positional map (p38), are made explicit in the Social worlds map (p37) and are explored in a great deal more detail throughout the chapter.

13.3 Sketch of hydropolitics in Mseleni

The hydropolitical situation in Mseleni involves a constellation of actors contesting water and water resources for: drinking, domestic use, growing food/crops, cattle, small scale businesses, larger formal businesses in the nearby town of Mbazwana, Mseleni Hospital, commercial and community forestry plantations, tourism and the environment.

Figure 13.1 Lake Sibaya, Photo: Eleanor Hazell

Water resources include a high groundwater table, seasonal rainfall, small rivers, water delivered by municipal tanker and piped, treated water delivered to households and communities surrounding Mseleni hospital by a leaky[30] reticulation network and via a larger water scheme to homes, businesses and a saw mill in Mbazwana. Lake Sibaya - home to indigenous species, a protected reserve and part of Greater St Lucia Wetland Authority, a World Heritage Site – is the source of piped water for Mseleni & Mbazwana.

Actors in the water situation include: Community members, small scale business owners and employees, people who sell water, community garden co-ordinators, local water committee members, indunas, inkosi, ward councillor, municipal managers, engineers, technicians, project managers, community health workers, community development workers, sangomas, pastors, teachers, doctors, environmentalists, plantation owners, a commercial forestry company and DWAF decision makers.

All these elements which make up the hydropolitical situation are included in the situational map (p35). Human elements (e.g. individuals and representatives of organisations) agreed and disagreed over views of water and water users, how and on what scale water resources should be managed, appropriate water uses and so on, discourses on these subjects were examined and are represented in the social worlds (p37) and positional (p38) maps. Non-human elements were interpreted by humans and/or affected the situation in other ways. The relationship between various elements and how they fit together and work is represented in the process map (p39).

13.4 Methodology

This section outlines the route and steps taken to investigate, understand and ultimately map hydropolitics in Mseleni. As the methodology was, inpart itself, the subject of research, the methodology is reflexively evaluated, with recommendations for future use in section 4.

The researcher formulated her own action plan, using as a starting point the framework outlined in the *Case study and methodology chapter* (Wilson & Gordon, 2006). She began by familiarising herself with policy documents pertaining to the case study area, collecting a selection of local area maps and drawing up a preliminary list of actors to interview. Where possible actors were contacted in advance to introduce the research and request their participation. Additional actors came to light during the course of research.

The researcher was located at the study site for the duration of fieldwork. One of the first tasks was to recruit a local interpreter/Research Assistant, as in the case study area the predominant language is Zulu. Meetings were arranged with community leaders and the chairperson of the local water committee to introduce the research, this protocol was considered important in a traditional rural community where these structures are highly respected (at least formally), and order social life. After clearance had been granted, interviews began.

The interview questions were designed to solicit views on: perception of self, water and other water users, how and on what scale water resources should be managed, appropriate water

[30] A local Water Engineer estimated water losses of up to 70% through leaks (personal communication, 2006).

uses, drivers of change in the water situation, methods to access water, and appropriate allocation technologies. The questions were tested during the first week of the research, as the researcher visited different parts of the case study area and carried out relatively informal interviews with community members. The local Research Assistant interpreted the questions into Zulu. Each actor was asked the same basic set of questions, designed to solicit data which would fit the preliminary coding frame (see Hazell, 2006:23-28), questions were sufficiently open, to allow additional issues to arise, and allow actors to discuss what they felt was most important to the situation. Additional questions were asked, where appropriate, to interrogate issues more deeply, and investigate the formal and informal processes which influence how people access water and how the water situation 'hangs together' (these processes are represented visually in the process map p39).

The preliminary list of actors to interview expanded as participants listed the key people and organisations which believed had influence over how they access water. Most interviews happened face-to-face in the field, there interviews were recorded, transferred to computer, replayed and analysed. Interviews with actors more remote from the situation, namely decision makers, were conducted over the telephone; for these interviews notes were taken, which were segmented into the 9 categories for discourse analysis (see p4) and typed into a framework immediately afterwards.

Focus groups were held with community members in a number of different isigodi. Participants engaged in a number of activities from the PRM toolbox including: Community mapping, community timelines, discussions on water & livelihoods, stakeholder mapping and discussion of water concerns and priorities. Participants were segregated by sex, to investigate whether gender differences were significant. Focus groups were followed by a transect 'drive' through the situation, with some of the participants, to verify information and issues emerging from the workshops.

The fieldwork aim was to uncover the spectrum of discourses on water and water management, to understand the 'social worlds' at play, the overlaps and conflicts between them, and axes of difference and debate. The researcher spent 5 weeks in the field.

Data analysis began whilst the researcher was in situ; the Mseleni situational map (p35) was drafted and reworked. The main body of interview and focus group material however was coded and analysed after fieldwork was complete.

Possible arrangements of discourses into social worlds began to emerge gradually, as the researcher immersed herself in the data. After the data for each actor had been coded, the combination of discourses the actor used was distilled into a circle representing their world view, some world view circles were similar and some vastly different. At this point things began to get tricky as there were often apparent contradictions in actors world views (e.g. they advocate water restriction, but do not want to be restricted themselves) and some actors world views were incomplete (e.g. they did not express an opinion on the price/value of water). I wanted to find all the different ways of making sense of the situation and all the different positions which were taken so I scoured the data for the discourse range on key issues. At this stage I decided the main axes of conflict in Mseleni were - how water is represented in relation to value and whether water is scarce or abundant – and began to plot the discourses as positions on two axes. I worked on the social worlds and positional maps concurrently. I moved between the coded interview data, the range of discourses, axes of conflict and actors individual social worlds. I wanted to transcend the contradictions, distill the essence of what people were saying into 'ideal types'. I was working inductively and experimented until I found the representation which I feel best fits the data. 13 'ideal types' of social world emerged. Discourses were combined into social worlds (p37), these circle were positioned and repositioned, until they overlap where there is convergence of views and are positioned apart where views diverge, circles are sized to reflect the relative *power* of

actors which inhabit that social world. For the positional map (p38), once the range of discourses had been plotted as axes of debate, the position of individuals and then social worlds, was plotted in relation to these axes.

Finally, for this stage of the research, community report backs and end-user mapping workshops were organised. The aim of community report backs were to present research findings to community members for verification, and of end-user mapping, to test the effectiveness of end-user mapping as an empowerment tool, and reveal how actors conceptualise the way forward. Report back sessions were arranged in 4 isigodi and attended by around 210 community members. 13 end-user maps were produced. The lessons learned, and suggestions for developing empowering end-user mapping tools, are outlined in section 4.

13.5 Findings

We were looking for the data to reveal, first discourses, then patterns between discourses which explain social worlds. Some became apparent almost immediately, others emerged inductively, as data was considered, revisited and reviewed. The main findings are outlined below: the discourses, the actors, how things fit together and work, where social worlds overlap (co-operation) and diverge (competion, conflict), finally what end-user mapping revealed about how people conceptualised problems, goals and visualised the way forward.

13.5.1 The Actors

This section introduces actors in the hydropolitical constellation and explores *why* they stake their positions and see the world in different ways.

Domestic water users: These are community members living in different isigodi, they have varying levels of access to water and get water in various ways: through pipes and taps, from the river, community wells, on foot, by vehicle, rainwater collection and jojo tanks filled by the municipality. Community members were inclined to see water as abundant, coming from many sources including Lake Sibaya, the rain, springs, underground and taps. The difficulty however, for many, is in getting water to their homes, as many do not understand the technology of piped water reticulation. Domestic water users were grouped into four social worlds (see map p37), according the level of agency they exerted: The **discontented** are taking matters into their own hands, adapting technology and connecting to alternative pipelines; another group are **demanding better service** from the municipality; another group feel a **lack of control** over how they get water and speak of going back to the river or getting a tubewell, which would give them more control; and neglected/isolated people are **crying for water,** struggling to get enough to meet basic needs.

Figure 13.2 Water for small businesses: making blocks in Mseleni

Water is used in various ways for **livelihoods and income generating activities**. Community people with sufficient access are using water to grow vegetables and fruit trees, make amahewu, Zulu beer, mats, baskets, lollypops, raise chickens, keep livestock and make blocks etc. People engage in these activities on various scales, and sometimes form co-operatives or groups to increase efficiency. The presence of water made a considerable difference, as in areas where water was scarce, these activities were absent. In areas where water was scarce people spoke of wanting to do these things but said their vegetables wilted, animals died and it was

impossible to start income generating activities because *water,* one of the key inputs was missing. People using water for income generating activities tended to view water in a similar way to **formal businesses** in Mbazwana: **water as an input** vital to the success of their activities**.** Livelihoods and income generating users were prepared to pay a fair price for good service and felt the municipality was failing to deliver. Some were taking matters into their own hands, adapting technology and sinking their own pipelines, for example the formal business community in Mbazwana who were planning to disconnect from the municipal pipeline and connect to an alternative (interview with Jorrie Jordaan 5/4/2006).

The water committee were responsible for managing Mseleni's piped water supply for many years. Their formal power was passed to the municipality in 2005 but committee members continue to give the impression that theirs is a vital role: "the role of the committee is to see that the municipality is working, the committee is the eye of the community on the municipality, we have a big role" (Water Committee Member 11/4/06). In the researchers opinion, they are not effective and although they could potentially play a vital role, they do not. The water committee viewed water as essential for life and good health and said problems were caused by lack of staff and finances. The committee has not been re-elected since 1998, community members expressed dissatisfaction with the committee openly in interviews, at community meetings and at the report backs. Despite this, the will is lacking to remove and/or relect them; I tried to find out why and was told "it is difficult". The water committee chairperson is a 'big man' in the community and people do not want to challenge him.

Councillors saw individuals as powerful agents for change (see **Amandla!** in Social Worlds map) and said people should work hand in hand with the municipality. The ward 5 councillor said water had come to the community of kwaSonto *through* her. They acknowledged the slow pace of service delivery and said "the process will come" and/or blamed the slow pace of delivery on party politics.[31] Community members said the councillors are always busy and only visit when they come to make promises before elections.

The newly qualified **Community Development Worker** saw access to water as a big problem facing the community, which the municipality should sort out. He accompanied me enthusiastically to focus groups and report backs,[32] in order to document community

Navigating Umkhanyakude municipality

I had difficulty engaging with Umkhanyakude, the district municipality and WSA. I wrote in March 2006 introducing the research and requesting a 30 minute meeting with Mr Zondi, Director of Water Services and Ms Ngubane, Institutional & Social Development Manager. Mr Zondi's secretary telephoned and we arranged a meeting on Tuesday 4th April at 10am. I telephoned to confirm and arrived at Mhuze as planned. I met with Ms Ngubane but Mr Zondi was not in the building. Ns Ngubane telephoned and left a message on his cell phone. I left several more messages for Mr Zondi over the course of the next week which he did not return. I spoke to his secretary who reported it was not unusual for him to not attend meetings, or for her to not know his whereabouts. I requested a copy of the district WSDP, a public document, and was told at numerous intervals, it was being updated and I could not have sight of it until the process was complete. When the document was ready I must come to the municipality office (400km from where I stay) and collect it, as they did not have a budget for postage. I managed to obtain the WSDP from the DWAF regional DWAF office in Durban. I telephoned Mr Zondi many more times, and wrote to him in May 2006 to request a telephone interview but received no response. On 5th June 2006 I interviewed Mr Johan Coetsee, Umkhanyakude's Technical Services Manager (a mandate which includes electricity and infrastructure) who told me that on 1st April 2006, his department had been given responsibility for the operations and maintenance of water services (leaving the Water Services Department in charge of planning), with no resources as the budget for the year had been spent in 7 months. However, by the mid-July 2006 operations and maintenance had

[31]The ANC is the party in power in South Africa and also in KZN, previously the IFP was the party in power in KZN, the IFP controls Umkhanyakude district municipality and IFP councillors represent Mseleni and surrounding wards. Some conflict between ANC and IFP was evident. Actors mentioned that: KZN had received a lower proportion of funding for water and sanitation post-1994 than other provinces with similar backlogs, perhaps because it was IFP controlled at the time; other parts of the province which were ANC controlled had received funding first e.g. the Shermula water scheme, a presidential lead project; perhaps the backlogs in IFP controlled areas were a result of their incompetence.

[32]He did not have access to a vehicle and had difficulty covering his allotted area (Mseleni-Mbazwana)

problems and report them to the municipality.

Engineers, technicians and people involved in operating the piped water scheme saw a need for people to pay for water, to generate income to operate and maintain infrastructure. Lack of parts, transport and electricity failures were seen as real hindrances, preventing them from doing their job and systems from operating well. These actors believed people also need to take responsibility and community attitudes have an influence over how well (or not) water systems function, payment and management systems matter. They advocated different kinds of technology for different water needs.

Unofficially, the **traditional authority** - the **inkosi** and his **indunas** who govern an isigodi - is the structure through which communication and development occurs. A potential developer or someone who wishes to communicate[33] with the community is taken to the induna, who reports to the inkosi. **Indunas** were concerned about problems faced by people in their isigodi, the inkosi was concerned about the problems faced by the tribe, he believed that water should be **free & unrestricted,** provided for free by the government (as it had been in certain areas in the past by the apartheid government) and preferably transferred from elsewhere in the region as Lake Sibaya is drying up, and is a potential draw for tourists. Traditional and municipal structures work closely, but not always harmoniously together, an actor commented that the new government was not respecting the amakosi as much as the previous government had.

Umkhanyakude Municipality is the **Water Service Authority** throughout the district. Umkhanyakude covers a large geographical area and the municipality lacks capacity and financial resources. It was reported the municipality is in several million rand of arrears to Mhlathuze Water, it's WSP and other contractors. Umkhanyakude has a backlog of 264,000 people without water (interview with DWAF official, 2/6/06) and at the current rate of progress, it does not appear that the backlog will be cleared by 2008[34]. The municipality has not implemented Free Basic Water in many areas, including Mseleni[35]. Not surprisingly, municipal managers saw water as a source of income and expenditure. One actor said "water schemes can make money", another was concerned about non-payment for services and reasoned it was justified to cut off people who do not pay. Municipal actors said piped water was for domestic and business use: other users (e.g. agriculture, farmers) would have to apply for a permit from DWAF and bear the cost of infrastructure to get water.

Mhlathuze Water is the **Water Service Provider.** They have a 3 year contract with Umkhanyakude. It was reported, but not confirmed by the Mhlathuze official, that Mhlathuze might stop working because of arrears owed by Umkhanyakude. Mhlathuze work closely with the municipality and meet 1x month with the water committee. Last year Mhlathuze absorbed people operating Mseleni water scheme into their staff. The view of water expressed by their representative was that it is a costly product; the priority is piped drinking water which ideally people need "24/7". He advocated using technology to control water: constructing bigger reservoirs, pipelines and bigger water schemes to bring more water to people, decision making on major refurbishment and new schemes is defered to Umkhanyakude, the WSA.

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[33]My research activities were vetted by these structures

[34]The national government target date to provide access to water for all.

[35]There is difficulty financing Free Basic Water. Free Basic Water must be financed through national grants & subsidies, the largest of these is the 'equitable share' granted on the basis of number of poor people in the district, but the entire equitable share grant would not be enough to fund Free Basic Water (Umkhanyakude, 2003:18).

WSSA operate the water treatment works, this was previously the responsibility of DWAF. This function was/is supported informally by the **hospital maintenance manager** who understands the system. DWAF appointed WSSA to manage the water treatments works and Umkhanyakude took responsibility for overseeing WSSA in 2005. The hospital maintenance manager still provides some support and expressed concern that WSSA staff are not properly trained and do not have transport to get to the pumphouse at the lake 6km distant. The **WSSA operator** believed water could be *used for anything*, and drew attention to the fact that some community members are illegally connected to the hospital pipeline and enjoy an unlimited, free, water supply.

Eskom supply power to the pumps which deliver water to the community. Frequent power cut-offs were cited as preventing people from accessing water. An Eskom informant said this was due to the local powerline being overloaded; Eskom are planning to upgrade it.

Mseleni hospital is a major institutional water user and important to the history of piped water in Mseleni. Water for the community piped water scheme originally came from the hospital water supply and the water scheme was initiated by **Victor Fredlund,** a doctor/missionary who advocated on behalf of the community and found donors to fund the pipeline and community water scheme (see Hazell, 2006:21). The water scheme was described by community members as "the idea of Dr Fredlund". That communities close to Mseleni hospital had piped water when other communities in rural South Africa did not can be attributed to the *water for health* discourse which promulgated action by the medical community. The community and the hospital still receive water via the same supply network (water treatment plant, storage tank, pipes etc) and the hospital pay the cost of bulk water supplied to both the hospital and the community. Many actors made a strong association between the hospital and water and the hospital was a key feature on many end-user maps.

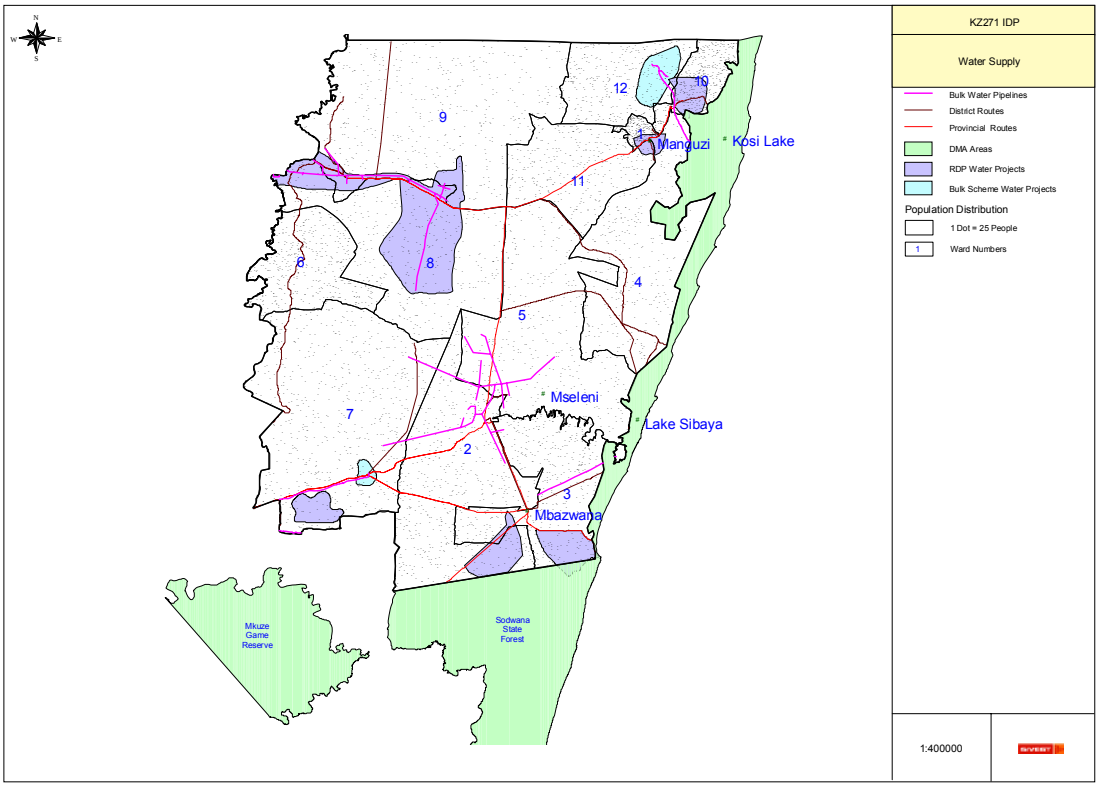

Figure 13.3 Areas served by bulk water supply, Umhlabuyalingana municipality (IDP, 2002),

Showing pipelines (pink) serving major towns (Mbazwana & Manguzi) & the hospital (Mseleni)

Other water users of note include: **Coastal Cashews**, a consortium of farmers who cultivate and process 620 hectares of cashews; **commercial forestry plantations** at Manzengwenya and a plantation owned by the inkosi and community members, supported by **Sappi.** The **Sappi representative** highlighted the importance of water for development, that it can be used to create jobs, income and development and the need for these in the area: *there is no industry or other development, people there are pretty poor, it is difficult to generate income.* The Sappi representative believed water use should be licensed and rational management decisions made, based on accurate studies of water availability. Community plantation owners and the CEO of Coastal Cashews did not appear to know how much water trees absorbed or understand the complexities of water licensing.

DWAF is the *custodian of South Africa's water resources,* which are *managed in the spirit of people first.* Domestic (water services) and bulk (water resource management) water functions are separated and representatives of these departments did not know the details of the functioning of their counterparts. Thus water for domestic, productive and other needs is viewed and managed differently. The water services department's role has recently changed, from provision to regulation and support for Water Service Authorities. The representative was concerned about lack of capacity at Umkhanyakude, but did not believe the service delivery backlog was worse than in other districts in KZN. She spoke of the need to *consider water supply options* and maintain infrastructure regularly. The water resource management representative said water use should be licensed and the groundwater table protected; this department are responsible for managing Lake Sibaya *from a water resource point of view.*

Other actors who influence the situation (or once did) include: **Vuka Mabaso** the community co-operative responsible for managing Mseleni Water scheme in its early years: they removed community tapstands in Vimbukhallo because people were *wasting the water* (which was free) and promoted private connections and water meters. **Donors** including **Mvula Trust**[36] who make rules on how and what funds can be spent on. Finally **people who collect and sell water** and/or **hire** their **vehicles** to community members to fetch water from the river and public taps. These *other actors* were not interviewed.

13.5.2 The Discourses

The selection of *different* case studies sought to sample the range of complexities and hydropolitical geographies which make up South Africa's waterscape (Wilson, 2006:17). The Mseleni case study stood out for being a rural, overwhelmingly poor and ethnically homogenous Zulu speaking community, with strong traditional authority governance structures exerting a great deal of influence at community level (Wilson 2006:51). The municipality is extremely undercapacitated and the community relatively isolated, having experienced few NGO interventions. The local geography is perhaps similar to other former 'homeland' areas, and stands in contrast to communities such as Grabouw which are more racially and ethnically diverse. It could be expected, in a homogenous community, that there would be little divergence of discourses. This appeared to be the case in certain forums (e.g. at community meetings), but important differences did emerge; testament to the fact that things are not always as they appear and the 'community' is not a homogenous unit, but contested terrain of inequality, conflict and co-operation (Gujit & Shah, 1998). The range of discourses and key issues of conflict and co-operation found in Mseleni is explored below.

13.5.2.1 Representations of water

What water is or means, was highly contested by actors. The *Draft hydropolitical map* (Wilson, 2005:14) outlines some of the representations of water competing in the national arena. Many of these and some more were found in Mseleni.

Community members, particularly those with limited control over their life conditions described water in terms of life or death: "if you don't have water there is no life there, if you have water you have everything" (interview 4/4/06). To people who have little, water is everything. People were represented as "crying for water", by neighbours in a relatively better off situation. In general community members were empathetic to the situation of others; they frequently expressed concern that there were parts of the community worse off than them, where people got no water at all.

For community members struggling to get water, finding water is sometimes available and sometimes not (due to piped water cut offs, drought, municipal tanker failing to arrive…) water was described as a "priority". People spend time worrying about how they will get water, women

[36]Mvula Trust is the largest water and sanitation NGO in South Africa and enjoys a close working relationship with the government (Wilson, 2006:7). Mvula Trust were at one time a significant funder of Mseleni water scheme, significant enough to request changes to the water scheme management model: "they said Vuka Mabaso was a business, they couldn't run a water supply, but Vuka Mabaso was owned by the people" (interview with Dr Fredlund 8/5/2006). Consequently in 1999 the water scheme was separated from Vuka Mabaso, a community water committee elected and a water board formed.

wake up in the night to check whether water is available in their taps and spend time walking long distances to fetch water. For these people, when water is available it is a source of joy "drinking water makes (her) happy, that is enough" (interview 24/4/06). People expressed concern and worry about not having enough water, particularly when there is a function (e.g. wedding, funeral or party) to prepare for, and during holidays when relatives come to visit from far away. People in policy/decision making positions spoke of being motivated in their jobs by seeing the "change in life" (interview 2/6/06) which getting better access to water makes to people.

After describing the vital role water plays in their lives, some people expressed concern over the cost of private connections[37], saying poor people cannot afford them. In Mseleni, some of the poorest pay the most for water, as people without access to taps hire vehicles (R35-200 per trip depending on distance) to collect water from the river or (free) communal taps at Mseleni hospital, pay others to fetch water for them, or walk several km each day to fetch water for the household. Some actors held the view that water should be free, notably the inkosi who remarked: "the current government has distributed more water to different parts of the tribe but made people pay for water" (interview 7/4/06). *However* not all community members believe water should be free "if the pipe is leaking, if people don't pay, where are the plumbers going to get money to fix it?" (interview 5/5/06). Local professionals, many of whom who had been or still are, active in local community development held the view that most people could actually afford to pay: "Water is cheap these days everyone can pay" (interview 11/4/06) "value helps people to share" (interview 8/5/06). The Free Basic Water Policy was mentioned by only a couple of actors, the municipality[38] has yet to implement FBWP in Mseleni, some people had not heard of it and many people had just heard of it on the radio. A municipal manager was concerned that the "Free Basic Water Policy is not working well in rural areas" (interview 5/6/06). Municipal managers also commented that water schemes can make money and reasoned it was justified to cut off people who do not pay. Water was represented as a source of expenditure[39] and income. Business water users (from small/informal producers to supermarket managers) were inclined to view water as a vital input and were willing to pay a fair price for good service. The representative of Mhlathuze Water, the WSP represented water as a commodity "you can't get a right or better product" (interview 3/5/06), costly, requiring the input of electricity, chemicals and human resources.

Discourses around the price, cost and value of water emerged as one of the key axes of difference and debate in Mseleni. The positions taken by individuals and actors who share the same world view are plotted on the Y axis of the positional map (p38).

13.5.2.2 Water, people & management

[37]In parts of Mseleni, most communal taps were removed several years ago, by Vuka Mabaso, a community co-operative which operated the community water scheme at that time. They were removed in response to concern over people wasting (free) water. People with private connections to the water scheme have to buy materials including a water meter and pay labour costs to connect to the pipeline. Price starts at around R700 and increases with distance from the main pipeline.

[38] Umkhanyakude Municipality intend to provide 3000 litres/household/month; national guidelines recommend 6000 litres/household/month (Umkhanyakude WSDP, 2003).

[39]It must be noted the municipality is in serious financial arrears, there is no budget left for operations and maintenance of water schemes and ower several million rand to contractors and the WSP

Water was represented in various ways in relation to people: As coming from peoples' power – "people make the pipeline and when the community drink water from pipes they say - we are drinking Thembi because Thembi helped us a lot" (interview 11/4/06). Certain individuals were seen as powerful and able to influence the water situation through their intervention (including at times myself). Numerous people commented that piped water was "the idea of Dr Fredlund" (interview 12/4/06), before he had the idea, community members did not conceive it was possible. Dr Fredlund believed water can bring people together for a common purpose and lead to community integration and development.

In more than one location in the case study area, people are taking matters into their own hands and are individually and/or collectively adapting technology to overcome water problems, sinking their own pipelines and joining ('illegally[40]' or otherwise) to alternative water supply networks.

Discourses which cast people as powerful agents in relation to water, contrast with the majority views, of the municipality and/or government as service provider, and people as passive recipients. Umkhanyakude municipality is responsible, in terms of the Water Service Act, for water services delivery throughout the district. In reality the situation is much messier, with a variety of formal and informal water service providers operating (see process map p39). But nevertheless the *majority* of actors believe the municipality *should* deliver water services. These discourses were particularly predominant in relatively better off areas, where the piped water supply infrastructure exists and intermittent supply is the major concern. Some people felt powerless in relation to accessing piped water: "only white people know how to join pipes to their homes" (interview 12/4/06); "there is nothing I can do, you can't change anything…" (various interviews)

There are then a range of representations of people, from passive recipients to powerful agents of change; and actors have differing opinions on how water resources and infrastructure should be managed and by whom.

13.5.2.3 Water use and access

Actors view the availability of water differently: from *scarce resource* to *abundant*. These discourses explain and justify positions on various issues: what water use(s) should be permitted and/or should take priority, whether or not water users should regulate their water use and/or be regulated and restricted by others. The issues are complex and a caveat must be stated upfront: there are different *kinds* of water in Mseleni, many actors view different kinds of water differently, and stake different positions in relation to them.

On one side water is constructed as a scarce resource. This was expressed, not surprisingly, by environmentalists highlighting the need to protect water resources, in particular Lake Sibaya. Environmentalists gave prominence to balancing human and ecological needs. The water service provider, speaking in reference to piped water, prioritised water for drinking; the water service authority prioritised water for domestic needs, as did community members who felt they were not getting water because some people were using too much. The definition of 'domestic needs' was also contested: does it include water for vegetable gardens? When water was in short supply, there was conflict over priority uses, for example in Bangizwe over water for people and cattle: an all-male focus group decided their priority was water for livestock, but not all men and very few

[40] The concept of illegality is itself a discourse, some actors spoke of self-made unofficial connections as illegal, others said they were not, they were justified, because the official service was so poor. Illegality was also evoked in relation to permitted and non-permitted water uses.

women own cattle. A man interviewed individually said watering cattle at the community water source was illegal as “that water is for human consumption first” (interview 7/4/06).

Piped water was described by some actors as “sanitised” and “better for drinking”; in contrast river water was “unclean, not right for people” (interview 6/4/06) and the cause of cholera and bilharzias. But not everyone preferred to drink tap water, one actor preferred spring water, and people who owned tubewells said this water tasted better “tubewell water is nice, tap water is a bit salty” (interview 18/7/06). The water service authority, water service provider and some other actors viewed piped water as expensive and/or limited. These actors believe it should be used sparingly, first for priority uses, and shared; people should regulate themselves or perhaps be restricted. There was however a difference between what people advocate and do: an actor who said community gardens connected *illegally* to the piped water network, as the water was for domestic use, admitted he in fact, used piped water in his garden. These actors are in direct conflict with others who do not see piped water as deserving special treatment, they believe it can be “used for anything” (interview 26/4/06) and is simply more convenient. An actor expressed desire for a tap in addition to his tubewell, the tap would be more convenient for making vegetable garden and doing washing, they would still draw tubewell water to drink (interview 18/7/06).

Other factors leading to curtailment are: the perception of water as expensive, causing actors to restrict themselves, the distance people walk to fetch water (also leading to self restriction), and erratic supply from pipelines. The Mseleni reticulation network is leaky (up to 70% losses), unreliable and service decreases rapidly with distance from the hospital. The network in Mbazwana appears to be in a similar state. Many people viewed themselves as being restricted by poor service. Some actors blamed the municipality for failing in its duty to provide water “we are still being oppressed” (interview 3/5/06). The inkosi said his people were being restricted and the government should provide water for free, he agreed with environmentalists on the need to protect the lake and advocated that water should be transferred from elsewhere. These discourses that restriction = oppression conflict strongly with those of a municipal manager, that people can be cut off if they do not pay. They reveal different ways of seeing the world.

Moving to the wider issue of water resources, the majority of community people see water as abundant, all they have to do is dig and it comes up from underground. The area is described as having substantial groundwater resources, which are not well developed (DWAF, 2002:30). There is no industry, the only major water users in the case study area are plantations. DWAF licenses water use and according to an informant, this section of the catchment is currently closed to new users to protect the water table. The representative of a commercial forestry company was of the opinion that decisions were based on *emotion* as opposed to *information* as the water table is quite high and the aquifer large. Another issue at stake is tourism development, which the area is earmarked for, as part of the Lebombo Spatial Development Initiative. Lake Sibaya is managed by of the Greater St Lucia Wetland Park Authority and is part of a World Heritage Site stretching from Cape Vidal to Kosi Bay. Tourism development requires the protection of the lake and surrounding ecosystem for lake-based tourism. Several actors constructed the lake as special, “a nature lake” (interview 3/5/06), in need of protection. The reasoning behind this was need for water to protect the environment and/or the future benefits tourism would bring. An environmentalist was not alone in staking positions spanning different discourses. He recognised the importance of conservation and protection, but was concerned about the need for water, not just for basic human needs, but for development in the region. Born and brought up locally, now an environmentalist living in the city he was caught between two worlds and aware of the contradictions between these positions.

Discourses on restriction or not of access to water and water use emerged as the second major conflict in Mseleni and constitute the X axis of the positional map (p38), which plots the positions taken by individuals and actors who share the same world view.

13.5.3 The role of technology

Technology was viewed as both helping and hindering people to access water. Resourceful actors are empowering themselves via technology, adapting it to their own needs: Converting taps and storage tanks so that they fill up at night and sinking their own pipelines.

Figure 13.4 An entrepreneur next to the water tank he adapted to fill up automatically when water comes at night

Technology was also constructed as problematic and "punishing" (interview 4/4/06). In addition to experiencing up to 70% water leakage, the Mseleni water scheme has water pressure problems. Around 700,000 litres of water is extracted from Lake Sibaya daily and due to an increased number of water connections, water no longer reaches people living at the extremities of the reticulation network[41]. In 2000, an attempt was made to install trickle feed tanks, to restrict households to 200 litres/day, with the aim of regulating and reducing and supply to enable more households further away to receive water. The trickle feed tanks however were rejected by people living close to the hospital, who viewed water as abundant, and resented having their supply restricted.

People are frequently frustrated by technology. Pipelines and taps don't always bring water, particularly to outlying areas and the water pressure is low; a high-tech windmill powered borehole at Bangizwe sometimes breaks and parts are hard-to-obtain; the electricity trips frequently and technicians have to walk 6km to Lake Sibaya to reset the pump which draws water for the hospital and community. Frustration sometimes leads to vandalism. Technology can be constructed as alienating people from water: community members do not understand how pipes and taps work "only white people know how to join pipes to homes" (interview 12/4/06). People with tubewells expressed the most satisfaction over the way they got water "water is always available" (interview 18/7/06) and a problem only occurs if the rope breaks (and this is easily and cheaply remedied). Many people with taps spoke of going back to the river "because water is always there" and/or or wanting their own tubewell. These are less technologically complex ways of getting water, over which people have more control.

The technology people in outlying areas rely on, is plastic 25 litre containers (spacspac's) carried on women's heads, wheelbarrows and 100 litre drums rolled and transported in vehicles.

Engineers and technicians spoke about a need for "overlapping technologies" and different "methodologies" of getting water for different needs. Piped reticulation networks were described as inappropriate, difficult to operate and maintain in low income areas with scattered rural homesteads. However, the decision makers: municipal managers and water service providers are planning "big reservoirs, big pipelines and bigger water schemes" and funding is committed to constructing new and upgrading existing piped water schemes.

[41]Some people in outlying isigodi paid for a private water connection and have never received a drop of water.

There is a difference, between simple and adapted technologies people *use* to get water, and *the idea* of more advanced technologies beyond their individual control, which they hope will improve the water situation. Technology emerged as the solution to water problems in most end-user maps, most frequently not technologies people could install or control themselves. The technology needed, I was told (by community members at every end-user mapping workshop) to be installed by the municipality.

13.5.4 Scalar level

Actors operate and visualise on various different scales. **Isigodi** is the level at which most local actors conceptualise the community: Each isigodi appeared to have its own particular community dynamic[42]. They are governed by an induna who calls escigawini where water issues are discussed, has (in theory) a sub-water committee and sends a representative to the community water committee. Many community members said each isigodi needed its own storage tank/pump and/or other means of getting water,

Municipal wards include several isigodi and have a councillor to represent their interests in the municipality. Ward development committees were mentioned as 'development actors' but were not found to be particularly active. Community members expressed dissatisfaction towards councillors' over their failure to bring water and development to the area.

The **piped water scheme** covers 9 isigodi and was, until the municipality took responsibility, the level at which the water supply was managed, by a community committee.

The wider community was seen as the **Mabaso tribe.** People belonging to this tribe were described as one people and concern was expressed for the "suffering" of neighbours within the tribe.

Umkhanyakude municipality is the WSA for the district and they have appointed a WSP – Mhlathuze water – who operate **between the Ustuthu and Utugela rivers**. Local actors see the municipality as remote and unresponsive. The district municipality office is 150km and 2 hours drive away in Mkhuze, and was described as deeply undercapacitated and in financial crisis. Some community members believed the **local municipality Umhlabuyalingana** was responsible for water services.

Water resources are managed and water use licensed at **provincial level** by DWAF, although this will change when a **Catchment Management Agency** is established. Few actors, notably environmentalists and water resource developers such as SAPPI, were aware of these water resource management structures, and the actors that were aware of these structures spoke of the need to assess water use, considering the impacts of other water users in the catchment.

Finally the **national government** was seen by some as failing in its duty to provide water for the people, and party politics[43] was seen as reducing the flow of finances and slowing service delivery in IFP controlled areas.

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[42] I was told: people of Vimbukhallo are the most active community, followed by Myanduya, people at kwaHlamvu were described as "stone-headed" and this community expressed hostility towards the researcher at the community report back.

[43] The local and district municipalities are Inkatha Freedom Party (IFP) controlled, KwaZulu Natal was formerly an IFP and is now an ANC controlled province.

The scalar levels actors believed are most important, are not necessarily the ones in which decision making power is located.

13.5.5 How things fit together in Mseleni: Interpreting the maps

This section explains the series of maps: Situational, social worlds, positional and process which render the hydropolitical constellation in Mseleni visible. The maps are described and explained in turn.

13.5.5.1 Situational map

The situational map (p35) began life as a brainstormed list of everything (including actors, technology, history, politics, geography, institutions, discursive constructions and so on) which seemed to make a difference in the water situation in Mseleni. A preliminary map, with elements grouped tentatively in like-groups, was constructed before fieldwork began, based on preliminary observations from the *case study brief* (Hazell, 2006). The situational map was updated several times in the field, when the data revealed new elements. The situational map was significantly restructured when the main body of data was coded and analysed, as at this stage a number of new elements came to light. It was also at this stage that the structure of the map was finalised.

The elements which affect the water situation in Mseleni are divided into: Individual and collective actors; water resources and infrastructure; discursive constructions of water, people and technology; drivers of change; geographic, political/historical, socio-cultural and institutional elements; water uses; water access mechanisms; differences; co-operations; conflicts; major issues/debates and elements which were present but under-articulated (e.g. opposition to the traditional authority). These like-groups cover the 9 categories of discourses we were coding for, and the issues over which actors agree and disagree, which create co-operation and conflict. The situational map can be read as an overview or introduction to the case study area, the essence of the situation is distilled into key words and discourses. The situational map does not reveal which elements are more important, or say a great deal about relationships between elements. It does however show the density of elements and range of discourses in the hydropolitical situation and represented thus it is quite easy to compare discourses and see where potential conflict emerges (e.g. discursive constructions of water: everyone here should pay a small amount, water here is cheap, water is costly, cost-recovery is necessary, water schemes can make money…. reveals conflicting discourses around the value or price of water).

13.5.5.2 Social worlds map

The social worlds map evolved through a number of forms before reaching the one enclosed on p37. After the data had been coded it was analysed, to uncover the discourses actors drew on. The data was considered and reconsidered from different viewpoints as the researcher sought to understand how the ‘world views’ of actors hung together. First the social worlds of a selection of individual actors were mapped, actors discourses were distilled into key words and placed in a circle. From this it became apparent that some actors combined discourses in similar and some in very different ways, some actors used contradictory discourses. The main issues actors discoursed on (as expanded in section 3.2) were: representations of water, in particular attitude to value/price, representation of water users, appropriate actors and scale on which to manage water, permissible water uses and appropriate water sources, cause of water access problems and appropriate technologies.

The aim was to transcend the contradictions inherent in actor’s individual social worlds, to draw discourses together into coherent ways of making sense of the situation, and map all the different

ways of making sense of the world, at play in the situation. I distilled the data into 13 'ideal types' of coherent world view. I moved between the coded data, the range of discourses (revealed in part by the situational map), various draft social worlds maps, and the axes of conflict which formed the foundation for the positional map (see section below). I sized and resized the circles to reflect the *relative power* (formal or informal) of the actors which inhabit the social worlds. A larger circle indicates a greater likelihood that the water situation will be *influenced* by those views (e.g. the **Water Service Authority** is represented as the most powerful social world). I positioned and repositioned the circles so that they overlap where social worlds share common ground (e.g. **Water Service Authority** and **Water Service Provider** agree that water has economic value, priority is piped water for domestic and business use, water services should be managed at municipal level and piped water schemes are the best technology) and diverge where social worlds view things in different ways (e.g. **Water Service Authority** believes services should be managed at municipal level, **Water for Communities** believes people should take responsibility and water can be managed by communities). I experimented over a number of days using a grounded theory approach, until I arrived at the representation which I feel best fits the data.

There are then 13 'ideal types' of social world at play in Mseleni. The **bold heading** indicates the title of the social world.

One social world in particular stands out as being different: **Free & Unrestricted** was modelled on the world views of the inkosi. This view sees water as a no 1 priority, people should not be restricted, water should be provided for free by the government, people should have enough water for all their needs, Lake Sibaya should be protected, therefore water should be transferred from elsewhere in the region, the most important scale is the Mabaso tribe.

A number of smaller social worlds are clustered protectively around **Free & Unrestricted** these are the social worlds of many community members who conceptualise on the level of their isigodi**. Crying for water** is the world of people who are struggling to get enough water to survive, they need water for human needs and for cattle, they feel neglected and isolated by formal actors such as the municipality and are currently walking long distances to fetch water and/or paying to access water informally (e.g. hiring cars to collect water from the river or communal taps). **Lack of control** is the world experienced by people frustrated by technology, they need water for domestic needs but water doesn't come from their taps and pipes, they feel there is nothing they can do and do not know who is responsible; they are going back to the river to fetch water. **Discontented** actors want water for domestic needs and growing vegetables, they believe problems are caused by poor management and leaky pipes, their solution is to make an alternative plan: to bypass the formal actors and get water in other ways e.g. by connecting to an alternative pipeline. Actors who **demand better service** have infrastructure in their homes and are dissatisfied with how it works, they want water 24/7 for domestic, agriculture and small business needs, they believe problems are caused by poor service delivery and solutions should come from the municipality.

The **Water Service Authority** is the most powerful actor, placed at the centre of the social worlds map. They view water as a source of income and expenditure, domestic and business users take priority, water users should be monitored and if necessary restricted (e.g. piped water is for domestic use only, people who don't pay should be cut off), they see problems as the result of lack of income/finance and operations and maintenance, water services should be managed at municipal level. There is considerable overlap between this social world and that of the **Water Service Provider,** who view piped water as a costly product, water for drinking takes priority and use should be monitored. They aim is to improve water service to customers, the goal being to provided piped water 24/7, and see new and upgraded piped water schemes as the best way to achieve this.

Water as input is the social world of small and large scale formal and informal businesses. Water is essential to their operations, they believe everyone should have access to water and are prepared to pay a fair price for good service. The municipality is failing and they are prepared to

take matters into their own hands, for example by sinking their own pipeline and connecting to alternative water supplies.

It has been already noted that some actors made use of apparently contradictory discourses (e.g. an environmentalist who highlighted the need for conservation/protection of water resources and also water resource development, a municipal manager who spoke of water as a source of municipal income and also the difference between life and death for people). It was decided that these constituted a world view in their own right, as these actors were **living in 2 worlds:** seeing water both as life (due to upbringing, background and experiences) and in ways related to professional positions (e.g. as a potential source of revenue, necessary for environmental protection). Human needs conflict with economic and/or environmental concerns, the need to bring water to people conflicts with financial and resource constraints, with no immediately apparent way to transcend the contradiction.

Environmentalists believe people should **respect & protect** water. Water maintains natural systems, human and ecological needs should be balanced, Lake Sibaya protected, different water supply options considered and water resources should be managed taking into account the actions of other water users in the catchment. Conflicting with this social world, on key issues, is **water resource development,** actors such as SAPPI who believe that water resources should be used to create wealth, jobs and development, priority should be given to the most efficient users and decisions based on the careful consideration of accurate information, they too believe water resources should be managed at catchment level.

Finally there are social worlds which place emphasis on people as powerful agents. **Amandla!** recognises that water comes from people's power, people can be more effective when working in partnership with the government. Councillors were likely to view the water situation in this way.

Water for communities was a social world inhabited by professionals and people active in local community development. They believe people should take more responsibility, water can be managed by communities and this can lead to community integration and development, people should all pay a little for water as value helps people to share and income is needed to maintain infrastructure.

These then are the 13 main 'world views' in Mseleni. The Social worlds map renders visible the areas and issues on which actors agree (potential co-operation) and disagree (potential conflict) and the relative power or influence of world views, in relation to one another.

13.5.5.3 Positional map

The social worlds and positional maps (p38) were worked on concurrently. The situational map made clear the range of discourses in the situation. From the situational map, data coding and analysis *the value of water* and *water as scarce or abundant* emerged as the key issues of debate and were selected as axes for the positional map. The range of discourses on these issues were extracted and positioned on sliding scales (e.g. X axis from water as abundant to water as a scarce resource; Y axis from water as a commodity to a gift from God). After the axes had been mapped, the data was revisited and positions individual actors stake on the 2 issues plotted (e.g. X axis: priority = domestic water; Y axis cut off people who don't pay). Positions for the 13 ideal types of social world were also plotted. The **Living in 2 worlds** social world is plotted in several different places, as actors which inhabit this social world stake contradictory positions (e.g. water schemes can make money but water means life or death; water is a scarce resource but water is needed for development).

Actors and social worlds are spread across the 4 quadrants of the positional map, however actors with formal power are clustered in the top right quadrant (charge for water and restrict use) and community members are clustered in the bottom left quadrant (water is essential to life, don't restrict). Business users are clustered in the top left quadrant (charge for water don't restrict use) and actors who feel their access to water is curtailed by others use are located in the bottom right quadrant (water is life, restrict use).

Actors with formal power and local water users stake quite different positions in relation to the key issues. One might expect that actors with formal power would have a greater ability to enforce their views. However the situation in Mseleni is such that formal actors have limited control over what *actually* happens, as there are other forces and actors at work (this is explored following section and process map).

I could have selected other conflicts to map (for example what scalar level water resources should be managed at or what technologies are most appropriate for providing people with water) but *the value of water* and *water as scarce or abundant* are, I believe the most important issues.
The positional map simplifies the hydropolitical situation, reducing many issues of conflict to 2. It reveals the positions actors take and do not take, where actors stand in relation to one another, and creates a plausible model of the dynamics underpinning conflict over access to water in Mseleni.

13.5.5.4 Process map

Finally I created a process map (p39), to reveal the processes[44] which affect how people get access to water and why. The map appears complex, because the situation in Mseleni is tangled, with formal and informal actors operating at different scales. The map illuminates processes and the relationships between them. I begin by introducing the various scales and actors which operate there, followed by a brief explanation of the process map.

National

DWAF is the *national custodian* of South Africa's water resources. In terms of (domestic & business) water services DWAF is responsible for monitoring, regulating and supporting WSA's. The DWAF water services representative described an *evolution in the devolvement of responsibility*, with things not always evolving smoothly and a number of WSA's lacking capacity. Finance arrangements have also changed: *funding has followed the function.* Water Service Authorities manage their own finances; they are able to access national government grants and are accountable to various government departments. Problems in Mseleni were described as arising from lack of national funding for operations and maintenance.

Catchment & provincial

DWAF KZN manages water resources in the province and licenses water use. These responsibilities will ultimately be devolved to a CMA when one is established. Water users require a license to extract more than 150,000m3/water/year and also to convert land to forestry. The part of the catchment Mseleni falls under is currently closed to new water users and forestry. A reserve amount of water is set aside for the environment and basic human needs. Water users are represented through industry/sector based committees and WUA's will be set up when a

[44]Processes' are defined for the purpose of this report, as management relationships, communication, infrastructure and journeys.

CMA is established. Lake Sibaya managed by DWAF (from a water resource point of view) and GSLWPA (from a conservation point of view), with KZNW implementing decisions and managing day-to-day.

District municipality

Things begin to get very messy at municipal level. Councillors are elected representatives of wards and link between communities the municipality. Umkhanyakude municipality covers a large geographic area and councillors reported they had too much to do in too little time with too few resources. Community members were dissatisfied with councillors and the municipality. The municipality is the district WSA, responsible for ensuring people in Umkhanyakude get access to water and rolling out the provision of Free Basic Water, 2 municipal departments (Water Services and Technical Services) share the function. Mhlathuze Water is contracted as a WSP and WSSA is contracted to treat and purify water. The relationship should be one where the WSA monitors, regulates and supports but it lacks the capacity to do this. People expressed concern about lack of transparency, corruption and financial mismanagement and laid blame on the municipality. The municipality and its water services departments are in serious financial straits, communicating with the municipality is challenging and community members reported a system to supply water by tanker to communities was corrupt[45]. This is the level at which formal power and responsibility for water service provision lies, the systems however do not function as they ought, and many people do not have adequate access to water through these formal channels.

Figure 13.5 Mseleni Water Treatment Works

Local level

At this level processes emerge informally to fill the gaps and hold things together. At the formal level: Water is pumped from Lake Sibaya and treated by WSSA at treatment plants near Mseleni and Mbazwana. The electricity trips frequently and when this happens, technicians have to walk 6km to Lake Sibaya to reset the pump, as they do not have regular access to a vehicle. Domestic and business users in Mseleni and Mbazwana theoretically receive water via piped reticulation networks, but the networks are in serious states of disrepair. Piped water supply is erratic; in Mseleni some outlying areas have not received water for years and in Mbazwana formal businesses (Spa, Engin Garage etc) are affected. The water schemes are supposed to be serviced by Mhlathuze Water but technicians reported they did not have transport, or spare parts, community members said the water office was not responsive when they reported leaks. The Mseleni Water Scheme was managed by the water committee, until Umkhanyakude took responsibility in 2005. Community members reported the water scheme had been badly managed for many years as the water committee were not active enough. The water committee no longer has a great deal of formal power, but committee members gave the impression they still play an important role and appeared to want to maintain their position.

This is the formal situation, but people need water, so plans are made and solutions found. The formal business community in Mbazwana have given up on the municipality and were organising

[45]Community members said the driver sells the water after filling up their Jojo tank (infrequently).

to sink their own pipeline[46] to an alternative supply network. Some households in Mseleni were doing a similar thing, on a smaller scale: connecting to alternative pipelines and (illegally) to the hospital water supply. These *strategies* were used to overcome water problems, but not all actors had strategies, many felt powerless. In the immediate/short term people are simply coping and lack of access to water makes life very hard. People draw on social networks "*(*water) costs me a case of beer a week" (interview 6/4/06)*,* and when neighbours are in similar straits, people club together to hire a vehicle if they have money (R35-200 depending on distance), or walk long distances to fetch water from streams, rivers and wells.

Amongst the Zulu people collecting water is "women's responsibility". Older women appear to be responsible for ensuring water is available in the household, but younger women and children are often the ones who collect. Elderly people often pay others to fetch water and use it sparingly. Access to employment and income are major factors affecting whether people can afford to pay to transport water. Gender thus intersects with age and class to influence how people access water and how much.

Figure 13.6Thandi & Lindiwe Sithole pushing a drum of water home, after the vehicle they hired to collect water refused to take them all the way home

The process map shows management and/or communication as purple arrows and infrastructure and journeys as green arrows, broken arrows indicate a problem area and text boxes explain the processes. Formal processes and formal actors are represented in blue, informal actors and processes are represented in red. Starting with Lake Sibaya at the bottom in the middle: Water is pumped to treatment plants at Mbazwana and Mseleni, electricity trips frequently cause the pumps to stop working. WSSA treat the water and monitor the reservoir level, they are supported informally by Mseleni hospital maintenance manager. From the bulk water storage tank water is supplied to various communities but leaks, lack of parts, staff, transport and pressure problems mean water does not reach outlying areas. A number of other actors engage at this point, including municipal tankers, people who rent out their cars and water sellers. Alternative water sources include community taps at Mseleni hospital, rivers, Jojo tanks, a windmill powered borehole and alternative pipelines. Actors at Vimbukhallo and Mbazwana lay their own pipelines; people near the hospital connect illegally to the hospital supply. Mseleni water office is supported by Umkhanyakude and Mhlathuze Water, but the municipality lacks capacity and funds and responsibility for water services is split between two municipal departments. The municipality is overseen by DWAF KZN in Durban and supported by funds from central government. Councillors fail to communicate well between the municipality and communities and people feel they are being bypassed by service delivery, decision making and development. The result is a tangled web of actors and infrastructure. There is a great deal more to the Mseleni water situation than first meets the eye.

13.5.6 Report backs & end-user mapping: conceptualising the way forward

To complete this stage of the research, community report backs and end-user mapping workshops were organised in each area where research had taken place.

[46]When the researcher returned in June 2006 for report backs she was told the pipeline had indeed been sunk and things were *100% better,* still problematic, but better.

The report backs were considered a very important stage of the research. The aim of community report backs were to present research findings to community members for verification.
The concept of a research report back was difficult for some community members to grasp, they attended expecting (or hoping) I would outline practical improvements which would be made. That the concept was difficult to grasp, is sadly because community members are used to researchers arriving, making promises that their research will result in change, and then leaving. Community members were not used to having research presented back to them. People made a great deal of effort to attend the community report backs, around 210 people attended in total.

At the report backs the aims of the research and methodology were outlined, the representations of people, water, dominant scalar level, drivers of change, water uses, ways people access water and technologies used to get water pertaining to the local situation were explained, and issues of conflict and co-operation outlined. The research was reported back via a translator. People were then given the opportunity to make comments, additions and ask questions. The findings were, on the whole, well received (except for in KwaHlamvu see p26). Particular issues appeared to really animate the crowd, provoking comment and widespread agreement by community members (e.g. on the ineffectiveness of the water committee).

Community members were very interested to know how the findings would be presented to decision makers (e.g. the municipality and DWAF), and expressed an interest in attending the final report back when the national project is complete. The researcher considers this key for ensuring that the research empowers local participants.

End-user mapping workshops were organised in 2 isigodi where community meetings were specifically called to report back the research. In 2 other isigodi, the report back was an item on the community meeting agenda and people were invited to remain for a mapping workshop. The aim of end-user mapping workshops was twofold: by introducing people to local area maps pertaining to *their* water landscape, and encouraging them to map water related goals, we hoped the research would empower participants to think about how their situation could be improved. Additionally we wanted to gain greater insight into the way people viewed the water landscape and conceptualised the way forward.

Workshop participants were divided into groups of around 10. Group members were introduced to various different kinds of map (boundary, infrastructure, process diagram, power relations, problem tree etc) and given pens and flip chart paper and asked to create a map which represents a water related problem, and a possible way to overcome the problem.

People appeared to enjoy the activity, but I believe many participants did not grasp how the maps could be practically useful to them. They saw change as driven by external agents: the municipality, the government and perhaps myself. When groups had presented their maps back to the rest of the crowd, they begged me to present their problems to the municipality.

End-user mapping did reveal interesting insights about the way people conceptualise the way forward. Outlined below is a brief synopsis of the findings at each end-user mapping workshop followed by analysis of patterns and themes which emerged.

13.5.6.1 Vimbukhallo/Mboma

Around 50 men and women (in roughly equal number) attended the report back and produced 5 maps. Several issues affecting the community were discussed, and there was widespread vocal agreement that the inactive water committee was a big problem. This problem was not addressed (except briefly by 1 of the maps), most maps showed infrastructure, technical problems and suggested solutions.

Maps were a combination of explanation of what the situation is like now and aspiration. Bigger tanks, more tanks, bigger pipes another pump featured highly, as did a house by the lake for WSSA workers - so they do not have to walk 6km to start restart the pump when the power goes down. Although problems were discussed in relation to their wider context which (infrastructure not repaired, water committee inactive, municipality not responsive), maps showed technical, localised solutions. The isigodi in relation to Lake Sibaya, the hospital, water storage tanks and water treatment works, was the dominant scale.

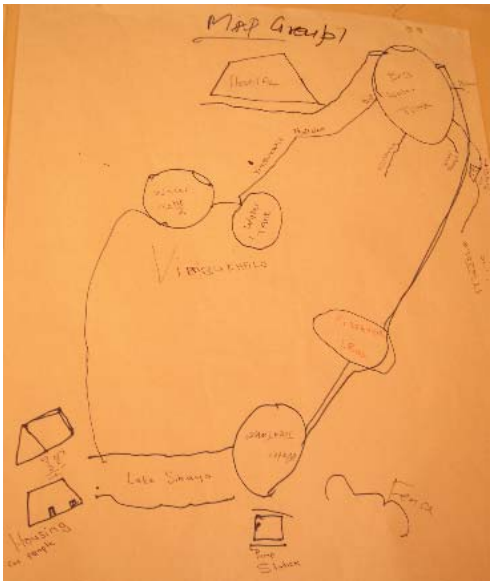


Figure 13.7 Vimbukhallo/Mboma end-user map. "The cause of the problem is that the pipe to the community joins the tank high up (map top right), if the water level goes down, the community get no water. kwaMboma don't get water, the solution would be to build 2 tanks (map centre), we would like housing for WSSA workers (map bottom left) by the lake and suggest a fence around the pump station (bottom right) as it is dangerous, there are crocodiles" (workshop participant 16/6/06).

We asked what would need to happen for the changes conceptualised on the maps to happen and the answer was unanimous: "the municipality can help with all these problems; you must present them to them" (workshop participant 16/6/06). This community saw change coming from the municipality, there was nothing they could do.

13.5.6.2 Bangizwe

In Bangizwe around 55 men and women (in roughly equal number) attended the report back and produced 6 different maps.

Figure 13.8 Infrastructure map drawn by a man

There was a gender divide: Men suggested splitting the women up and putting a couple in each group, "because they can't write" (workshop participant 21/6/06), we didn't do this; there were all males, all female and mixed sex groups. Men had a tendency to dominate in their groups, they were

concerned about accuracy and didn't believe the women would "get things right" (Ibid). Men's maps showed infrastructure – roads, pipelines, tanks, windmills – and boundaries, they were quite specific about the cause of the problem and the (technical) solution.

Women's maps showed people, journeys and lived experiences. Women also mapped the conflict between water for people and animals: "both people and animals are getting water from here; the solutions must be another tank for animals only, so that people and animals don't drink together…" (workshop participant 21/6/06)

Figure 13.9 Map of a journey to get water & explanation:

"She is walking to the jojo tank, because there are many people, some get water, others don't find it. She didn't find water there so she went to the borehole, where the animals drink, she will get dirty water. Below is the community garden, the green garden shows what will happen if it rains, the plants grow, the red garden shows that if the sun is out and there is no rain the plants die, we wait for the rain to water our plants. Here is the clinic, it is built with grass, they get wet inside. The roads here are full of soil; we walk a long distance on the soily road and get tired. If there can be a change and we can get 5 jojo tanks, filled up 3x a month, and a neat, hygienic clinic, our own pump and a market to sell our products then we will be happy" (workshop participant 21/6/06)

We asked what would need to happen for changes to come and were told: "It will happen with the help of the municipality, if you can ask for help of the municipality" (workshop participant 21/6/06).

The municipality was seen once again as the agent of change, and maybe, hopefully, myself, as broker between municipality and community. People emphasized that they would be involved in the change, "community members will do this (build the tank), but we just need some money and help from the government" (workshop participant 21/6/06)

Water is scarce in Bangizwe; the community is spread over a large area, and use a number of water sources including: river, borehole, tubewells, open wells and jojo tank filled by the municipality tanker. People see water from the jojo tanks as the best, it is purified, animals do not drink there and it doesn't make people sick. There is only 1 jojo tank in the community and it is filled up irregularly[47], when filled the water lasts less than a day, because so many people come to fill up their containers. The preferred solution to all problems in Bangizwe was more jojo tanks, filled up more regularly; failing that, there were things the community could do, if they were given support by the municipality.

[47]Between 1-4 times a month, it was reported.

13.5.6.3 KwaHlamvu

KwaHlamvu is the most developed and wealthy isigodi in Mseleni; it was the site of a report back as an item on a community meeting[48] agenda. Around 45 men and women (in roughly equal number) attended the meeting and 5 young men stayed behind to make a map. The community were quite hostile towards the researcher[49]; they said as she had come to their community, she should be there to solve their problems. A couple of men dominated the question session, they said problems were caused by the community not having their own pump and tank separate from the hospital, the researcher should write this down and present it to the municipality. That would be the solution, she must draw the map.

After the meeting 5 young men stayed behind to make a map. They explained that unlike in other isigodi, the problem was not infrastructure, they had that, it was service delivery. They produced a different type of map (see right): it was a flow chart showing government operations from provincial to isigodi level, with effort % awarded at each level, the young men listed challenges and proposed interventions. These related, not to technical but management problems:

- *The municipality to fast track performance based programme*
- *Transparency and clear communication channels*
- *Re-allocation of funds based on priorities*
- *Clear implementation plan…*

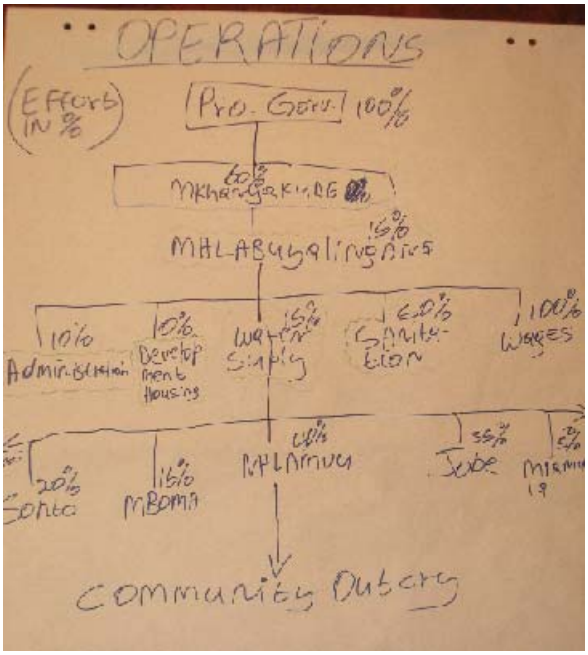


Figure 13.10 KwaHlamvu end-user map.

Conceptualised this way, both the problem and the solution lie within the municipality. The community felt the municipality should be delivering better services and were angry: They focused some of this anger on the researcher, the solution was that she should approach the municipality on their behalf; wasn't that why she was there?

[48]Called esigcawini, all community members are called by the induna, to discuss matters affecting the community.

[49]The race issue came out. As the young men were driven home they told the interpreter that she should not translate everything that was said, or she (the interpreter) would find herself in trouble; they said that *black people are like that sometimes*, when they encounter a white person they are accustomed to thinking that he/she is going to (or should) give them something.

13.5.7 Emerging patterns and themes

Certain elements are selected and others left out of any given 'map' or representation. There was a tendency to avoid mapping conflicts (except by women in Bangizwe who mapped the conflict between people and cattle), there was also a tendency (in all areas except KwaHlamvu) to sidestep real issues of power, responsibility and control over access to water, by presenting problems and solutions as technical. People discussed their problems in terms or power and politics, but solutions were not often conceptualised in these terms.

The municipality was visualised as the (sometimes only) agent of change. People are aware of its formal water service responsibilities, but difficulties they face in dealing with the municipality lead them to believe they need someone else to speak on their behalf; the councillors are failing.

There was a difference between the way men and women conceptualised access to water and water problems (particularly in Bangizwe): men in terms of boundaries and broken infrastructure, women in terms of people's journeys and experiences.

Thus end-user mapping revealed a great deal about the way participants see the world and conceptualise solutions to problems. It added density to representation of the hydropolitical context.

13.6 Reflections on methodology: towards a rapid hydropolitical assessment tool

In this final section, the researcher reflects on the methodology: tools and strategies used, challenges encountered and lessons learned from this case study, for hydropolitical mapping. It is hoped that this section will contribute towards developing a rapid hydropolitical assessment tool.

13.6.1 Critical ethnography

In keeping with a critical ethnography approach to fieldwork, the researcher lived in a local community for the duration of fieldwork (5 ½ weeks). This greatly simplified the logistics[50] of doing research in a remote, rural area, and facilitated a good level of access to local actors and information. During her stay in the community the researcher was able to build relationships with and gain the trust of local actors (this was also helped by employing a local Research Assistant) and experience the hydropolitical context first hand, which added up to a deeper, richer

[50]The best way to arrange interviews with local actors was to go and visit them as not everybody has cellphones and those that do, do not always switch them on. It was relatively easy to find somebody who knew the person we wanted to speak to and could either provide a contact number or direct us to their home. The idea of an 'interview' is not as fixed in a rural as an urban area, quite often something would 'come up' and our interviewee would not be there; flexibility in the face of changing circumstances was key. All these things were easier to deal with when living in the field. For example, the researcher tried to organise research report backs from Durban (400km distant) and found when she returned to the community that circumstances had changed, other events had come up, venues had changed and the induna's had not informed community members. The report backs were rescheduled. Circumstances changed again, as 2 community members died and the community prepared for their funerals, but this time it was easier to work around things as the researcher was living in the community.

understanding of the context. The downside of living in the context, from the point of view of impartial research, was that the researcher was drawn into the localised hydropolitical situation somewhat. It was vital for the researcher to leave the community for the data analysis stage of research, to distance herself from the context. During this time she carried out interviews with decision makers more remote from the situation and was able to step back, reflect, consider the hydropolitics from a wider perspective.

13.6.2 Working with a local interpreter

Most of the interviews and all community focus groups and report backs were carried out with the help of a local interpreter/Research Assistant. This role was crucial to the success of the research. Recruiting an interpreter contributed to building local capacity, and, it is believed, was important for establishing local acceptance of the research. Recruiting an interpreter was one of the first research tasks: adverts were placed around the community and (as per advice) the induna was asked to recommend suitable candidates. The person recruited was born and brought up in the community, she knew many of the people in the surrounding communities and had an in-depth knowledge of local institutions. She interpreted not only language but Zulu culture and custom, and advised about the appropriate way to approach people to participate in the research. This is not something an outsider would have been able to do.

The local interpreter was a great asset, but her influence on the research process must be considered. Much of the data was filtered through two people; “her interpretation is the lens through which I will gain insight into how others see the world” (journal entry 7/4/06). The interpreter’s position was established up front, by asking her the interview questions. After this we discussed the aims of the research and methodology. I explained I would be analysing what people said, in order to understand how they see the world and that it was important people interpreted the (somewhat open ended) interview questions themselves, in order for their own views and perceptions to surface.

During the time we spent working together, we discussed many issues, including: How the community viewed me (curious, interested) and the research (most people are happy to help if we explain what it is about), various aspects of Zulu culture (polygamy, traditional authority, pregnancy outside marriage), social norms (women collect water, cook and clean) and how these are changing. Discussions with my interpreter deepened my understanding of the local situation.

We discussed how interview questions would be interpreted. For some this was relatively straightforward, but for others, there were no words which would capture the original meaning exactly. For example:

8. Could you take me on an imaginary tour of the this and the surrounding areas and describe the places we would come across; do people in those areas get water and use water in the same way you do?

There is no word in Zulu for ‘area’ which does not suggest some kind of scale, we decided in the end on a word which means ‘community’ (isigodi), as this was the scale most community members spoke about most often.

12. If you were to create a list of all the key people and organizations that have influence over how you get your water, who would be on that list? (Who would/do you go to when you have water problems?)

The Zulu word for organisation has political connotation, we decided to explain to people that we were not necessarily referring to political organisations, but to any group of people or institution which might help.

We also compared our opinions on different kinds of people (e.g. people of Bangizwe are uneducated, they are more interested in cattle than education), and discussed how these might influence the way we approached data collection and interpreted people's answers. The researcher and interpreter (if used) will always influence the research, but this can be acknowledged and considered, if their positions are established upfront.

13.6.3 The politics of research in a traditional, rural Zulu community

The politics of the local area was such that it was vital for the researcher to work with and through the traditional authority. Their support was valuable: they participated in the research, made rooms available for interviews and focus groups, communicated to community members and called community meetings for report backs. As the research was communicated to community members through these channels, there are certain views it would not be possible to express: namely dissatisfaction with the traditional authority[51]. When participation was in a community/public forum, there was a tendency for several individuals (usually men) to dominate and for consensus views to be presented at unanimous. Therefore it was important to have a variety of methods for people to participate (e.g. individual interviews, single sex focus groups, community meeting), to sample all the different ways there are of thinking and speaking about the situation.

In focus groups where community members mapped the importance of community institutions, the traditional authority (inkosi, tribal court and indunas) featured unanimously as the most important. I discussed this with my interpreter. She said they were the most important institutions and you had to respect them, I asked if everyone respected them and she said no, but you could not defy them openly, the fine for disrespecting the inkosi was 1 cow, if you kept disrespecting them they would come and take all your livestock. There were also certain questions you could not ask: A DWAF representative reported receiving an application for a plantation from inkosi Nxumalo, the application was for an equal sized plantation for himself and for the rest of the community members, and was rejected on this basis. I reported this to my interpreter, who was one of the community members who had paid R50 to make the application; she said what could she do? She could not raise it with him. A similar dynamic appeared to be at play with the issue of the community water committee: The committee had not been elected for 7 years and people expressed their dissatisfaction with them openly at community meetings, despite this the will was lacking to challenge them, I was told the situation was "difficult" and read between the lines that the chairperson is a 'big man' in the community, whom community members are afraid to offend.

13.7 Hydropolitical assessment

The assessment tools were: semi-structured interviews with actors using a basic question format, community focus groups using PRM tools, discourse analysis, situational, social worlds & positional mapping, community report backs and end-user mapping workshops.

The interview questions worked well as a means to gather data for the situational, social worlds and positional maps. Questions were designed to solicit data to fit the categories of:

[51]People did not express these views; the point is they could not have even if they wanted to.

representation of self, water users, water etc. Interviews also provided opportunities for additional information and issues to arise because the questions were open ended enough to allow this. Standard interview questions (see p41) were designed with the local context in mind and were adapted slightly for interviews with actors more removed from the situation e.g.
7. Is there anything (else) that prevents you from getting water?
became: Is there anything that prevents people in that area from getting water?
8. Could you take me on an imaginary tour of the this and the surrounding areas and describe the places we would come across; do people in those areas get water and use water in the same way you do?
became: Could you describe how people in that area get access to water?
It is recommended that interview questions be tested and if necessary adapted to different hydropolitical situations, so that people are engaged in reflecting meaningfully on their local water situation and experiences.

Focus groups were organised in 2 isigodi with the help of the traditional authority[52]. A number of activities from the PRM toolbox were tested including: Community mapping, timelines, stakeholder mapping, discussion of water concerns and priorities and transect drives. These activities were useful for creating a thicker picture of how community members see the world. In particular mapping was revealing of how participants perceived their community and others surrounding them, and stakeholder mapping revealed perceptions of local power dynamics. The researcher had difficulty following the flow of discussion and debate (which took place in Zulu).
In retrospect, some PRM activities were more worthwhile than others; it is recommended the PRM activities be focused and the semi-structured interview questions be discussed as well. There was a great deal of interest on the part of community members to be involved in the research (especially if lunch was provided), which should definitely be tapped. It added density to the research that data was collected in a variety of contexts from individual interviews to community meetings, as the dynamic was different and different issues emerged. Focus groups were followed by transect drives (the distances were too large to walk) which were very worthwhile. They gave an opportunity to triangulate workshop findings (e.g. are the water sources really where people say they are?), experience spatial and infrastructure elements (see situational map p35) firsthand, chat informally with people who accompanied us and others we met along the way, and speak in more detail about issues of concern. Transect drives and walks also took place at other times, the researcher found them to be a really useful way of grounding oneself in the situation and observing differences between different parts of the case study area.

It was the researcher's first experience of constructing 'grounded theory'. It was useful to begin analysing data, coding and fitting it into a framework and producing preliminary situational maps, whilst in the field as these enhanced understanding of the situation. There was a certain degree of 'trusting the process' as not having created social world's and positional maps before, I was not sure what the outputs would be, and whether they would indeed be revealing of the hydropolitical constellation. Things only 'clicked' and began to completely make sense, when the researcher was back in the field delivering research report backs. I am not sure whether this is indicative of the research approach, or the researcher's own personal journey towards deeper theoretical understanding and insight. Social worlds and positional maps were a useful way of representing the way world views and discourses clash in a hydropolitical context. The Mseleni results are based on the interpretation of 1 researcher, they could be triangulated, by the coded data being subjected to the critical eye of another researcher, to see if similar or different social worlds emerge.

[52]Induna's called people to attend; 1 was held at the tribal court and another at a local primary school. This undoubtedly had influence over *who* attended, but it was logistically a big help, and the research had to go through these channels to be accepted.

Community report backs were, on the whole, well received; they were appreciated by people who are used to researchers' coming, extracting information and leaving. However, I believe some community members found them a bit frustrating, as they came with the expectation that the research would lead to an immediate improvement in their water situation. Practical concerns greatly outweighed desire to understand the situation more deeply. The researcher was repeatedly asked to please engage with the municipality on peoples' behalf. This is revealing of the fact that the municipality was conceptualised as the responsible agent in the water situation and the agent with the power to affect change. It is also I believe revealing of a community which feels neglected by support services and marginalised by decision making processes. The researcher made several attempts to engage with the municipality (see p10); 2 municipal managers and a councillor were interviewed for the research, but were too busy to attend community report backs. Difficulties the researcher experienced when attempting to engage with the municipality are indicative of the hydropolitics in Mseleni. A Community Development Worker accompanied the research team to most of the focus groups and community report backs and said he would present community concerns to the municipality; he found it useful to travel with us as he had difficulty reaching the communities in his allotted area on foot.

It is I believe essential for the next stage, when the research findings are presented to decision makers, for people in the case study communities to have an opportunity to engage with the powerful actors who influence their situation.

End-user mapping was very revealing about the way participants see the world and conceptualise change (as coming from improved technology and/or the municipality). But people were sometimes perplexed as to how their maps could be useful to them in addressing their water concerns. Some participants were illiterate; many were unfamiliar with maps and were not confident at all that they could create their own. As numbers were large (40+) and time limited, we were not able to introduce our selection of maps to everyone, and unfortunately most of our maps were in English. In light of these significant constraints, what was envisaged in the *case study selection and methodology* (Wilson & Gordon 2006:69) in terms of empowerment through PRM tools was not achievable in 1 workshop.

> *"The objectives of PRM are to promote community empowerment so that development can occur primarily from internal rather than external catalytic sources…The first stage of diagnosis endeavors to encourage assessment and consideration of the community environment… The second step involves prioritizing knowledge… a set of issues and concerns that face the community is drawn up… The third step involves problem analysis… The last step for the participatory research process is to draw up an action plan"* (Ibid:67)

We got somewhere between the second and third stages of prioritising knowledge and problem analysis.

The most significant barrier to empowerment was that community members conceptualised change as being beyond their control, being driven by powerful external agents, namely the municipality and sometimes myself. Perhaps my position as a relatively affluent white woman conducting research in a very poor rural community created the expectation that I could bring change. At times the research findings did really appear to animate people and stimulated discussion and debate. At one report back an articulate man, addressed the crowd, saying the research findings were accurate and the greatest problem they faced was the apathy of the water committee, I was confident he would propose a course of action, then he sat down. Afterwards I asked him what it would take to change the water committee and he said it was very difficult, perhaps the municipality could intervene as they were now responsible for water service delivery. Perhaps the first tentative step to change was simply discussing the issue openly.

At the Bangizwe end-user mapping workshop participants reported that they could solve their problems *with the help of the municipality.* Perhaps this is a possible route to empowerment, to engage with decision makers and give thought to how hydropolitical assessment can be integrated into planning and decision making. I got the impression people are used to being bypassed by participatory channels, there was a great willingness to participate, particularly in the poorer communities, to do anything if it would bring change, but community members did not believe that anything they could do *on their own* would bring change.

The research brief was to conduct a rapid hydropolitical assessment. I believe rapid assessment and empowerment would be difficult to achieve concurrently, as empowerment takes time. I recommend that as the hydropolitical assessment methodology is developed, thought be given to building in the empowerment aspect at the beginning of the research. Sessions could be organised to develop confidence and build skills around collecting, interpreting and presenting information, which help community members present their concerns to decision makers. Illiteracy did not appear to be a significant barrier to mapping, illiterate women were able to map equally well as the literate men, indicating that mapping could be a useful tool to enable people with low levels of literacy to present concerns and engage in planning and decision making processes.

Overall the hydropolitical assessment was very successful. Some tools worked better than others, it is recommended they be tested and developed in other contexts and by other researchers and input sought from activists, development practitioners and community members on how to enhance the 'empowerment' aspect.

Figure 13.11 End-user mapping in progress, Vimbukhallo.

13.8 Situational, social worlds, positional & process maps for Mseleni

13.8.1 *Mseleni Situational Map*: elements which bound 'the situation''

- **Individual Actors**

- Municipal Managers, councillors, Mayor, contractors, facilitators, consultants, technicians, plumbers, landlords, doctors, engineers, teachers, researchers, me, Community Health Workers, Community Development Workers, donors, inkosi, indunas, Stephen Nash, hospital maintenance officer, Dr Fredlund, Bheka Zondi, Johan Coetsee, Mantombi Ngubane, Mr Malambule, tourists, tourism operators, patients, God, Minister of Water Affairs, Health Minister, healers, pastors, cattle owners, cattle herders, cattle, Malaria controller, environmentalists, stakeholders

- **Collective Actors**

- Umkhanyakude Municipality, Mhlathuze Water Board, WSSA, Vuka Mabaso, Water Committee, Mseleni hospital, schools, clinics, Community Forum, Mvula Trust, dept Agriculture, other govt depts, Sugar Association, donors, treasury, AquaAmanzi, Project Steering Committee, planning committees, water user committees, DWAF, Partners in Development, Tribal Authority, Ancestors, Community, Eskom, Coastal Cashews, SAPPI, KZN Wildlife, Greater St Lucia Wetland Park Authority, business community, conservation agencies, Media

- **Water resources & infrastructure**

- Lake Sibaya, rivers, streams, springs, groundwater, rainwater, piped water, pans dug in ground, family wells, community wells, boreholes, tubewells, windmill, standpipes, private connections, pipes, taps, water meters, trickle feed tanks, handpumps, reservoirs, dams, bulk reticulation lines, water treatment plant, rising mains, sand filter, chlorine purifier, buckets, plastic containers & drums, ezimbizo (clay pots), fix with rubber/string/ plastic, flush toilets, VIP's, septic tank, electricity, feeder line, electricity connections, fuel, roads, tankers, generator, wheelbarrows, vehicles,

- **Discursive construction of Water**

- Everyone needs water, No 1 priority, source of life, feeds community & hospital, means life or death, can be destructive, can be controlled, people need water 24/7, 1st thing people use in the morning, don't get enough, take for granted, water brings change, comes from people's power, we are drinking Thembi, can lead to integration, some for all, share resources, value/price helps people to share, water should be free, should be subsidized, everyone should pay a small amount, water here is cheap, water is costly, cost-recovery necessary, water schemes can make money, Free Basic Water not working well in rural areas, you can't get a better product, commodity, input, vital to business, fetching water wastes time, fetching water was fun & good exercise, enjoyed playing in water, fetching water was hard work, bring water to the people, didn't know river water was unclean, contaminated/safe water, get diseases from water, 'sanitized', blessed water is like Panadol, nature needs water, feeds natural systems, maintains ecological processes, Lake Sibaya is unique, Lake Sibaya is drying out, carrying capacity, lot of emotion around Lake Sibaya/Kosi Bay, catchment closed as a precautionary principle, need scientific verification, water in this area is scarce, use sparingly, abundance of water here, hydrological functioning, water cycle, rainfall replenishment, element, compound molecule, water system, availability of resource, always find water at the river, better to change to isigayo (tubewell), consider water options, balance

- **Discursive constructions of People**

- Consumers, enjoying water, crying for water, are still living without water, frustrated vandals, organize/gang against you, meet regularly, don't go to water meetings, apathetic, lack information, poor, need education/skills/jobs, no form of livelihoods, need training to manage projects, learn to adjust, make a plan, accept life situation, are still oppressed, work hard to get water, municipality working hand in hand with the people, politicians corrupt, councillors failing, afraid of the councillors & water committee, community destructive, need leaders, are equal, actors with power, no one takes responsibility, don't care about the welfare of others, need to make water a priority, want water all the time, promise anything to get water, don't want to pay for water, are willing to pay for water, are already paying for water, need to understand why water is paid for, can be cut off if they don't pay, politicians told people to stop paying for water, committee not controlling very well, committee do nothing now just listen, natives, Zulu,

- Good Samaritans, the Messiah, those who shout the loudest get things first,

- young people waste water, old people don't wash, men with wives don't carry water.

- **Discursive constructions of technology**

- Technology needs facilitation, glorified new thing, people make the pipeline, the pipeline went through me, community dug/laid the pipeline, water pipes 'luxury' for Africans, cut corners save money using cheap materials, restricting people, people see technology as punishment, water losses are huge, we are fighting leaks, need to change the whole system, upgrade, separate community water from hospital, govt prefers big expensive schemes, lack emphasis on linking people, people adapt technology to own needs, pipes are like toys, pipes are so expensive, people buy own materials/fix own pipes, too many connections, water scheme is overloaded, pipelines not the only answer, appropriate technology, explore alternative forms, water quality testing, methodology of getting water, lack of financing, lack of transport, electricity problems, interconnected power network, infrastructure needs expenditure/maintenance.

human/ecological needs, water 'logic', methodology of getting water, need more water in future, need to think about recycling water.

- **Drivers of change**
- Cholera epidemic, individual agency, negotiations, research/study, Dr Fredlund, Vuka Mabaso, first pipelines laid, closing public standpipes, getting tap @ home, private connections increase, Mvula Trust, funding, change of management, Umkhanyakude, council resolution, politicians, cost recovery, population pressure, new govt, DWAF water programme, new laws, infrastructure roll-out, municipal restructuring, devolved responsibility, funding arrangements change, evolution of institutions & structures, move to Catchment Management Agencies, Free Basic Water, national targets (2008)

- **Water Use**
- Domestic (washing, cleaning, cooking), personal, drinking, swimming, fishing, sanitation, flushing toilets, washing machines, baths, showers, washing cars, making crafts, making Amahewu/Zulu Beer, social functions, small businesses: bakery, fruit/veg sellers, caterers, panel beater, mortuary, block making, building, sanitation project, businesses @ Mbazwana: garage, Build it, supermarket, cash & carry, schools, clinics, Mseleni hospital, Mbazwana, hygiene, healing, cleaning wounds, mixing/taking medicine, mixing malaria chemicals, livestock, Coastal Cashews, Hippos, Crocodiles, water based tourism, environment, community & commercial plantations, community gardens, poultry projects, fruit trees, food security, gardening, grass, flowers, beautification
- Water for people vs livestock/business

- **Major issues & Debates**
- From water for free to paying, some people not paying for water, lack of money to pay for connection, Vuka Mabaso closing community taps, access differs greatly between isigodi, water always cuts, too many connections, appropriate level of technology/ connection, implementing Free Basic Water, cut off people who don't pay, lack of maintenance, lack of finance, lack of capacity to deliver, prioritization of projects/areas, lack of O&M, budgets overspent, need more transparency, councillors failing, municipality failing, contractors failing, water committee ineffective, lack authority & haven't been elected for years, govt lacking actions in rural areas, plantations reduce groundwater flow, catchment closed to new users,

-

- **Geographic/Spatial elements**
- Isigodi, ward(s), Mabaso tribe, Umhlabuyalingana, Umkhanyakude, catchment, KZN, dispersed homesteads, backwater poor/remote/ rural communities, one of the poorest municipalities, cholera, bilharzias,
- land use: plantations, muddy areas where people plant vegetables, Lake Sibaya, Greater St Lucia Wetland Park, World Heritage Site, Lubombo Spatial Development Initiative, development nodes, infrastructure roll-out, floodplain, groundwater table, aquifer, flat/sandy land, poor soil/nutrient status, relatively high rainfall, drought, streamflow reduction,

- **Socio-cultural/Symbolic elements**
- Shembe Pastors bless water, cannot carry heavy loads on Saturday, water is healing, Baptism, in the name of Jesus Christ, ancestors bring rain, rain is not falling because people forgetting to clean ancestors river, weddings, funerals, ritual washing when family member has died

- **Present but un(der)articulated**
- HIV/AIDS
- Unemployment
- Poverty
- Disability (Mseleni Joint Disease)
- Alcohol
- Gender politics
- Population growth
- NOT race
- People afraid to stand up to water committee

- **Political/Historic elements**
- Former homeland area, tribal war, apartheid govt relationship with Zulu kingdom, former mission hospital, Zulu tradition/culture, developments come & go, historical (race) disadvantage, large service delivery backlog, violence in KZN, political affiliation with IFP, post-1994 KZN lacking financial resources vs other provinces, interface between traditional & democratic governance systems.

- **Institutional elements**
- RDP, (Shermula scheme) Presidential lead project, Water Services Act, National Water Act, Municipal Finance Management Act, World Heritage Act, Protected Areas Act, Free Basic Water Policy, contracts, budgets, MIG, equitable share, service delivery partnership, WSDP, IDP's, Water Service Authority, Water Service Provider, national water target (2008), lack of O&M structures, water extraction permit, feasibility study, scoping reports, Environmental Impact Assessment, business plans, decision making processes, planning processes, local area planning, water bills, pensions, Catchment Management Agencies
-

- **Water Access mechanisms**
- Private connections, illegal connections, illegal connections to hospital supply, piped water to homes, water supply cuts off, community taps near hospital, hospital supply, go back to the river, share with cattle, unprotected wells, people carry water, women/children carry water, grandchildren fetch water, old people pay for water, hire people/oxen/vehicles to carry for them, take a taxi to hospital, family wells, community boreholes, community wells, windmill powered borehole, collect/store rainwater, Jojo tanks, water from school, Municipal tankers, tankers which sell water, ask a neighbour/ friend for help, buy water, use wheelbarrows, vehicles, drums, containers, adapt technology to suit needs, sink your own pipeline, join another pipeline,

balance priorities in GSLWP (tourism/conservation communities), permitted activities in Park, household priorities

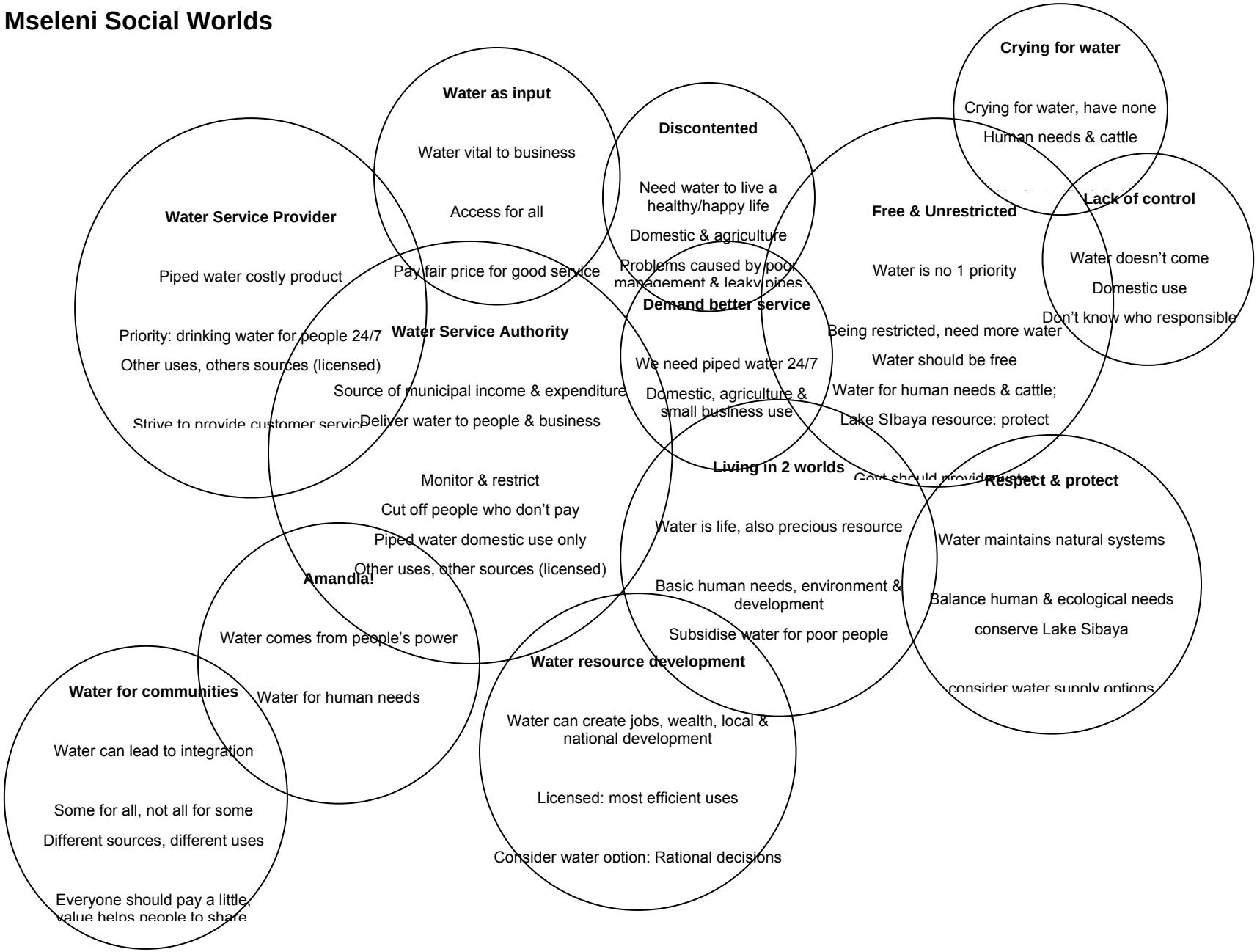
- **Conflicts**
- Outskirts vs those near hospital
- Hospital vs community
- Municipality vs contractors
- Between municipal depts.
- Politicians vs municipal employees
- Free Basic Water vs cost recovery
- ANC vs IFP
- Payment vs non-payment
- People vs animals
- Domestic vs irrigation & business use
- Traditional authorities vs municipal structures
- People cannot stand up to inkosi

- **Differences**
- Isigodi, professional status, income, gender, age, race, marital status, proximity to source, type of connection, social network, type of water use, household priorities.
-

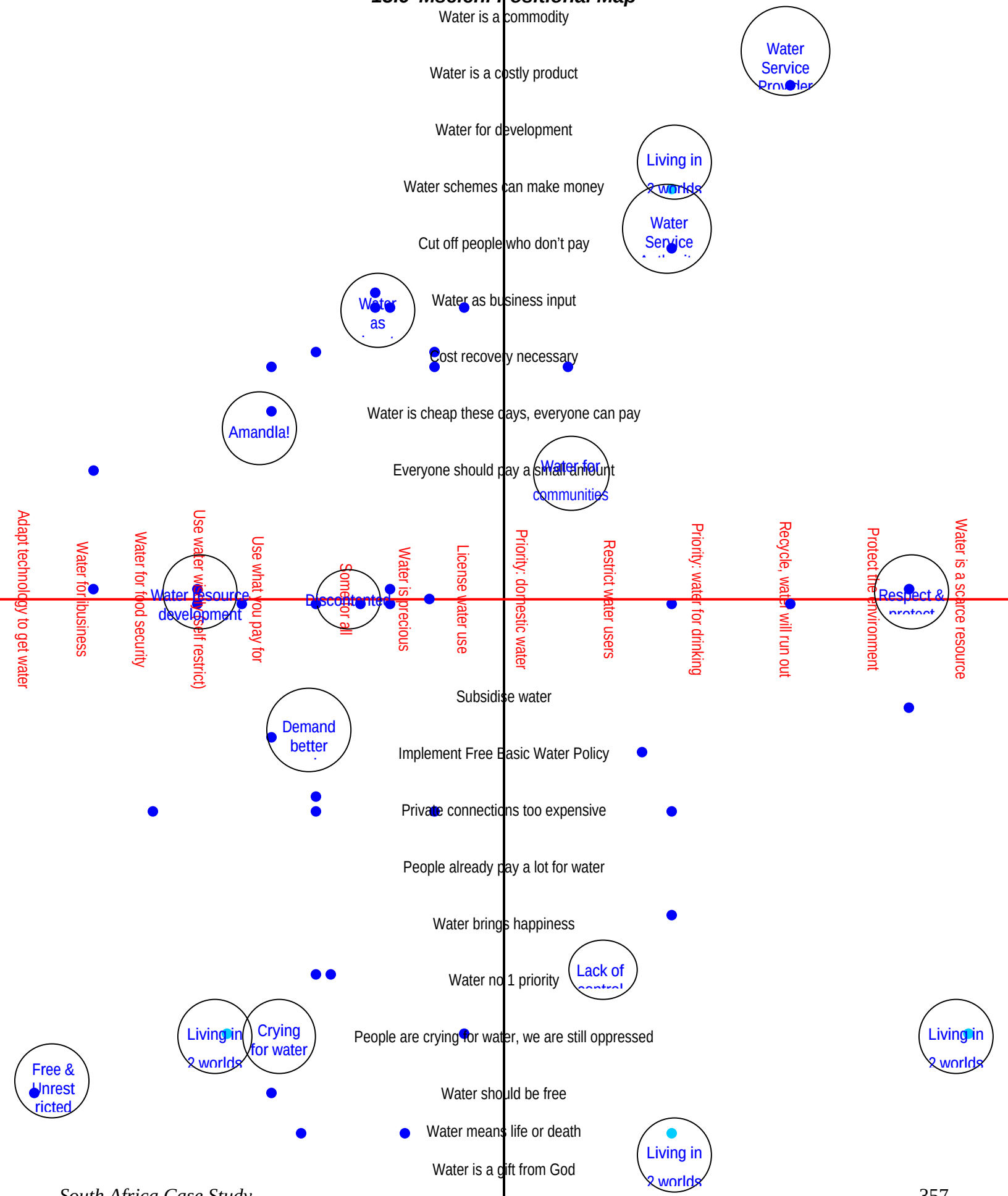
community receive bulk (treated) water free, consider regional water transfer, solicit funding, Water Service Authority, Water Service Provider, hospital maintenance take some responsibility

- **Co-operations**
- Hospital & community
- Umkhanyakude & Mhlathuze
- Between municipal depts.
- Municipality & community
- Between neighbours…..
- Traditional authority & community members
-

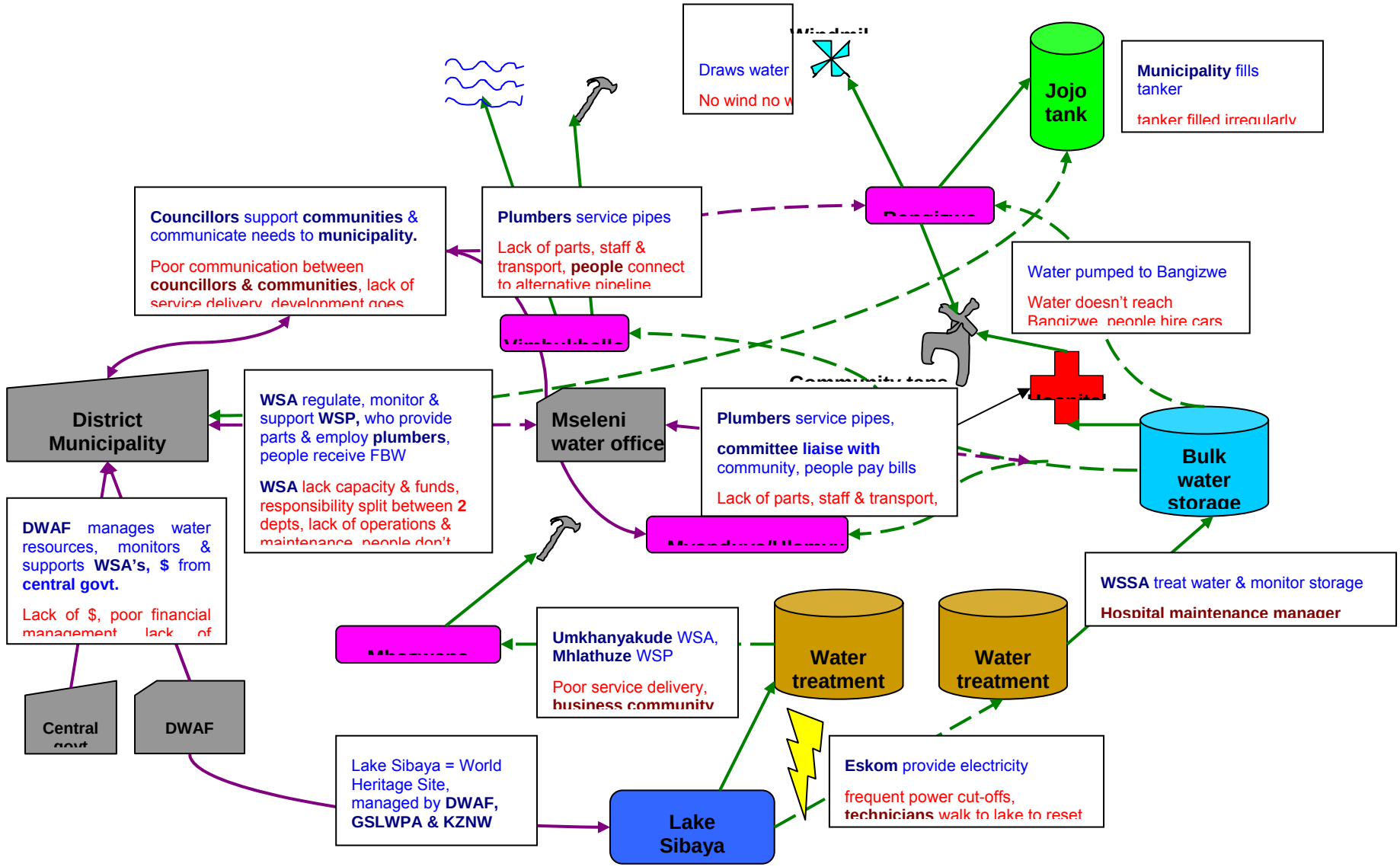
13.8.2 Mseleni Social Worlds



13.9 Mseleni Positional Map



13.9.1 Mseleni Process Map



Key: Formal processes: how things ought to work, **actor with formal power**;

Informal processes: what actually happens, **actor with informal power**

infrastructure and/or/journey management and/or communication broken line indicates a problem area

14 eThekwini Case Study

By Dr J. Zoë Wilson, Eleanor Hazell with general and specific research assistance from Wiseman Luthuli, Scebi Mkhize, and Jason Musyoka Research Director: Dr Julie Trottier

14.1 eThekwini evolution

A new democratic system of municipal authority for the City of Durban and surrounding areas was ushered in by the December 5, 2000 local government elections. In 1994, South Africa held its first democratic multi-racial elections and in 1996, the country began a broad nation-wide transformation of the municipal system. The goal was to create a wall-to-wall de-centralized system out of the fragmentary and authoritarian apartheid spatial legacy. eThekwini municipality emerged from this process in 2000 from a series of boundary re-demarcations and transitional governance arrangements. The new boundaries reflect both Durban's dominant economic and political position in the sub-region, as well as the functional interdependencies between the region's economic core and previously marginalized areas under apartheid. It also reflects an effort to re-distribute resources from the relatively affluent core to the under-serviced and economically dependent peripheries. A key feature of this re-demarcation is the inclusion of a sizeable tract of rural and sparsely settled former Traditional Lands, increasing the land mass by 68%, while adding 9% to the population. The municipality now covers an area of 2297 square kilometers. The population of Durban is now approximately 3 million, the majority of which are African

Table 14.1The Population Breakdown for Durban

Population group	%
Black/African	63%
Asian	22%
Coloured	3%
White	11%

Source: eThekwini Municipality 2002b, 11

Source: Marx and Charlton (2003: 3)

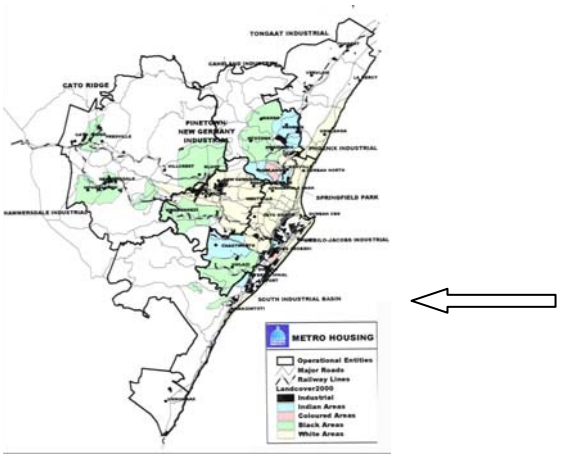
According to the most recent Water Services Development plan (2004: 30-34), eThekwini is currently working to eliminate a water service backlog of 73500 households and sanitation backlog of 187,000 households.

eThekwini's water and sanitation challenges, as well as responses to these challenges are best understood against apartheid-era legacies and subsequent municipal restructuring, including the radical re-development of South Africa's water management regime. The details of these transformations, as they apply to South Africa more generally, are available in the Scoping Chapter. This chapter, as in the case of the other Case Study Briefs (Mseleni in the North of KwaZulu-Natal and Grabouw, 80 km east of Cape Town in the Western Cape), will focus primarily on the implications for this specific case. This Section is the first of three that will background Durban's progress towards meeting water and sanitation targets, and in particular its use of alternative technologies in response to complex social and spatial issues. This first Section deals mainly with two features of Durban's apartheid legacy: 1) the spatial, socio-economic and infrastructure legacies of apartheid era planning, and specifically the legacies implicate in the Group Areas act, which specified different settlement locations and municipal services for different racial groups, and 2) related municipal strengths and constraints.

14.1.1 Social, Spatial and Infrastructure Legacies

By and large, Durban's current spatial configuration is the result of the apartheid state imaginary and related state responses to conflicts over space and race throughout the century. In particular, in the 1940's the Pegging and Ghetto Acts were passed affording government sweeping powers to clear shack settlements, ostensibly in the interests of health and hygiene. This culminated in the 1950's with the Group Areas Act, which designated areas for Whites, Indians, Coloureds and Africans, with Indian and Coloured settlements enforced to act as buffer zones between White and Black areas. Chatsworth, for example remains a largely Indian settlement designed in the first instance to act as buffer between White areas and the largely Black settlement of Umlazi.

Figure 14.1 Historical Development of eThekwini urban residential areas by race



Source: Marx and Charlton (2003: 11)

Pre-1994, Durban's Municipal boundaries and spatial organization served to create and maintain a wide range of social distinctions familiar to scholars of apartheid. Most obviously these related to race and exploitative labour practices.

> It was the systemic function of the apartheid cities to ensure that white residents had all the social benefits of living in the city, and to deny black residents equal access to urban social goods and opportunities. The result is cities where very large proportions of the population are not included – materially or psychologically in urban life (South African Cities Network 2004: 77-78).

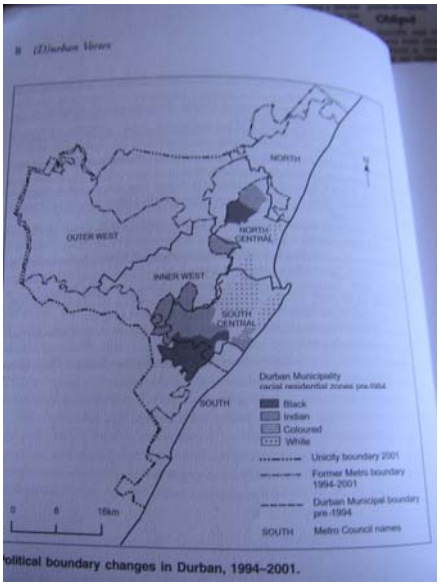
Distinctions in access to social benefits also cut across and made fine distinctions between a wide range of overlapping categories of diversity, such as ethnicity, class, age, and gender, with nevertheless clear hierarchical implications, the effects of which are still apparent today. Most notably, statistics for the health and well being of black women and children revealing a society highly skewed towards their exploitation, victimization and exclusion from the full benefits of citizenship. Distinctions were partly maintained through brute force and partly through complex social myths and differentiated workforce integration that that encouraged those higher up the ladder to protect their interests against encroachment from other disadvantaged people. Throughout the century, this strategy appears to have contributed significantly to high levels of inter- and intra-community conflict and generally high levels of social dysfunction. For example, Marx and Charlton (2003: 11) note:

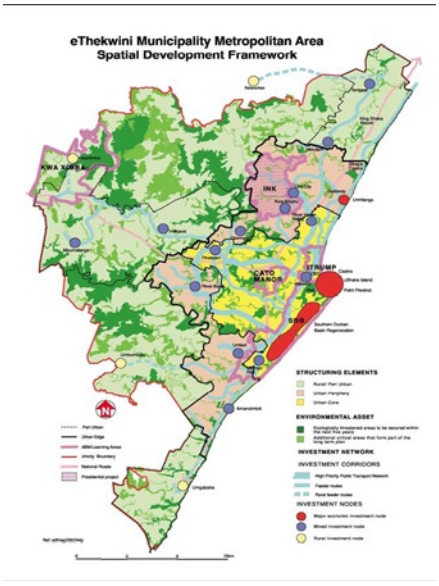
> In 1949, riots between Africans and Indians in informal settlements in Cato Manor provided a major justification for municipal intervention and ultimately, from 1960, the forced removal of the entire population to the dormitory locations on the periphery.

Bhana also notes that horrific acts of personal and intimate violence characterized the riots, including the murder and rape of children. [53] Similarly Hughes (1987: 353), looking at patterns of violence between the Black settlement of Inanda and neighbouring Indian communities, concludes that such violence only becomes fully intelligible in the context of 'relations of wealth and poverty and how race had been hitched to vested interest over many years in a place such as Inanda. For the 'Inanda mobs' could not be excused as criminals and hooligans, however obnoxious their behaviour had been. They were local people experiencing ever-increasing degrees of poverty and deprivation, who had identified symbols of wealth and well-being (most certainly without the assistance of the police, as one African landowner had alleged) on the other side of a great divide.' Hughes also notes that apartheid-era policies contributed to fragile social relations expressed as high incidence of violent crimes against person, such as mugging, assault, rape and murder (342).

The maps below detail both Durban's original municipal boundaries as well successive boundary demarcations since 1996. Specifically, from 1996 onwards, Durban's boundaries are re-demarcated as it begins efforts to consolidate transformation. In essence, this shift is one from municipal provision of piped water 24/7 and fully reticulated sewerage to a mainly white and economically privileged customer base - notwithstanding various levels of often inadequate service to Black, Indian and Coloured communities – to a commitment to constitutional guarantees to equity and provision of a free basic lifeline amount of water and basic sanitation.

Figure 14.2eThekwini municipality metropolitan area





Source: Durban Vortex and 2002 and WSDP 2004: 13)

In overlapping attempts to decentralize, devolve and improve the overall distribution of state services, the end of apartheid ushered in a contentious and "protracted process of municipal restructuring" (Robbins 2004: 12). Many of the reasons behind the fractiousness of the process lie the nature and complexity of historical infrastructure and spatial planning processes, which most notably culminated in 'urban planning characterized by racially fragmented and discontinuous land use and settlement patterns, haphazard, dysfunctional and inefficient spatial ordering, land use mismatches, low level population density, the

[53] http://www.sahistory.org.za/pages/sources/bhana/part02-b-70.htm

concentration of poor in relatively high density areas on the periphery and the rich in the core intermediate urban areas (Maharaj 2002: 1).

In this context, post-apartheid attempts to recognize and integrate functional interdependencies while disrupting their exploitative and socially dysfunctional nature meant, most notably, for the water sector:

> amalgamating 43 separate water utilities and municipalities into one operational entity. The main purpose of the single body was to provide equal services to all citizens across the metro at the same tariff. The former black townships had received particularly poor water services in the past and cost recovery was negligible. The Greater Metropolitan Area was subsequently enlarged further by the incorporation of extensive rural areas – by 68% in area but only 9% in population – in 2001 to create the ethekwini Municipality (Harrison et al. 2004).

Efforts to reform the water sector were further complicated by a number of factors, which included the need to upgrade decayed and inadequate infrastructure in former township areas coupled with the need to institute radical and equity-based tariff, billing and pricing system reforms in complex and highly variable social terrains. For example:

> It is acknowledged by the municipal water authority that unless the water supply to a group of households (such as an informal settlement accessing a communal
>
> standpipe) is indexed to the number of households, the perverse situation arises where a policy that is intended to be pro-poor, actually discriminates against the very poorest. This is because it is very expensive to regulate the distribution of water to each household from a single point and their collective consumption pushes the consumption for a single connection into the highest tariff charge. (Marx and Charlton 2003: 18)

Affordability concerns are further exacerbated by the contraction of Durban's manufacturing sector and consequent high unemployment. Other pressing issues include the proliferation of illegal connections contributing to high water loss, the need to extend the existing T shaped grid into sprawling peri-urban and rural settlements not well serviced by roads and often located on marginal and hilly terrain. According to eThekwini's Water Services Development Plan, the municipality now covers an area of 2297 square kilometers (WSDP 2004: 13), much of which lies at distance from water mains and sewer trunks and is not well integrated with other municipal infrastructure.

In this context, there is also a proliferation of shack settlements and informal communities in both urban and rural areas. For example, *The Economist* (April 8-14 2006, 10) reported recently about one Durban shack settlement:

> The rapid, unplanned influx into shantytowns has caused living conditions to deteriorate. In Foreman Road, residents say there are just five toilets between 7000 of them, and only four water standpipes provided by the local council…Residents suffer a lot of health problems, mainly stomach and respiratory ailments. Last year the accumulated grievances…erupted into protests throughout the country, with clashes between residents and police.

Figure 14.3 Informal settlements

Source: Marx and Charlton (2003: 7)

In such cases, often the 'most determining obstacle to the provision of a basic water supply is land ownership. The municipal water authority is unable to provide a household connection to dwellings in informal settlements without authorisation from the landowner' (Marx and Charlton 2003: 18).

Of particular concern for eThekwini Water and Sanitation was the inclusion of approximately 36,000 rural and dispersed households, which according to the unicity committee technical task team: 'are rural and according to Durban's growth path, they are going to stay rural' (in Marahaj 2002: 11). In this context, the re-demarcation also put the onus on the Municipality to respect the "nature of local territorially-based communities and their potential for democratic self-governance within the complex political and economic environment" (Sancton 1996 in Maharaj 2002: 1), while at the same time navigating potentially highly contentious collisions, particularly those between the rural and urban:

> A key component of this process has been spatial re-organization through boundary delimitation. However, boundaries are not neutral geographical lines. Boundary changes are often associated with a redistribution of political power and resources, with some institutions and parties benefiting and others being disadvantaged…*Quite often, boundary conflicts are associated with urban municipalities encroaching onto rural areas* [emphasis added] (Maharaj 2002: 2).

In this context eThekwini is also called upon to recognize the legitimacy of traditional governance structures and settlement patterns and re-conceptualize its understanding of water and sanitation services in ways that are consistent with these without exacerbating inequities and sealing off avenues for change and growth.

Figure 14.4Rural ABM study area

Source: http://www.durban.gov.za/eThekwini/Municipality/abm/rural/rural_map

Indeed, South Africa's the Free Basic Water (FBW) policy co-evolved in tandem with the roll out of basic service to eThekwini's rural areas, former Traditional Zulu Lands, whose rural and dispersed settlement at distance from sewer trunks precluded fully reticulated systems on city grid. Here, the municipality has rolled out over 30,000 200litre which are filled daily with the FBW amount, and the technology is coupled with a dry sanitation technology (urine diversion), which is waterless, allows for easy decentralized management, and produces little smell or environmental impact. The impact of FBW in rural areas with the 200litre tanks and UD toilets, overall, appears to have been positive. Reportedly, women have been among the key beneficiaries, given that poor households are more likely to be female-headed. Responsibility for water also tends to fall, traditionally, to women. Thus, alleviation from the burdens of fetching water has transformed the opportunity structure – particularly in terms of available time – not just for women but for children as well, who are often called upon to help with daily tasks. This is even more meaningful in areas and households with high rates of HIV infection. More research quantifying the public health and social well-being benefits associated with systematic and intensively supported roll-out of alternative technologies can now be done, but early indications are positive (site visits, Oct 2005).

Figure 14.5 Alternative Technologies

Photos: Zoë Wilson, Valley of a Thousand Hills, 2005

There are a number of other technological and management packages the Municipality supports, which are correlated to community features such as likelihood of resettlement, affordability, distance from sewer trunks, delivery of FBW and so one. These have been the subject of considerable debate and conflict. Municipal Services Expert Glen Robbins comments for example:

> [T]he evolution of policy at a government level with regard to housing and free basic services…has had a fundamental impact on the actors in these processes. In this regard, it is important to keep in mind that the actual practise [sic] of managing local delivery and policy is also informed by initiatives such as the models used for the delivery of low income housing and the roll-out of free basic service provision. Free basic service provision in particular has played an increasingly important role in discussions about the most effective systems for delivery of services such as water and sanitation to all households (Robbins 2004: 8) .

Alternative and de-centralized models in play fit within an emerging global discourse debating the equity and sustainability implications of traditional versus alternative water and sanitation options. The drivers and material implications of these debates make up the main thrust of this case study and will be expanded upon in subsequent Sections.

14.1.2 Municipal Strengths and Constraints

According to CEROI,[54] there are 14 rivers within the Municipality, the most important in terms of bulk water supply is the Umgeni, which provides high quality potable water. Most rivers, however, have been significantly modified, and suffer from some environmental stress. It also noted that in 'a few poorly serviced areas, some residents still rely directly on streams for their daily water supply.'

The responsibility for bulk supply lies with Umgeni Water, a statutory body created out of Durban's historically integrated water supply infrastructure in 1984 under pressure from central government. The split has not be unproblematic for Durban, which purchases 85% of Umgeni's water. According the CEROI, '[m]ost of the water stored to supply Durban (98%) is located outside the metropolitan boundaries. This means that the DMA does not have direct control of its most critical water resources. Future water needs for the DMA may be in direct competition with the neighbouring capital city of Pietermaritzburg and other agricultural users.' The have also been conflicts over pricing, leading Durban to challenge Umgeni's independence as a matter of public interest, under section 78 of the Municipal Services Act, commissioning studies supporting the view that significant public costs are incurred by not merging the two organizations (WSDP 2004: 56). Recently, a rapprochement between the two organizations appears to have slowed plans for a merger, with Head of eThekwini Water and Sanitation now sitting on the Umgeni board. Loftus (2005: draft) characterizes longstanding tensions between Durban and Umgeni thusly:

> Durban's water supply infrastructure was originally developed through large municipal projects in the early- mid-twentieth century. As a result, the city's engineers have been held aloft in several publications for their heroic efforts in harnessing water for the city (see Lynski 1982). From 1984, however, under pressure from the central government, the city was required to sell its bulk-water infrastructure to a water board. Originally termed the Umgeni Water Board, this has now been abridged to Umgeni Water. …It is important to note that, from the start, the relationship between municipality and bulk-supplier has been tense. Durban makes up approximately 85% of the entity's bulk-water custom. The municipality, in short, has provided its reason for existence. The bulk-water tariff to the city has, however, increased steadily since 1984, with several unprecedented rises between the late 1990s and 2002.

Tensions between central government municipal objectives have had other notable influences on Durban's development. Historically, Durban has been relatively prosperous, while its municipal finances conservatively managed. Predominantly British during its formative years (home to lowest proportion of people of Dutch descent of South Africa's major urban centres), and operating under an imaginary that located the province of Natal within the mythology of the global British empire, Durban's relationship with Pretoria was weaker – and more at variance - than that of other major urban centres.[55] In real terms, it meant that the stakes for financial self-sufficiency were high, with less recourse to central government deficit support. Early on, Durban adopted a conservative policy of financial self-sufficiency. As a result, at the

[54] http://ceroi.net/reports/durban/issues/fshwater/state.htm

[55] Interview, Vishnu Padayachee, School of Development Studies, March 01, 2005.

end of apartheid, Durban's capacity and financial solvency translated into a stronger financial position than other leading municipalities. It has been speculated that this contributed to eThekwini's relatively strong progress in water and sanitation coverage, as well as its early adoption and experimentation with alternative technologies. Glen Robbins,[56] for example, has argued that Durban has been able to pilot and test new technologies because it is not in a state of perpetual crisis. In addition to a creatively fungible Capital Fund, it runs a perpetual surplus, while every other city runs off deficit. It is also a well-capacitated Metro, especially in fiscal and engineering terms. As such it is also adept at accessing national government grants, often fronting itself a portion of the grant so as to stay well ahead of targets and deadlines, and therefore eligible for additional top-up dispersements. As a result, the proportion of people well-integrated into the water and sanitation system has consistently been higher than any other municipality. The scale of delivery and quality has been as high as or higher than other comparable environment, such as Chile, Robbins notes.

14.1.3 Summary Remarks

South Africa's social and institutional contexts vary widely. This variability is related to the highly uneven social landscapes residual from apartheid. It is expressed in spatial as well as social terms, not limited to various forms of ghettoization, infrastructure legacies and governance regimes, as well as race, ethnic, class, age, and gender cleavages. Likewise, eThekwini Municipality is a municipality of contrasts. Assessments of eThekwini's handling of water and sanitation challenges over the last ten years tend to be polarized. On the one side we find arguments that consider it the continent's leading innovator, a learning organization increasingly skilled at combining alternative technologies with pro-poor solutions. On the other side, we find we find those contending that Durban's innovations are thinly veiled delivery mechanisms for new inequalities, which have come at the cost of escalating social conflict, intensifying financial hardships and debilitating health risks. The balance of research and subsequent sections are designed to situate the material consequences of eThekwini's Water and Sanitation strategies within the web of perceptions about water and sanitation more generally (i.e. water should be free or flush sanitation is optimal sanitation). It will make explicit the relations of cooperation, competition and conflict existing among the various actors that deploy their strategies over a local scale, a national scale or a global scale.

14.2 eThekwini Innovation

The water global policy environment is increasingly shaped by tensions between interests and ideologies associated with the highly centralized public works projects of the twentieth century western world - and the promise they still hold up for improving health and hygiene - and emerging clusters of ecologically-minded and technically adventurous research and advocacy. Driving what might be identified as a paradigm shift in the global water sector is the high-level realization of growing global freshwater scarcity, the deep ecosystem impacts of traditional water and waste water practices, and the failure of mainstream thinking to make much headway towards the Millennium Goals[i], especially in the poorest countries. As a result, many of the world's global water think tanks have started to think creatively about scale and innovation (UNESCO 2006). For example, in 2000 a wide range of experts working in areas related to sanitation developed the 'Bellagio Principles', which promote a household-centred multiple-pathway approach to environmental sanitation for rapidly urbanizing low to middle income countries. Given the sluggish gains in achieving sanitation-related MDGs, 'The approach [is designed to] respond directly to needs and demands of the users but attempts to avoid problems resulting from purely "bottom-up" or "top-down" approaches. It offers the promise of overcoming the shortcomings of unsustainable planning and resource management practices of conventional approaches' (WASH 2005: 5).

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[56] Interviews with Glen Robbins, School of Development Studies, 2004 and June 23, 2005.

It is in this light, eThekwini municipality[ii] has taken advantage of South Africa's new farseeing water policy environment – which makes provision for a wide-variety of technologies, partnerships and management models - and leveraged the global store of emerging technologies that bring with them the possibility of management at new scales, in order to make progress in water and sanitation provision across some of the most complex and fraught socio-political terrains in Africa.

14.2.1 Municipality of Contrasts; Municipality of Innovation

In 2002, *National Geographic* praised eThekwini Executive Director for Water and Sanitation, Neil Macleod, for, among other things, 'drastically reducing waste in the city's water system while simultaneously improving water delivery to the urban poor'. More recently, Harrison *et al.* (2004, 2) argued that: 'The City of Durban is one of the leading institutions in this drive [to provide safe drinking water and improved sanitation] and has gained the reputation for innovation, coverage and efficient service delivery. The situation is not static and is constantly evolving.'

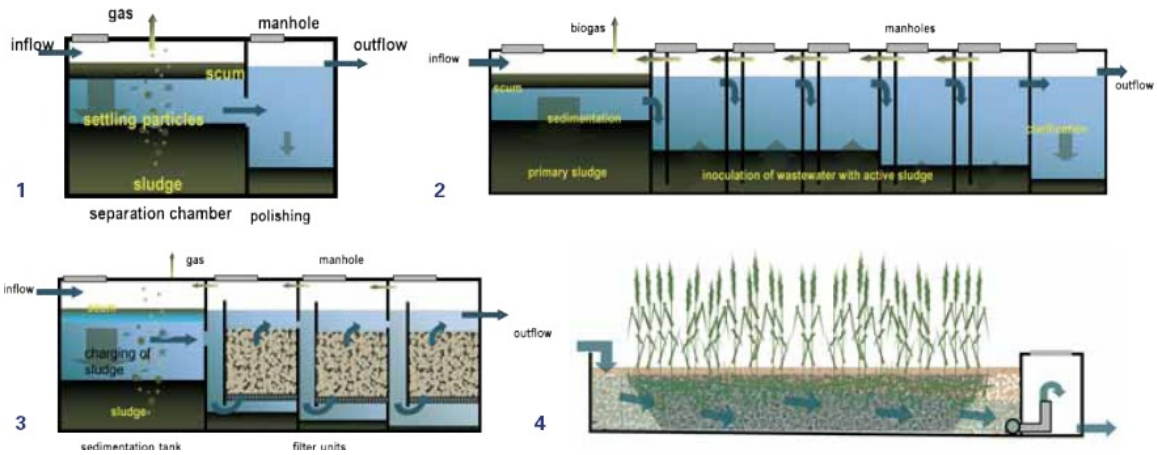
As noted in the previous related section, over the last ten years, Durban's municipal boundaries have stretched to include social diversities and spatial complexities alien to the municipal systems that evolved to refine and maintain apartheid. Many of eThekwini's new areas are more similar to the peri-urban and rural areas of Sub-Saharan Africa than to rural areas and suburbs of the West. Distinctively they include the partially and exploitatively enfranchised former townships plagued by the collapse of the textiles industries and crisis of unemployment, as well as traditional and tribal home lands where formal employment is rare. For example, municipal boundary re-demarcations meant the inclusion of approximately 36,000 extremely low-income rural and dispersed huts/households, which according to the unicity committee technical task team: 'are rural and according to Durban's growth path, they are going to stay rural' (in Marahaj 2002, 11). In response to these complexities, EWS has –at times –undertaken moves that set it apart as the continent's leading innovator.

Particularly innovative is the municipality's adoption of alternative 'appropriate technologies' and management models for the rural poor and tribal areas. Located outside the urban edge, some newly incorporated communities are too dispersed for conventional waterborne sewage technologies. Lack of sewerage also puts important limits on the amount of water that can be safely disposed of on site without leading to stagnant pools, runoff into neighboring plots and waterborne health risks. Thus, into these previously non-serviced areas, the municipality pipes in 200litres per household per day –the Free Basic Water amount based on an assumption of eight persons per household. This is accompanied by a waterless urine diversion (UD) toilet system. The UD system has been well received internationally and represents a significant improvement over other onsite and closed loop sewerage options. The main reason for this is that separating the urine and feces eliminates most of the odor and greatly facilitates ultimate waste removal.[iii] In theory, the UD system is also an 'ecosan' system, which means that human waste is also made available for agricultural purposes, although this is not advocated in the Durban case and tests are currently underway with the Pollution Research Group at the University of KwaZulu Natal to ascertain health and safety standards. There have been more than 170,000 UD toilets rolled out in Northern China where water shortages bear significantly upon technological choices. eThekwini now has approximately 30,000. The roll out has been accompanied by extensive local job creation and skills development, successfully training in excess of 600 local contractors, 300 local health facilitators and 3500 local labourers.[iv]

The UD is a simple decentralized waste management design for rural and dispersed households – often transient - with no previous toilet facilities and lying far from trunk sewers (see photos in previous Section). In denser communities that are nevertheless far removed from trunk sewers, the municipality has undertaken to test Decentralized Water Treatment Systems (DEWATS). Interviews at eThekwini Water and Sanitation indicate that the decision to pilot the DEWATS systems was made possible through participation, especially on the part of Head of Water and Sanitation Neil MacLeod, in related alternative technology knowledge networks. This decision was bolstered by the availability of local research support and experience with the technology held by the Pollution Research Group, with whom the municipality has a formal and longstanding research agreement. It is also noteworthy that the municipality is in a position to finance inputs and construction of the facility, and as noted in

the Background Section, is sufficiently solvent to experiment with new and alternative technologies.

Figure 14.6 Decentralised wastewater treatment system



Source: Borda nd[v]

According to Chris Buckley of Durban's University of KwaZulu Natal's Pollution Research Group, 'DEcentralized WAstewater Treatment Systems is a Community Based System and incorporates the anaerobic baffled reactor as the core process technology. The main technical features of DEWATS-CBS are low investment- and maintenance costs, use of locally supplied and readily available building materials, independence from external energy sources, high tolerance towards inflow fluctuation and organic pollution load, high treatment efficiency, operation and maintenance possible by technically un-skilled persons, re-use of treated wastewater and recycling of stabilized sludge as organic fertiliser. Domestic wastewater volumes of up to 1 000 kl/d can be treated by DEWATS-CBS. Over 300 such systems have been built in Asia.'[vi] EWS's deployment will be the technology's first trial in Africa.

Of further note is the co-evolution of South Africa's Free Basic Water policy with Durban's UD experience. Until 2001, South Africa's policy environment made provision for Free Basic Water, while no municipalities had implemented the policy. However, once the UD/200kl drum technological option began to roll-out, it became clear that the cost to the municipality of billing and cost recovery measures for very low water usage approached the cost of delivering services. This was due, in part, to a basic inability of the rural poor to pay and related recidivism costs. Moreover, the costs of misjudging the robustness of local economies had been costly in human terms. Deadly cholera outbreaks in 2000 reinforced the message that the costs of joining and maintaining membership in the new regime were too high and/or the inequities in the network required innovative redistributions in order to invest poor communities with the means to make meaningful cost-benefit analyses and generate second order opportunities. Thus, in defiance of an international climate committed to full cost recovery, EWS adopted a Free Basic (lifeline) Water for the poor, which ultimately became the template for the national Free Basic Water policy. The policy is now applied to account holders universally across the municipality, and has been implemented in many other of South Africa's municipalities.

In South Africa's decentralized municipal water delivery governance model, Free Basic Water remains both the responsibility and at the discretion of local government, and depends largely on local capacity and financial sustainability. Official statistics, nevertheless, indicate that progress towards full coverage, is advancing. However, it is important to note that field research conducted in other areas during the course of this project revealed that consumer experience access to Free Basic water could be at significant variance from official statistics.

National View

28 October 2006

Summary view

Population	Total	Poor
Total	48,606,643	22,645,790
Served	36,646,124	15,672,540
%	**75.39%**	**69.21%**

Service level view

Total Population Served					
Service Level	No Infrastructure	Below RDP	at RDP	Above RDP	Total
Total	3,379,459	4,838,374	8,427,112	31,961,698	48,606,643
Served	70,287	4,572,755	5,573,692	26,429,390	36,646,124
%	**2.08%**	**94.51%**	**66.14%**	**82.69%**	**75.39%**

Service level view

Total Poor Population Served					
Service Level	No Infrastructure	Below RDP	at RDP	Above RDP	Total
Total	2,210,543	2,631,662	4,943,374	12,860,211	22,645,790
Served	24,170	2,465,670	3,069,719	10,112,981	15,672,540
%	**1.09%**	**93.69%**	**62.10%**	**78.64%**	**69.21%**

Water Sevice Authorities			
Total	Providing to all	Providing to some	Not Providing
170	9	156	5

Source: http://www.dwaf.gov.za/FreeBasicWater/

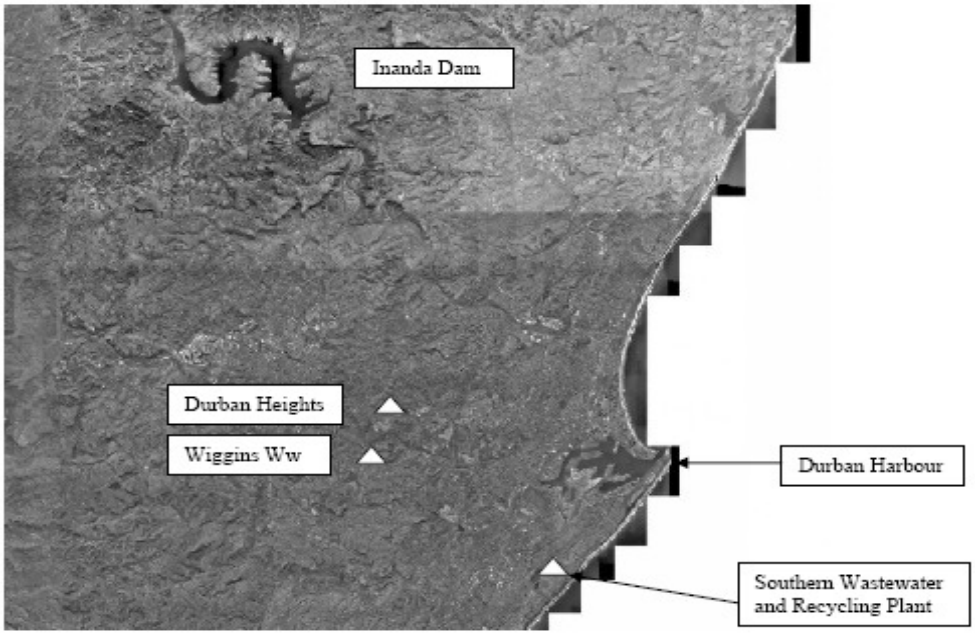
In some areas of eThekwini, FBW has facilitated independence from the residual systemic processes and relations of apartheid and resulted in significant livelihood gains, especially in rural areas. Further, these gains tend to be sticky and dynamic, helping to consolidate rural communities, stem the flow of migration to urban slums and even reverse migration flows resulting in former residents returning to rural areas where access to basic services has helped to transform the opportunity structure. Reportedly, women have been among the key beneficiaries, given that poor households are more likely to be female-headed. Responsibility for water also tends to fall, traditionally, to women. Thus, alleviation from the burdens of fetching water has transformed lives – particularly in terms of available time – not just for women but for children as well, who are often called upon to help with daily tasks. This is even more meaningful in areas and households with high rates of HIV infection. Some areas have also experimented with rain water harvesting and community gardens. Overall community upliftment as a result of Free Basic Water has been notable.[vii]

The Municipality has also experimented with innovative theatre to disseminate information on how alternative technologies operate and basic hygiene and built community buy-in through related prize give-aways and employment schemes supportive of local business creation – such as brick construction and skills transfer through local installation teams coordinated through the Pinetown Public Works Project Team, resulting, as noted above, in training in excess of 600 local contractors, 300 local health facilitators and 3500 local labourers.[viii]

Thus, in many ways EWS has navigated a number of different scales effectively, Over the last six years, it has drawn increasingly on emerging global expertise in alternative and decentralized technologies and seized upon new national level policy space, while also modifying and tailoring these opportunities to local level needs and demands, including the demand for voice, free basic services and local employment.

14.2.2 Innovative Partnerships

Public-private partnerships in South Africa, overall, have been fraught with controversy. Since 2000, Durban, has experimented with number of water service partnerships, with only one remaining, and which has not been the subject of critique since its inception in 1998 and activation in 2001: Durban Water Recycling (Pty) partnership with Veolia Water (Southern Wastewater and Recycling Plant).



Source: Friedrich *et al*. 2006: 3

The partnership was formed to modernise the secondary treatment system and build a new facility to generate 43 000 m^3 per day of reclaimed water for industrial use, with adjacent pulp and paper mills being the main customers. The concession will run for 20 years, after which the plant will revert back to the municipality. The overall objective of the project is to treat domestic wastewater to an acceptable standard for industrial use. The treated water is then sold to high-volume local industrial consumers in the southern Durban industrial basin. The new plant releases an additional 47 000 m^3 of treated water per day for domestic, delaying capital expansion, and thereby freeing up municipal resources for investments in other areas.[ix] According to a recent South African Water Research Commission study (Friedrich *et al*. 2006: 47):

> Major benefits include a reduction in the overall industrial consumption of potable water and a decrease in the amount of treated sewage being released into the environment. Industry also gains as the industrial water is less expensive and allows a significant reduction in operating costs.

Further support for the claim that the municipality is innovative, dynamic and learning is rooted in its support for explorative research into areas such as grey water reuse, ecological sanitation and baffled septic for high density poor settlements, such as Cato Manor.[x] Most recently, this longstanding research interest culminated in an official research partnership between the University of KwaZulu Natal (Pollution Research Group) and eThekwini water and Sanitation, the first such agreement activating a long standing Memorandum between the University and the Municipality.

14.2.3 Multiple Pathways and Innovation in Africa

The global ideal for water and sanitation is fully reticulated water coupled with flush sanitation. This conventional or traditional approach sets the tone, both in terms of industry supply inputs and the parameters of regulatory frameworks. Capacity and financial constraints notwithstanding, the goal of extending conventional water and sanitation grids to many of the world's poor generates near automatic support. Many people remain skeptical of the social and political implications of alternative technological and management models, while the global store of experience and supply chains remain overwhelmingly wedded to centralized management structures and input supply-chains from western models. This, to date, has provided few opportunities for those who are not well served by the dominant network model.

Across Africa, conventional infrastructures are in advanced states of decay and the rural poor remain critically underserved. Dense per-urban settlements pose a further complex array of problems that make grid extension difficult including land tenure, transient populations, settlement patterns that prevent access to pit latrines for emptying, poor drainage and so on (see section 14.3) Yet, as a result of having been married to a relatively homogenous global water and sanitation technological and management network, developing country water and sanitation systems tend to have little in the way of alternative networks and information to help them change course and avoid crisis. Further, individuals, households and communities have also had very few affordable and self-implementable technological options to solve their own water and sanitation dilemmas, especially where the state is weak or unwilling to intervene in service provision. As a result, in much of Africa, people make do with a lack of improved facilities and have few options aside from pressuring the state (or international organizations) to come in and solve urgent problems.

At the same time, municipal environments are increasingly called upon to be the kind of spaces where many different kinds of people and communities can thrive. Indeed, many have characterized globalization, in part, as a process whereby the national state gives way to the city as a new unit of analysis, implementation, and control. In South Africa, as part of broader de-centralization processes, increasingly, decisions about appropriate water and sanitation technologies are made at the municipal level. As a result, space now exists to diverge significantly and creatively from the highly centralized and standardized spatial imaginary of apartheid:

> It was the systemic function of the apartheid cities to ensure that white residents had all the social benefits of living in the city, and to deny black residents equal access to urban social goods and opportunities. The result is cities where very large proportions of the population are not included – materially or psychologically in urban life (South African Cities Network 2004, 77-78).

Municipalities in South Africa now have the option of further decentralizing control over water and sanitation and placing more control and self-determination, by means of access to appropriate and affordable technologies, at increasingly smaller scales. In Durban, this has meant that, for example, traditional rural areas can maintain their settlement and lifestyle patterns, while at the same time having access to improved water and sanitation facilities. Indeed, appropriate services in the rural areas have, to some extent, stemmed the tide of in-migration to dense peri-urban and urban areas, where services and opportunities are sometimes poorer. Thus, Durban exemplifies the fact that water and sanitation services *can* bend to accommodate self-determined lifestyle and settlement patters, rather than simply being the foundational network grid upon which the rationalization of settlement patterns comes to suit the spatial imaginary of the state (cf. Scott 1998).

The implications for water sector reform across Africa may be profound. Where country engineering and maintenance capacities are weak and colonial era infrastructures are in advanced states of decay, African municipalities need to look towards alternative technologies – even a technology leap – by-passing, perhaps, water guzzling and ecosystem degrading water and sanitation infrastructures altogether (Wilson 2007). Towards this end, EWS is something of an innovation hub, pioneering important and hard-earned lessons at scale.

14.2.4 eThekwini Situational Map(draft)

As noted in the Draft Hydropolitical Map, situational maps are an effective tool for mapping conflictual, competitive and cooperative landscapes. Their main strength lies in elucidating complexities within the shifting and unstable empirical world. Such maps have proved useful in making the 'usually invisible and inchoate social features of a situation more visible' (Clarke 2003: 572).

To create a situational map, first, a list is complied of as many as possible of the obvious and implicated individuals, collective, discursive, political, spatial, temporal, symbolic/cultural and other elements (actants), such as technologies, information systems, infrastructure, capacity, etc. The boundary of the map is 'the situation', and the aim to provoke the relationships among them to be revealed. Key questions are: 'Who and what are in this situation?' 'Who and what matters to this situation?' 'What elements make a difference in this situation?' 'What seems present but unarticulated?'

After an extensive search that becomes increasingly repetitive (but is always open to revision and additions) and once the same actors and elements systematically re-appear and new search terms and methods have been adequately explored, the map typically takes the form, first of a brainstormed space, then gradually of an ordered space, where terms come to rest in like-groups.

Below is a draft situational map for eThekwini Municipality. In terms of some brief explanatory notes: human elements were drawn from across the social and political spectrum, from recreational users to municipal managers. Collective actors, as well, ranged from governmental offices at multiple scales, from the national regulator Department of Water Affairs and Forestry and National Electricity provider ESKOM, to the Provincial KwaZulu Natal Wildlife, to the city Port Authority to local activist organizations – such as the ratepayer associations (see footnote 1) – and transnational companies such as Engen and Sasol. Geographical elements again, touch on the multi-scalar dimensions of the situation, and well as complex spatial flows and disruptions such as informal settlement and rural urban migration. Various hydrological and technological scales are represented as well. Discursive constructions flag a wide variety of contemporary debates, as do key events and historical elements. For example, we see that South Africa's shift to a more fiscally conservative growth plan (the Growth and Economic Recovery Plan) plays regularly in debates about water services. We also see clear lines of division and debate begin to emerge– as for example, between activists and multinationals and alternative futures. These, the map notes, are complicated by the relationship between various informal institutions and formal water management policies. Please see sections 14.1 and 14.3 on eThekwini for more information.

- Individual/Human elements/Actors:
- Municipal Managers; technicians; engineers; Councillor Liaison Officers; Customer Service Agents; Call Centre Staff; Researchers; Councillors; water users; activists; community leaders; committee members; politicians; doctors; Community Health workers; teachers; Community Development Workers; traditional leaders; City Manager; Mayor; tourists; surfers
-

- Implicated and Silent Actors/Actants:
- Children; HIV/AIDS; water-related illnesses e.g. cholera, scabies; pollution; the environment; climate change; wildlife; marine life

- Collective actors:
- EWS; eThekwini Council; other municipal Departments; Umgeni Water; Veolia Water; Water User Associations; ratepayers associations; Catchment Management Agencies; schools; churches; formal & informal businesses; chamber of commerce; hospitals & clinics; ward committees; Community Based Organizations e.g. Groundwork; Durban Port Authority; Water Institute for Southern Africa; Pollution Group; NGO's e.g. Mvula Trust; KwaZulu Natal Wildlife; eThekwini Water and Sanitation contractors & suppliers; Department of Water Affairs and Forestry; Oil refineries e.g. Sasol, Engen…; other chemical companies e.g. Bayer/Lanxess; Sugar Association; Sugar Plantations; Timber and Paper company Mondi; ESKOM

- Key events (& drivers of change):
- cholera outbreak; pollution incidents; municipal restructuring; infrastructure roll-out; introduction of FBW; introduction of new technologies; reduction of service delivery backlogs; end of apartheid; Reconstruction and Development Plan to more fiscally more conservative Growth and Economic Pecovery Plan; demonstrations; national & international conferences; creation of Umgeni Water; elections

- Discursive constructions of water:
- Water as: economic good, scarce resource, human right, life; water for domestic, productive, industry, agriculture, leisure & the environment.

- Discursive Constructions of people/ organisations:
- People as citizens, customers, consumers, clients, activists, vandals…; eThekwini Water and Sanitation as a business, public service entity, international example of municipal excellence… Oil/chemical companies as pollutants disregarding people's health;

- Discursive constructions of technologies:
- 'Appropriate' technologies as innovative/ demeaning

- Political/historical elements:
- African National Congress and Ikantha Freedom Party politics; council politics; KwaZulu Natal as Zulu homeland; end of apartheid; legacy of apartheid; municipal demarcation; violence in KwaZulu Natal; HIV/AIDS; history of municipal funding; history as a port & industry hub

- Geographic/Spatial elements:
- Climate; coast; harbour; South Durban Basin
- pollution; municipal boundaries; wards;

- Socio-cultural/symbolic elements:
- Ethnic, racial & religious diversity in Durban; festivals & public holidays; Zulu tradition/culture; weddings; funerals; celebrations

- municipal demarcation; city planning; industrial zones; Area Based Management; rural areas; rural-urban migration & linkages; flows of people, goods & services; informal settlements; formal settlements; tribal areas; population; housing developments; Drakensburg mountains; golf courses; nature reserves

- Water resources & infrastructure:
- Sea; Durban Harbour; rainfall; rivers e.g. Umgeni; reservoirs; dams e.g. Inanda; groundwater; piped reticulation network; full & semi pressure connections; roof tanks; ground tanks; water meters; stand pipes; waterbourne sewerage networks; septic tanks; flush toilets; Urine Diversion toilets; Ventilated Pit Latrine toilets; communal toilet blocks; anaerobic baffled reactors; Free Basic Water; 200l/household/day; municipal & water offices; internet; greywater recycling; wastewater treatment works; Geographic Information Systems; internet; media e.g radio & TV; databases; swimming pools

- Institutional elements:
- Water Services Act; National Water Act; Municipal Systems Act; Strategic Framework for water services; White papers; policy frameworks; policy implementation guidelines; Water Service Development Plans; Integrated Development Plan, water bills; Free Basic Water policy; tariffs; South African constitution; Reconstruction to Development Plan; Growth and Economic Recovery Plan ; budgets; business plans; tender processes; consultative processes; elections; stakeholder forums; data sets (e.g. census); Key Performance Indicators; management systems; environmental monitoring; Waste Discharge Charge System; hygiene education programmes

- Major issues & Debates:
- Cost recovery; payment/non-payment for services; disconnections; 'illegal' connections; service restrictions; Free basic Water; Unaccounted for Water Loss;

-

14.3 Challenges faced in eThekwini's designation as continental innovator

As previous sections have detailed, eThekwini faces a complex array of challenges both upgrading and extending services into its previously disadvantaged areas. Despite being a relatively well-capacitated municipality, its adoption of innovative technologies and, over time, an increasingly progressive tariff regime, the municipality has been subject to sustained critique. This comes mainly from Durban's vocal and well organized social movements and tends to revolve around concerns about the level of service provided to low incomes housing areas, escalating household debts and inadequate provision in Durban's burgeoning informal shack settlements.

Source:www.ukzn.ac.za/ccs/

In particular, many former township areas received more heavily subsidized services during apartheid than they do now, and many households have had difficulty coping with rising prices in the context of high unemployment. Further, outlying areas receiving services for the first time sometimes voice a preference for full pressure reticulated systems with flush toilets, but depending primarily on key community features, can receive low-pressure water systems, sometimes restricted to the Free Basic Water amount – 200kl per household per day – paired with a dry sanitation unit. Infrastructure decisions are based on community features, such as permanence of settlement, ability to pay, proximity to existing sewer trunks and household dispersion (i.e. rural versus urban settlement patterns). Yet, while alternative technologies are well-received in some areas, others, especially those closer to the urban edge or adjacent to areas with full pressure systems, experience lower levels of satisfaction and more equity concerns, tending to equate differential service with the municipality's valuation of community worth rather than rural settlement patterns.

Shack settlements experience extremely low levels of service and access and by and large live in squalid and undignified conditions. Shack settlement movements tend to focus their criticism at the Department of Housing – which is a provincial body - with eThekwini Water and Sanitation sometimes caught up in complex bureaucratic divisions and land rights issues that forestall satisfactory interim water and sanitation solutions for these areas.

Overall, evidence suggests that while the relationship between eThekwini Water and Sanitation (EWS) and Durban's various communities is an evolving one, changes associated with the move from apartheid to post-apartheid water management regimes have caused friction. Further, as things evolve, new challenges and points of contention are emerging. It is undoubtedly the case that Durban's vocal and well-organized social movements[xi] will continue to monitor these changes and remain among EWS's toughest critics.

14.3.1 Former Townships, Free Basic Water and Escalating Debts

eThekwini's critics and social movements (Desai 2002) argue that the net impact of water sector reforms – particularly pricing reforms – on former poor and marginalized townships has been negative. Researchers like Lumsden and Loftus (2006, 117), for example, contend that the complex underbelly of eThekwini's post-apartheid reforms have included ill-conceived cost recovery measures contributing to escalating debt, disconnections and new and

intensifying hardships, especially in formerly under-served areas. Their work records a series of anecdotal examples – similar to those found in the broader social movements literature, such as (2003: 14):

> In Amatiwe…[a] number of semi-pressure connections have been introduced but, under this new commodified service delivery, disconnections have become a common occurrence. Victoria Khawula was disconnected from her water in January of this year without warning. Her arrears had reached R318; "I am unemployed how am I ever going to pay this (Interview L 2nd Feb 2003). "Now I have to beg my neighbour but I can't do that forever." Others were simply relieved to be disconnected, "it means we can't fall into more debt" (Mrs Mthembu, Interview Feb 2nd February 2003).

There is a wide range of evidence suggesting that in areas comparatively well-serviced by the apartheid administration many failed to see their post-apartheid expectations met. For example, in Bayview Flats, a former coloured township, a flat rate tariff coupled with a zero disconnection policy – essentially amounting to unlimited water supply - was replaced by a minimum Free Basic Water (FBW) amount (6kl per household per month) and rising block 'social' tariff (see Bailey 2003). This was accompanied by a new disconnection policy. The key change was that many households transitioned from high water use and low or flat rate tariffs (many of which went unpaid as part of the apartheid ruling bargain) to a very limited Free Basic amount and a sharply escalating tariff curve. Further, the regime change appears to have been poorly understood by many customers, leaving them inadequately prepared to manage consumptive patterns under the new billing regime. Cottle (2005: 22) comments:

> In replacing the flat rate that was due for water supply through the system with a tariff structure that included a free allocation, household debts mounted. Rather than minimizing the costs of domestic household consumption, FBW [free basic water] has attended a trend making water more unaffordable for the poor…Most of the arrears of respondents in our survey date back to prior to the introduction of FBW with five accounts becoming indebted only after FBW.

The area is a good case study for gaining insight into the source of conflict between EWS and some community groups. Bayview Flats[xii] was built in the 1960s as temporary housing for railway and banana plantation workers displaced by the Group Areas Act. The Act formalized the process of racial segregation and mandated the physical displacement of communities in order to bring the settlement landscape into line with the racialized spatial imaginary of apartheid. There are 857 households in the Flats, many of which have lived there since the 1960s. As part of the ruling bargain, people paid a small rent and small electricity tariff and water was rolled into this small flat rate monthly charge. The Flats are fully reticulated, but at the time of transition, household infrastructure was often in advanced decay and leakages after the meter were a significant problem for rate payers when metered billing was introduced. Today the majority of households in the Flats are female-headed.

Evidence suggests that in areas such as the Flats, changes in the tariff regime were poorly communicated and understood. In 2005, for example the Durban Newspaper, *The Daily News* reported in reference to a similar area Umlazi F: 'Police were later called in to assist the security guards who were battling to control the crowd. Charity Mache said that residents were angry because they had not been consulted about the disconnection

of the water pipes. "We were not told about this new system or even how it would work. They cannot just cut our water without informing us," she said.'[xiii] There are stalemates elsewhere as well, as recent armed stand-offs between Bayview Flats and municipal workers testify.[xiv] Indeed, violent clashes between municipal disconnection teams and residents have become common place, and EWS regularly works with armed guards.

In effect, a significant proportion of community members in areas such as the Flats found the costs of the new water regime were too high and/or interviews indicate that they had insufficient information to make meaningful cost benefit analyses to assess how best to manage their water use under the new regime. In fact, the potential re-distributive gains of many post-apartheid reforms – such as Free Basic Water[xv] - may have been significantly offset by information deficits related to the nature and impact of the shift from the apartheid to post-apartheid water regime, which tended to be top-down and only thinly married to consultative and training processes.[xvi] Further, other potential re-distributive gains tended to be siphoned off by residual costs associated with the legacy of apartheid, many of which were beyond the redress capabilities of EWS - including joblessness and skills deficits. Overall, however, the systemic challenges posed by poor former township communities did not appear to lend themselves straightforwardly to mainstream thinking about water and sanitation solutions in the first instance.

Many debts were also related to water leaks after the meter due to longstanding household infrastructure decay exacerbated by poverty and easily tolerated under the previously highly subsidized water regime. The municipality effected upgrades several years ago, but often debts were incurred prior to the upgrading. By 'June 2003 it was reported that about 90% of Baview residents were in debt to eThekwini municipality. In 2003 the areas of Chatsworth, Phenix and Verulum owed the council some R78M for rent, electricity and water services' (Cottle 2005, 25[xvii]). While debt-reduction facilities are now in place, mistrust, poverty and a general lack of skills required to navigate complex encounters with the state tend to mean that many people both do not and cannot take advantage of debt reduction. It was reported that city-wide water debt rose *"alarmingly"*, to reach R571 million in January 2006. [xviii] For those who are still unable to meet their debts, 're-housing' to areas where water to households are technologically restricted to the Free Basic amount remains an option – albeit not a preferred one - to long time residents and those dependent on access to city markets and related economic flows.

'Illegal connections' are reported to be on the increase and preliminary fieldwork[xix] findings suggest that people are generally sympathetic towards community members who reconnect 'illegally' after their water supply has been restricted. Community members are also generally sympathetic to those who resort to violence to thwart disconnection teams. EWS routinely work with armed guards, which is not viewed as unusual or problematic. Illegal connections are estimated to be the cause of a high proportion of all unaccounted for water. According to a 2003 intergovernmental fiscal review, Durban was unable to account for 32% (85 billion litres) of the bulk water purchased in 2001 (the greatest municipal loss after Johannesburg's 42%/165 billion litres). Durban's proportion of Unaccounted for Water remains at around 30%, attributed to inaccurate metering/billing, leaky infrastructure and water theft.[xx]

It is not just households that have experienced difficulties with regime change. Schools are also in the red. Hundreds of schools in eThekwini faced the possibility of water cut-offs and a handful experienced them in 2002, 2003 and 2005:

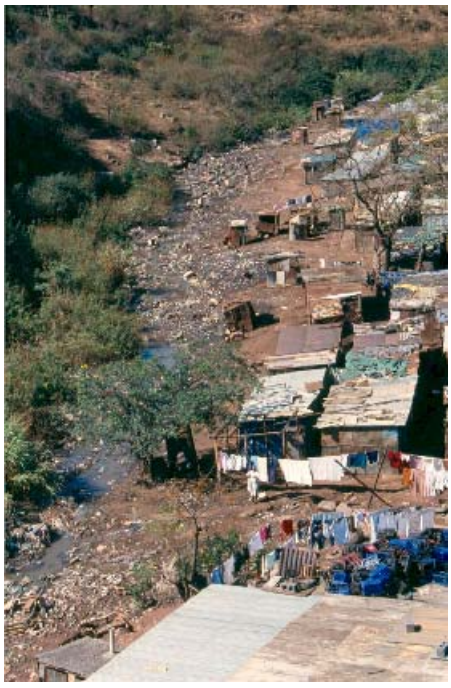
> 262 schools are in arrears totaling more than R10-million. If they do not pay, their water supply will be disconnected' said Neil Mcleod [Head of Water and Sanitation]… The worst affected areas were Umlazi, with 49 schools in arrears, Mpumalanga with 17 schools and Chatsworth with 12 schools in arrears.[xxi]

The reasons for debt appear to be manifold, including: water being siphoned by people from informal settlements (without access to adequate water and sanitation), parents not paying school fees, school charges being miscalculated, water meters shared between a number of institutions, leaks and 'wrangling' within the Department of Education.[xxii]

14.3.2 Shack Settlements

Elsewhere, as well, Durban struggled to make headway. For example, *The Economist* (April 8-14 2006, 10) reported recently about one Durban shack settlement:

> The rapid, unplanned influx into shantytowns has caused living conditions to deteriorate. In Foreman Road, residents say there are just five toilets between 7000 of them, and only four water standpipes provided by the local council…Residents suffer a lot of health problems, mainly stomach and respiratory ailments. Last year the accumulated grievances…erupted into protests throughout the country, with clashes between residents and police.



Shack dwellers pose an even more profound systemic problem for a municipality geared towards conventional mainstream service and billing. Such communities are highly unstable, characterized by transient populations, high local crime, vandalism and violence, both political and social in nature. Thus, gains and information flows are difficult and costly to establish, while tending to be short-lived and unreliable. Shack dwellers also – almost by definition – will find the entry costs into mainstream water and sanitation networks too high. Shack settlements, then, are systemic subsystems that are not only in many ways *switched off*, they also defy the rules of modern water and sanitation networks more generally and thus are extremely difficult to *switch on* using conventional methods and paradigms.

"the number of people living in shacks has almost doubled in the past 12 years. According to the minister of housing, the number of people living in informal settlements has increased from 1.4-million to 2,4-million. In Durban, almost one in three people live in a shack"[xxiii]

While housing is both the key concern for Shack dwellers and the Provincial Department of Housing is first and foremost responsible for securing land and formalizing new housing settlements, water and sanitation are key issues in these communities. The presence of the shacks inside the urban edge transcends spatial boundaries of apartheid, which located black/coloured/Indian communities far from city centers and economic opportunities, and heightens the contradictions of an incomplete transformation. Some shack-dwellers are organizing (for example Abahlali baseMjondolo, the Durban shack dwellers movement), demanding their rights to adequate housing and basic services voicing their concerns via the media[xxiv] and utilizing strategies of co-operation on various scales - building alliances with social movements in other parts of South Africa and around the world.

Feelings of unease resulting from the inadequate provision of water and sanitation services in informal settlements are experienced by people living in neighboring settlements: preliminary fieldwork findings from Umalazi AA/BB and Newlands East, area 40 suggest people are concerned about: water wastage from standpipes left running; illegal water connections negatively affecting water pressure and increasing bills; theft of water from private connections

14.3.3 Conclusions

The net impact, in terms of the social movements literature and criticisms emerging from South Africa's left has been the emergence of a picture of EWS as a sometimes coercive,[xxv] retrogressive Department responding to economic imperatives by passing on the costs to those least able to pay. In areas like the Flats and shacks, relations with the municipality have become strained. People on the outside looking in cohere around social movements that have taken the position: 'We have learnt from our experience that when you want to achieve what is legitimate by peaceful negotiations, by humbleness, by respecting those in authority your plea becomes criminal. You will be deceived for more than ten years, you will be fooled and undermined. This is why we have taken to the streets.' (Zikode 2006: 3).

14.4 Situating the material consequences of eThekwini's water and sanitation programme

The objective of this section is to situate the effects of eThekwini's water and sanitation (EWS) strategy within the web of perceptions that evaluate, contest and celebrate its diversified and often innovative approach to rolling out services across some of the most varied and complex municipal terrains in Africa. As with the other case studies, this one will make explicit the relations of cooperation, competition and conflict existing, among the various actors that deploy their strategies over local, national and global scales. It will also evaluate the research process undertaken to complete the case study, and especially the extent to which research was able to effectively empower some local actors to claim a better overall distribution of gains and influence across the waterscape.

Unlike the other case study sections, this section is backgrounded by three related sections:

1) Background Section detailing the evolution of Durban Metro to eThekwini Municipality;

2) Section on the up-to-date evidence that eThekwini has transformed into a national and continental leader in water and sanitation innovations for Africa and identification of key actors, strategies and operative scales, and

3) Section on the up-to-date evidence that challenges eThekwini's designation as continental innovator and identification of key actors, strategies and operatives scales.

This final Case Study section unfolds in four major sub-sections. The first takes two concrete examples to illustrate how different bodies of evidence can be marshalled to draw two very different pictures of the EWS's equity performance. The key point is that, at one level, discourses around pro-poor performance have hardened around polarized positions. As the second and third *Background sections* detail, assessments of eThekwini's handling of water and sanitation challenges over the last ten years are polarized. On the one side we find arguments that consider it the continent's leading innovator, a learning organization increasingly skilled at combining alternative technologies with pro-poor solutions. On the other side, we find we find those contending that Durban's innovations are thinly veiled delivery mechanisms for new inequalities, which have come at the cost of escalating social conflict, intensifying financial hardships and debilitating health risks. The next sub section outlines the Research Methodology and research reporting back procedures (see also the *Final Hydropolitical Map Chapter*). Indeed, the key research problematic was designing an approach that could cut through and deconstruct polarized positions to, at once test their validity and pull out key strategic entry points. Section three reports on findings. These play at two levels. At one level, we discuss the broader institutional context and the relationships between major groups and organizations. Here is where polarized debates are most characteristic of relations of conflict and alliance; and key contentious issues, such as pricing, disconnections, and alternative technologies are given place and meaning within broader political debates. At another level, we discuss the findings from purposive surveys conducted in two specific communities designed, at once, to get a feel for the day-to-day issues and struggles and the level of debate on the ground, as well as to initiate a longer term dialogical process between people living and working in formerly disadvantaged areas and the water service provider (see also *Final Hydropolitical Map Chapter*) to achieve the empowerment objectives of the research project. Findings delineated into two sections:

i) The key issues actors draw upon to formulate political positions are interrogated. In eThekwini these are: Water pricing; EWS' handling of water & sanitation challenges; the role of technology in supplying and restricting water, water treatment and future provisions. Reference is made to the Social Worlds and Positional maps, which show how actors interpret the water situation and position themselves in relation to the key debates.

ii) Results and recommendations from community surveys in uMlazi aa/bb and Newland's East, area 40 are discussed in relation to key debates operative at other scales.

In the fourth sub section, as with the other Case Studies 'the research methodology was, in part itself, the subject of research' (Hazell, 2006:7), and researchers reflect on this, with recommendations for hydropolitical mapping in general.

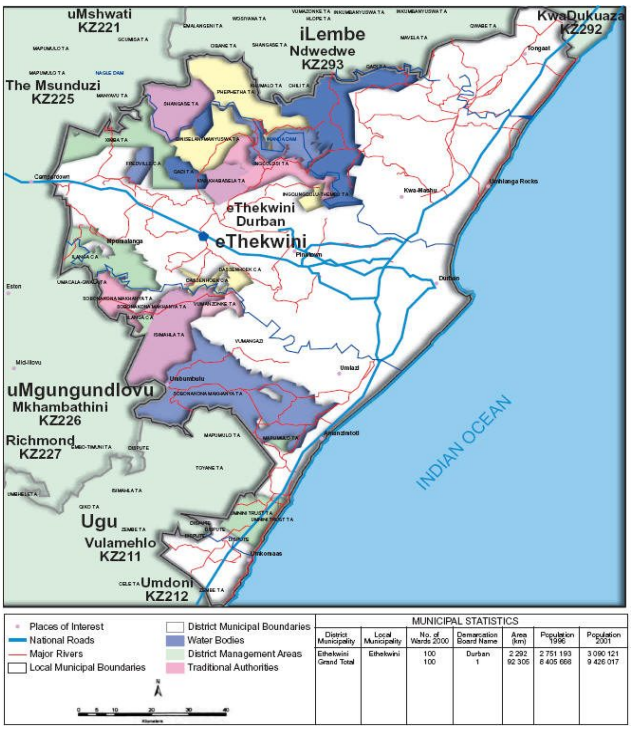
14.4.1 Sketching the Issues and Terrain for Debate

14.4.1.1 Hydropolitical Sketch of eThekwini

Water Scarcity and environmental legislation bound eThekwini's situation. Water Resource development in the immediate surrounding area is said to be close to maximum capacity.[57] Expansion of EMA, the reduction of water service backlogs, roll-out of FBW and economic development in Durban have all worked to significantly increase demand for water. At the same time, new environmental legislation, particularly around the integrity of rivers and estuaries, is now limiting options in terms of new water inflows and disposal of waste. Further increases in demand could induce a situation of water scarcity and/or competition between eThekwini and surrounding municipalities or between different kinds of water users (Wilson, 2006(2):9). With this in mind, EWS is currently implementing and exploring a number of technological fixes, from waste water recycling to desalination (see *Section 14.2*).

Infrastructure also influences the hydropolitical context. As *eThekwini evolution section* notes, the bulk water infrastructure (dams, reservoirs, water treatment works, bulk supply lines etc) is owned and managed by Umgeni Water, Durban's potable water bulk supplier. EWS owns and maintains a reticulated water and sewage network, which delivers water to and removes wastewater from their domestic, business and industrial customers in the city. In outlying areas, beyond the reaches of the reticulated grid, EWS has installed 200 litre water tanks and UD toilets, to provide households with free basic water and improved sanitation. Pipelines to transport oil/effluent are owned and maintained by oil/other companies and discharge monitored by EWS, NPA (in Durban Harbour) and environmental groups such as SDCEA. EWS customers are responsible for maintaining/repairing infrastructure beyond the meter (pipes etc within the household), and must bear the cost of water leaks. They are encouraged to take out Water Loss Insurance. Water meters are another key technology: they were installed throughout the city several years ago with the transition to a new pricing regime, to facilitate accurate billing and cost-recovery. The transition was problematic in townships which had previously benefited from highly subsidised water supply at a flat-rate. Confusion over the regime change and distrust of water meters has been associated in some areas with escalating bills, water restrictions and disconnections (Wilson, 2006(c):2), and in many areas price and affordability issues remain among the most prominent concerns.

Actors influencing the hydropolitical constellation include: DWAF (regional KZN & national departments); eThekwini council and council structures including councillors & committees; eThekwini Municipality (& District & Provincial) Departments - and staff - such as Health, Education & Housing, responsible for services which impact on water & sanitation; civil society organisations such as CBO's, NGO's, Ratepayers Associations & environmental groups; research institutions & researchers; the media; and the spectrum of water users: from households to small businesses, companies, industries, plantations & agricultural users (See also Situational Map).



[57] http://ceroi.net/reports/durban/issues/fshwater/index.htm

14.4.1.2 The Parameters of Debate

There are several key issues on which the axes of politics tend to fall (see Appendix K – Positional Map). Those that arose most often were: *Water pricing*; *perceptions of EWS' as innovative or coercive; and the interface between long term water supply and appropriate or water efficient technologies.* The key discourses or ways of interpreting and speaking about these issues are outlined below. Discourses and their proponents are explored in greater detail in section 3.1, with consideration for which discourses different actors draw on, how discourses are combined in different ways, and the positions actors' stake in relation to key axes of debate.

Water pricing

The price of water emerged as a key concern in Grabouw & Mseleni (Hazell, 2006; Peters, 2006). Similarly, in eThekwini it is a major issue, both at the level of political struggle and everyday concern. Surveys generally revealed very high levels of concern around affordability and price related issues. Actors involved in the water supply chain highlight the *value* of water, the cost of treating and supplying, and need to recover costs. Notions of *making profit* from water are absent in eThekwini. Free Basic Water is a key discourse;[58] almost all domestic customers believe the poor should have access to a free lifeline amount of water. The opinion that water should be subsidised is also widespread: this could be by central government, grants, and/or by charging business and or high income/high use customers more. For some customers, the change from fixed rate tariff, to water-meters and bills for the water you use, was problematic. Bills are difficult to understand, some people find the price of water unfair, particularly in the context of high unemployment. But most feel water meters are the best way to measure and charge for water, and few feel an unlimited amount of water should be free. Questions of affordability ultimately became the y axis on the Positional Map.

Perceptions of EWS

As outlined in previous sections in the eThekwini case study chapter, perceptions of EWS' handling of water and sanitation challenges tend to be polarised: 'On the one side we find arguments that consider it the continent's leading innovator, a learning organization increasingly skilled at combining alternative technologies with pro-poor solutions. On the other side, we find we find those contending that Durban's innovations are thinly veiled delivery mechanisms for new inequalities, which have come at the cost of escalating social conflict, intensifying financial hardships and debilitating health risks. Fieldwork, literature and internet searches uncovered these polarities as well as range of more nuanced views along a spectrum between the two points. Perceptions of EWS ultimately became the X axis of the Positional Map.

Scarcity and Technology

Some actors perceive water as *abundant*, others as *scarce resource*. These perceptions influence how water users behave e.g. use water freely or try to conserve it, and how well they tolerate or support various technological options. Water is perceived as abundant or scarce in different ways: Price, affordability and the threat of disconnection affect perceptions of household scarcity; at the same time, people are concerned to see water wasted, running from standpipes in informal communities, which they feel impacts their access; at the community level, people experience scarcity when water supplies are disrupted; there is a feeling that certain areas receive better standards of service; EWS is concerned about

[58] It is worth noting that EWS was the first Water Service Authority to start implementing the Free Basic Water Policy.

scarcity within the region[59] and have/are taking steps to reduce UAW, repair leaks, contain the number of illegal connections, encourage customers to conserve water, consider rain water harvesting and grey water re-use, invest in water recycling and apply a range of appropriate and water efficient technologies.

Related to debates on water scarcity, are different technological options for water transmission and allocation. On the one hand are 'supply-side' discourses advocating water resource development and transfers to redistribute water resources in relation to need: technologies include major dams, reservoirs and bulk supply pipelines. On the other, are 'demand-management' discourses: reduce water-loss, encourage conservation, invest in water recycling and technologies which increase efficiency. Technology is discussed in relation to location and management scale: EWS is rolling-out UD toilets and 200 litre water tanks to rural areas beyond the reach of Durban's reticulated water & sanitation networks, and has undertaken to test Decentralised Water Treatment Systems (Wilson, 2006(3):3), leveraging a 'global store of emerging technologies that bring with them the possibility of management at new scales' (Ibid:1). Opponents however hold the ideal of flush-toilets and full-pressure connections aloft. Technologies used to monitor water use (meters) and provide a limited supply to customers in arrears are constructed alternately as restrictive/coercive or cost-effective and efficient.

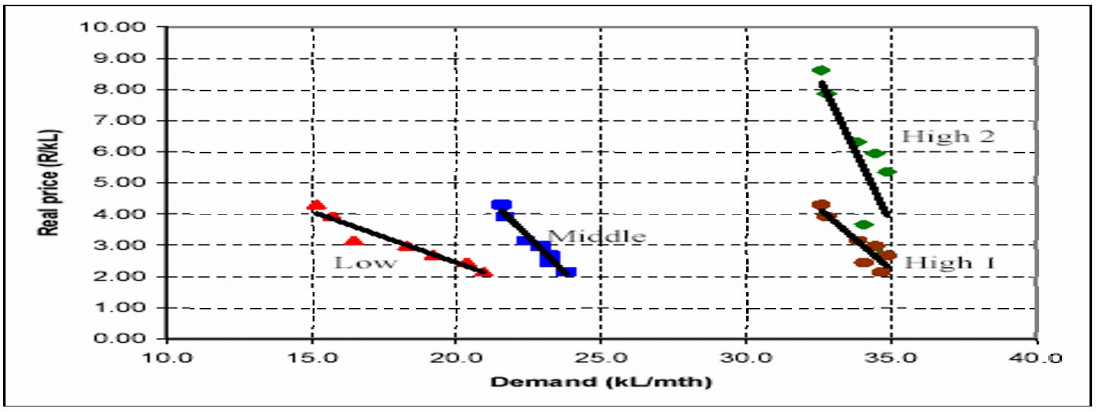
14.4.1.3 Terrain of Debate: example of polarity

As noted, in the Final Hydropolitical Map Chapter, one of the key features of South Africa's hydropoliticalscape is extreme heterogeneity. As a consequence of this, discourses that emerge in one context, rarely speak very informatively to alternative hydropolitical contexts. For example, eThekwini's experience with Free Basic Water tells us very little about experiences in Johannesburg or Cape Town – much less about smaller rural municipalities - despite the efforts of some political actors to conflate either the best or worst of these experiences into deeper insights. At the same time, however, politics is driven by perceptions. What people believe is right and just tends to shape their political behaviour and it is well established in the decision-making literature that people base their opinions on mental models and incomplete information. As Anaïs Nin famously observed: 'we do not see the world as it is, but as we are.'

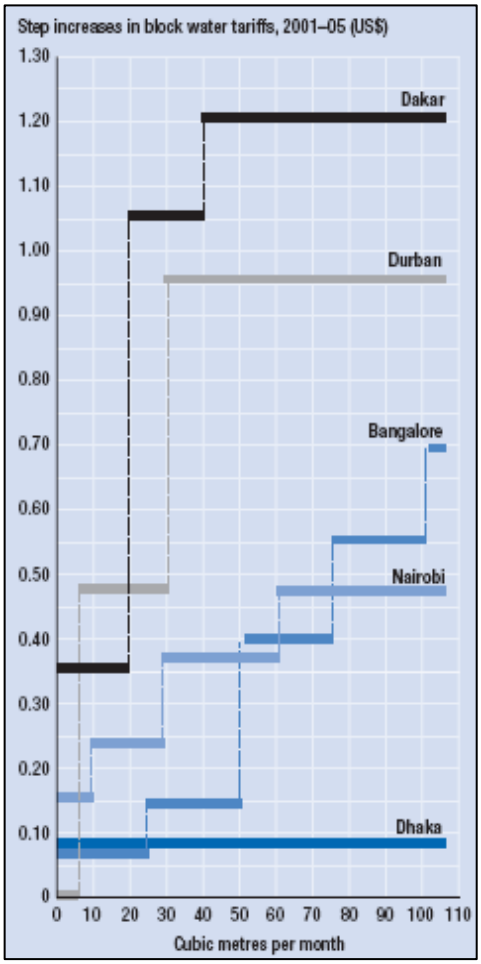
This, in part, explains polarized views of EWS's performance. Yet, perceptions are also rooted in the experiences of Durban's many diverse types of communities, some of which are affluent, others peri-urban, some rural, and still others informal shack settlements. Thus, assessments of its performance are further complicated by the complexity of that performance: The diversity of contexts within which it operates. In part, then, where one stands also depends on where one sits, or with whom our sympathies and alliances lie. Yet, our research indicates that these relationships are not straightforward. Debates and alliances cut across communities in unpredictable and unexpected ways. For example, members of disadvantaged communities sometimes argue for prepaid meters, while more affluent users advocate for universal entitlements. Further, water and sanitations issues are also, at times, proxy issues and lightening rods for other concerns, such as housing, or the nature of transformation or the good of society more generally. Yet, at the highest aggregate level, debates tend remain polarized and intractable. Take for example, the two following analyses of EWS (cf: Wilson and Bond 2007):

[59] Most of the water supplied to Durban is stored outside the EMA, future water demand may be in competition with neighbouring municipalities (Wilson, 2006(b):9.

- **The adverse impact of Durban's convex tariff on water consumption**
- **Impact of price on water consumption by different income groups:**
- **1997 (lower price, higher volumes) to 2003 (higher price, lower volumes)**



In Durban, South Africa, the 1997 consumption of water by the one third of the city's residents who have the lowest income was 22 kl/household/month. Shortly afterwards, a 'Free Basic Water' strategy was adopted (for just the first 6 kl/hh/month), but steep increases in price for the next blocks of water were imposed. By 2003, the price of the average litre of water consumed by the lowest-income third of billed residents had doubled from R2 in 1997 (about US$0.30) to R4. According to Reg Bailey, who runs Durban's water tariffs, that price increase resulted in average consumption by some low-income consumers diminishing to 15 kl/household/month during the same period. The price elasticity for water was, hence, a disturbing -0.55 – an extremely large impact for what should be a basic need, hence relatively impervious to price change. In contrast, for middle- and high-income consumers, the price rise was higher, but the corresponding decline in average consumption far less (Bailey and Buckley 2005). Indeed, the UNDP's 2006 *Human Development Report* indicates that Durban has a convex-shaped tariff curve, compared to several other Third World cities, with by far the highest prices in the 6-20 kl/month range, the block in which many of the lowest-income people consume.



Durban compared to four other cities

- **Free Basic Water and Sustainable Sanitation for Rural Areas**
-
- In 2002, *National Geographic* praised eThekwini Executive Director for Water and Sanitation, Neil Macleod, for, among other things, 'drastically reducing waste in the city's water system while simultaneously improving water delivery to the urban poor'. More recently, Harrison *et al.* (2004, 2) argued that: 'The City of Durban is one of the leading institutions in this drive [to provide of safe drinking water and improved sanitation] and has gained the reputation for innovation, coverage and efficient service delivery. The situation is not static and is constantly evolving.' Particularly innovative is the municipality's adoption of alternative 'appropriate technologies' and management models for the rural poor and tribal areas. Located outside the urban edge, some newly incorporated communities are too dispersed for conventional waterborne sewage technologies. Lack of sewerage also puts important limits on the amount of water that can be safely disposed of on site without leading to stagnant pools, runoff into neighbouring plots and waterborne health risks. Thus, into these previously non-serviced areas, the municipality pipes in 200litres per household per day –the Free Basic Water amount of 25 litres per person per day based on an assumption of eight persons per household. This is accompanied by a waterless urine diversion (UD) toilet system. The UD system has been well received internationally and represents a significant improvement over other onsite and closed loop sewerage options. The main reason for this is that separating the urine and faeces eliminates most of the odour and greatly facilitates ultimate waste removal. There have been more than 170,000 UD toilets rolled out in Northern China where water shortages bear significantly upon technological choices. eThekwini now has approximately 30,000. The roll out has been accompanied by extensive local job creation and skills development, successfully training in excess of 600 local contractors, 300 local health facilitators and 3500 local labourers.
-

eThekwini, as detailed in the Background section is characterized by extreme heterogeneity, from deep rural to high modern. Its various communities fit unevenly together as a number of fragmented yet interlinked systemic sub-systems, often characterized by interdependence, synthesis and border skirmishes, both physical and ideational. In terms of water and sanitation specifically, different areas, based on a range of factors from settlement patterns and density, to distance from sewer trunks, to affordability, etc., are fitted with different technological and management packages. These differences carry a range of meanings, which are sometimes difficult to disentangle from the position of those championing one or the other, and difficult to detangle from broader issues associated with the expectations of the post-apartheid era and the future of the national identity. As such, the challenge for this case study was to both illuminate these axes of conflict, and to deconstruct and render them in a way that engages meaningfully with specificity – while empowering actors to engage with and transform their own experience of water security.

	Domestic Ground Tank - Low Pressure This service is available in informal and rural settlements where potable water is available nearby - normally a standpipe in the road reserve within 200 metres of the dwelling. 200 litres of water is fed daily into the tank. A charge is made for the installation of the tank. Provided that only one tank is installed, as the monthly consumption of water is equal to or below 6kl, no charge is levied for the water consumption. However, if more than 1 tank is installed, a consumption charge is levied per additional tank.
	Domestic Roof Tank - Semi-pressure system This service is available in low-cost housing settlements. A charge is made for the semi-pressure connection and the installation of the tank. Water consumption is levied in terms of the water tariffs. Domestic Full Pressure This service is available in the formal housing areas throughout the municipal area. Application for a connection can be made by calling at any of our Walk-In Centres. A connection fee is charged in terms of the applicable tariff for the size of connection (normally 20mm) . Water consumption and monthly charges are made in terms of the water tariffs.

Figure 14.7 EWS levels of service: www.durban.gov.za

14.4.2 Methodology

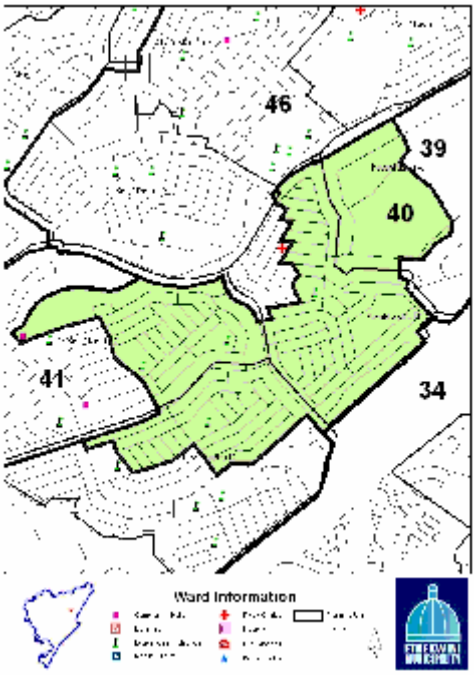
The research methodology for the eThekwini case, unfolded somewhat differently to that of the Grabouw & Mseleni cases (Hazell, 2006; Peters, 2006). As noted in the *Final Hydropolitical Map Chapter,* lessons learned from the previous two case studies, were incorporated into research design and community empowerment strategy. In particular, it was noted that in South Africa, research partnerships with implementing agencies and constructive engagement between all stakeholders is fundamental to empowerment in the sector (Hazell, 2006:31). Additionally the eThekwini case is *distinctive* in that the Municipality - and furthermore water and sanitation service delivery within its borders - have been the subject of significant research, with clear emergent assessments. It was not necessary therefore to conduct primary research to uncover dominant water sector discourses and drivers of conflict, competition and co-operation. Rather, at the initial stages, the general information landscape was readily discernable from documents in the public domain. Research methods included: Internet and media information searches and discourse analysis.

First, a situational map was complied, of actors and actants in the eThekwini water situation. Information available in the public domain (e.g. websites, newspaper articles) was coded and analysed in the same way qualitative interview material was in the previous two case studies, interrogating perceptions of self (in relation to water use), other water users (including EWS), water, scale on which water should be managed, causes of change over time (in the water situation), water use, water access & appropriate technologies for allocation/transmission of water. Where information and therefore discourses, were incomplete, gaps were filled in where possible, via personal communication with individuals/organisation's representatives. As with the Mseleni case (Hazell, 2006:4), data was categorised, coded and arranged in a table similar to the following:

- **Representation of self**
- **Representation of people**
- **Representation of EWS**
- **Scalar level**
- **Representation of water**
- **Drivers of change**
- **Water Use**
- **Access modalities**
- **Allocation/Transmission**

It was hypothesized, however, that community level perceptions of hydropolitics would cut across and disrupt the polarized general informational landscape as they struggled to articulate more grounded and pragmatic concerns, as was the trend in the other two case studies. This, we felt, was the key to unlocking the empowering potential of the hydropolitical mapping process. Thus, a second level of research was undertaken. In order to investigate community-level perceptions of hydropolitics in eThekwini and tie them to an empowerment strategy that allowed individuals and groups to intervene in decision-making processes to influence the overall distribution of gains and access to political power in the system, a

research partnership was formed with eThekwini Water & Sanitation (EWS).[60] The research partnership facilitated greater access to resources[61] and furthermore, made the research process more worthwhile for participants, by offering them an opportunity to engage with a key hydropolitical actor.[62]



A 55 question survey was designed, based on the store of qualitative data acquired through the previous case studies, as well as other scoping research (see especially *Preliminary Scoping Chapter* and *Case Study and Methodology Chapter*), tested and refined in the field.[63] The survey drew on the semi-structured questionnaire used in the Grabouw and Mseleni cases and previous research carried out in eThekwini. Respondents were presented with a series of statements to which they could answer agree/disagree/don't know, some questions were more open ended, and respondents were encouraged to make additional comments. The survey was designed to provide insight into people's experiences and perceptions of service delivery and the hydropolitical context these are embedded in. It aimed to surface drivers of co-operation, competition and conflict.

As noted in *the eThekwini innovation section,* Durban is a city of contrasts. Communities span from rural/under traditional governance to urban/high income and are largely still largely organised along racial lines, not withstanding other overlapping categories of diversity, such as ethnicity, class, age and gender. The survey was piloted in 2 different previously disadvantaged communities: **Umlazi AA/BB,** a relatively affluent part of a former African township, 16-20km from Durban and **Newlands East**, a former coloured township with strong community/social networks. Further interviews were carried out in **KwaMashu Area 40** – a former African township with worse water access and a reputation for violent crime.

The research team completed around 150 interviews, with community leaders, professionals, members and activists. A snowball technique was used to identify participants. Fieldwork commenced with a reconnaissance of the area, where key community landmarks were visited and contact details of schools, businesses, health care centres etc taken, in order to arrange interviews. 3-4 days of intensive interviews followed, people with a strong professional/social stake in community health and wellbeing were targeted, and participants asked to recommend others to interview. The aim was to conduct 40-50 interviews with a diverse spread[64] of actors in each community. Outputs included network diagrams rendering visible the density and interconnectedness of community networks.

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[60] EWS had their own research objectives namely: Investigate customer perceptions of service delivery, in order to improve service design and delivery; establish consultative standing groups, to improve customer relations and enhance community voice in water & sanitation decision making.

[61] e.g. Research Assistants, transport & materials.

[62] The majority of participants believed that EWS makes most important decisions about water and sanitation in eThekwini (Interviews, uMlazi & Newlands East, 2006).

[63] The questionnaire was originally 105 questions and was modified and refined.

[64] e.g. Individuals active in business, church, school, healthcare and voluntary sectors.

Figure 14.8 Community Survey in progress, KwaMashu – Eleanor Hazell

The resultant maps operate at two levels. They take account of both the general information landscape as well as the specific situated positions aggregated from the tabulation of the survey results. Primary and secondary research techniques as outlined above (as well as previous related field research, cf: Wilson 2006; Wilson forthcoming) formed the basis of the Social Worlds and Positional maps (see Appendixes J and K). The analysis methods and evolution process, from data through draft to final hydropolitical maps was similar to that outlined in the Mseleni Case Study Chapter (Hazell, 2006:8). Researchers identified key debates around water in eThekwini and positions actors stake out in relation to these (Positional Map), and pieced together discourses on: perceptions of self (in relation to water use), other water users (including EWS), water, scale at which water should be managed, water use, water access and appropriate technologies for allocation/transmission of water into stylized social worlds. Finally, strategies of co-operation, competitions and conflicts between actors were made explicit in the Network Visual (see Appendix L).

Report Backs and empowerment initiatives took the form of meetings between participants, researchers and EWS, where research findings were presented for comment. Proceedings began with spirited theatre performed in Zulu and were followed by an information session, where survey results were disseminated and EWS acknowledged concerns. An ongoing dialogical process through the constitution of Consultative Standing Groups was then initiated. The first meeting took place in uMlazi library on Wednesday 17th of Janurary, 2007.

14.9 Consultative group meeting

14.10 Water & sanitation theatre performance, uMlazi aa/bb 17/1/07 – Eleanor Hazell

14.4.3 Findings

Findings play at two levels. At one, we discuss the broader institutional context and the relationships between major groups and organizations. Here is where polarized debates are most characteristic of relations of conflict and alliance; and key contentious issues, such as pricing, disconnections, and alternative technologies are given place and meaning within broader political debates. At another level, we discuss the findings from purposive surveys conducted in two specific communities designed, at once, to get a feel for the day to day issues and struggles and the level of debate on the ground, as well as to initiate a longer term dialogical process between people living and working in formerly disadvantaged areas and the water service provider (see also *Final Hydropolitical Map Chapter*) in order to give substance to the empowerment objectives of the research project. See Appendixes J-L for visuals.

14.4.3.1 Hydropolitical constellation

This sub-section describes the constellation of the main hydropolitical actors and actants. The situation includes individual and collective actors, as well as silent actants such as technology, and begins to outline the relationship networks (see Appendix L) between them. This sub-section will be discussed in relation to the Situational Map, Social Worlds and Networks Maps (Appendixes J-L).

eThekwini Council, comprising mayor Obed Mlaba, 200 councillors, executive & supporting committees, is politically responsible for the provision of infrastructure and basic services to citizens; 100 councillors are representatives of people living in their wards. eThekwini council has the power to set municipal rates and departmental budgets. They see water as a basic service, source of revenue and are concerned with cost-recovery through rates. People are defined as citizens and participants with the power to influence decision making. The council

has a vision of eThekwini being 'Africa's most liveable city'.[65] The dominant scalar level is the EMA, which is subdivided into management areas and wards. There are co-operations - participation in political structures and community forums - and conflicts – protests over service delivery[66] - between eThekwini Council and communities, and co-operations between the council and municipal departments over planning, policy making and service delivery.

EWS is a municipal department, responsible for water service provision to customers (domestic, business & industry) throughout the municipal area. EWS sets water tariffs and implements policy and has the power to restrict customers in arrears and disconnect those who tamper with water meters. As outlined in previous sections, perceptions of EWS' approach to water & sanitation tend to be polarised: 'On the one side we find arguments that consider it the continent's leading innovator, a learning organization increasingly skilled at combining alternative technologies with pro-poor solutions. On the other side, we find we find those contending that Durban's innovations are thinly veiled delivery mechanisms for new inequalities, which have come at the cost of escalating social conflict, intensifying financial hardships and debilitating health risks' (Wilson, 2006(2):10). Primary and secondary research probed these perceptions and revealed a range of positions along a continuum (see Appendix K).

Actors include: Neil Macleod – Head of EWS -, Service Department Heads, engineers, technicians, plumbers, customer service & call centre staff. Water is seen primarily as a scarce resource which should be conserved, recycled and priced fairly to recover costs. EWS is committed to eradicating backlogs and have successfully combined the extension of water & sanitation services with job creation (Wilson, 2006(2):2). People are represented as customers and staff, customer focus being a 'core value'.[67] The dominant scale is the EMA. EWS is not wedded to a standardised, centralised service delivery model and has pioneered the implementation of 'alternative' technologies at scale (Ibid, 1). EWS co-operates with the council, Umgeni Water (provider of bulk water), other municipal departments, particularly Health (over service delivery), research institutes such as the Pollution Research Group, HSRC, *this* research team, communities and customers. They compete with other municipal departments for funding, Umgeni Water over the price of water and other municipalities for water resources in times of drought.[68] There is conflict between EWS, communities, customers, Rate Payers Associations and schools, over water restrictions and disconnections.[69]

Other municipal departments in particular **Health, Housing and Education** have been of interest because issues of security of tenure, and the relationship between health and water access are inextricably bound. Thus, these departments also influence the hydropolitical situation in eThekwini. They represent themselves as efficient at making policy, planning and implementing service delivery programmes. Actors include Department Heads, doctors, clinic

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[65] http://www.durban.gov.za/eThekwini/Council/about

[66] See for example: 'Demonstrators want shelter and basic services', *The Mercury,* 15/9/05 www.iol.co.za/index.php?set_id=1&click_id=13&art_id=vn20050915060900409C380383

[67] http://www.durban.gov.za/eThekwini/Services/water_and_sanitation/about

[68] e.g. with Msunduzi (formerly Pietermaritzburg) municipality, see 'Durban could face water restrictions', *The Daily News,* 19/11/04, http://www.iol.co.za/index.php?set_id=1&click_id=13&art_id=vn20041119140018266C762717

[69] See 'Water supply may be cut off at Durban schools', *The Daily News,* 24/8/05, http://www.iol.co.za/index.php?set_id=1&click_id=13&art_id=vn20050824083956428C847104 & 'Municipal Officials 'saved from marchers'', *The Daily News,* 15/11/05, http://www.iol.co.za/index.php?set_id=1&click_id=13&art_id=vn20051115093729366C598246

staff, Community Health Workers, Environmental Health Officers and other frontline staff. These actors were also interviewed during area surveys. Water is seen as a basic service, necessary for a healthy community. Teachers expressed concern that schools are sometimes without adequate water and sanitation services. People are represented as citizens. These departments ought to work with EWS to deliver an integrated package of basic services, however responsibility and functionality is split between multiscalar levels resulting in information blockages: **Healthcare**: municipal (clinics & Environmental Health) and district (Community Health Workers & hospitals) systems do not map exactly onto one another and information does not appear to flow freely between them.[70] Education is managed at Provincial level and the Department of Education has previously had to step in to prevent schools from having their water supply cutoff for non-payment of bills totaling several hundred thousand Rand.[71] Housing is also mainly a provincial responsibility. Providing basic water and sanitation services in shack settlements are key concerns (Wilson 2006(2):5-6; Wilson 2006(3):5) and this is complicated by the fact that the WSA require authorisation from the landowner to make water connections and the Provincial Housing Department are responsible for securing land. Thus, there is a complex web of co-operations, competitions and conflicts at multiple scales, between EWS and other departments responsible for the delivery of related services.

Durban **communities** are clustered largely in racial and economic terms. They range from rural, dispersed communities under traditional authority, to former black, coloured and Indian townships, informal settlements and white high-income suburbs (see also Wilson (1), 2006). Communities receive different levels of service (see page 10-11) and are billed for these at different combinations of fixed charges and R/kl tarrifs (see below). Communities tend to view water as essential for human needs, health and wellbeing. Different areas have different issues of concern: where unemployment is high, this is believed to be a major actant preventing adequate water access; lack of security of tenure creates obstacles to access in informal settlements; and in high income areas residents are concerned about decaying/inadequately maintained and overloaded infrastructure. Increasingly, residents across all communities are concerned with environmental sustainability. The dominant scalar level expressed (especially during surveys) is the community, with some conflict evident at the boundaries between different types of communities and pricing regimes (e.g. interface between informal & formal settlements). General satisfaction with water and sanitation services is expressed in communities surveyed and people tend to believe that service is improving in their area, over the last five years. People are represented as community members and citizens, with various degrees of voice in water and sanitation service delivery. Co-operations are between households and between communities and EWS, other municipal departments and eThekwini Council. Conflicts are between different types of community, and between communities and EWS, other municipal departments and eThekwini Council.

[70] During fieldwork the Research team were unable to obtain Community Health Workers contact details from the clinics, they had to take a different approach, enquiring in the community.

[71] 'Authorities step in to save KZN schools', *The Mercury,* 16/5/03. http://www.iol.co.za/index.php?set_id=1&click_id=13&art_id=vn20030516011949565C340244

ETHEKWINI WATER AND SANITATION ANNEXURE "A"

WATER TARIFFS 2006 / 2007

(Effective from 2006-07-01)

ITEM NO	DESCRIPTION	BASIC TARIFF (R)	VAT (R)	TARIFF INCLUDING VAT (R)
1	For exclusive domestic consumption where all water is consumed through a break pressure tank, supplied by the eThekwini Municipality, per connection,calculated on a daily basis			
	(i) Monthly consumption up to 6 kls - per kl	Nil	Nil	Nil
	(ii) Monthly consumption greater than 6 kls up to 30 kls - per kl	4,16	0,58	4,74
	(iii) Monthly consumption greater than 30 kls - per kl	12,53	1,75	14,28
	(iv) Monthly fixed charge where the monthly consumption exceeds 6 kls/month calculated on a daily basis	Nil	Nil	Nil
2	For exclusive domestic consumption where all or part of the water through a connection is supplied without the intervention of individual break pressure tanks supplied by the eThekwini Municipality, per dwelling unit calculated on a daily basis			
	(i) Monthly consumption up to 6 kls - per kl	Nil	Nil	Nil
	(ii) Monthly consumption greater than 6 kls up to 30 kls - per kl	6,27	0,88	7,15
	(iii) Monthly consumption greater than 30 kls - per kl	12,53	1,75	14,28
	(iv) Monthly fixed charge where the monthly consumption exceeds 6 kls/month but is less than 12 kls/month calculated on a daily basis	34,19	4,79	38,98
	(v) Monthly fixed charge where the monthly consumption is equal to or greater than 12 kls/month calculated on a daily basis	48,90	6,85	55,75
	(vi) Monthly fixed charge where the monthly consumption exceeds 6 kls/month calculated on a daily basis and the property rateable value is less than or equal to R 40 000	Nil	Nil	Nil

ITEM NO.	DESCRIPTION	BASIC TARIFF (R)	VAT (R)	TARIFF INCLUDING VAT (R)
3	For all other classes of consumer other than domestic consumers			
	(i) Consumption	6,27	0,88	7,15
	(ii) Monthly fixed charge calculated on a daily basis based on connection size (mm)			
	(a) Less than 20 mm	48,90	6,85	55,75
	(b) Greater than 20 mm but less than or equal to 25 mm	76,41	10,70	87,11
	(c) Greater than 25 mm but less than or equal to 40 mm	195,62	27,39	223,01
	(d) Greater than 40 mm but less than or equal to 50 mm	305,67	42,79	348,46
	(e) Greater than 50 mm but less than or equal to 75 mm	687,71	96,28	783,99
	(f) Greater than 75 mm but less than or equal to 100 mm	1222,61	171,17	1393,78
	(g) Greater than 100 mm but less than or equal to 150 mm	2750,86	385,12	3135,98
	(h) Greater than 150 mm	4890,42	684,66	5575,08

14.11 eThekwini Water tariffs

Source:
http://www.durban.gov.za/eThekwini/Services/water_and_sanitation/bylaws_and_tariffs/water tariffs

Ratepayers Associations/Action Groups posit themselves as representing community voice. They view water as a basic service provided by the municipality which should be affordable and accessible for all. People are represented as ratepayers and citizens, whose needs should take precedence over those of big business. They mobilise around local issues. For example, in Bayview Flats, tariff restructuring and rising household debt (Wilson, 2006(3)). The more affulent **Umhlanga Ratepayers Action Group** formed to challenge the spread new private developments,[72] which they are concerned will increase pressure on existing infrastructure and change community profiles. Co-operations are with communities, the Media and sometimes eThekwini Council and municipal departments. Conflicts are with developers, EWS and eThekwini Council.

Private developers are also part of the. Hypolitical situations. Private developers co-operate with eThekwini council and EWS, to submit impact assessments, meet environmental standards and conform to regulations. For example in some areas developers may have to contribute financially to upgrade water, sewage and other infrastructure[73] and in others they have to integrate self-contained sanitation solutions (e.g. PTP's) into developments. Here there are conflicts as well. EWS no longer licences developers to build operate and manage their own PTP, as the number of substandard units and practices recently preclude this. Co-operations and competitions are with EWS, other municipal departments and eThekwini Council.

Umgeni Water is the largest bulk water supplier in KZN. It purchases raw water from DWAF, treats it and sells potable water in bulk to EWS. EWS is Umgeni's most important customer purchasing 85% of supply, other customers include Msunduzi, Illembe, Sisonke, Umgungundlovu & Ugu municipalities. As outlined in the *eThekwini evolution section* (Wilson, 2006(b):9), the relationship with EWS has been conflictual, particularly around questions of predatory pricing and monopolistic behaviour contrary to the public interest. EWS has considered proposals to acquire and manage Umgeni. Umgeni represents water as a scarce resource, water supply as a business and people as customers. Their operational area spans 24,000km2. They are a catchment-based supplier advocating catchment-based water resources management.

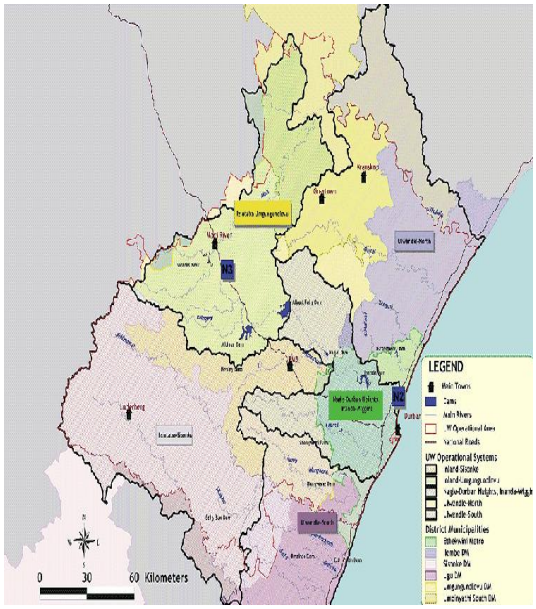


Figure 14.12 Umgeni Water's Operational Area

Source:http://www.umgeni.co.za/images/basemap.gif

Umgeni owns and manages bulk infrastructure, including 10 dams, 14 water works and 4 wastewater treatment works. A subsidiary called Msinsi Holdings manages the land

[72] 'Pearls decision was courageous', *The Mercury,* 23/8/06 http://www.themercury.co.za/index.php?fArticleId=3405064

[73] 'KZN property developers may have to pay up', *The Mercury,* 19/9/06, http://www.iol.co.za/index.php?set_id=1&click_id=13&art_id=vn20060919024209584C120171

surrounding infrastructure for conservation purposes. Umgeni co-operates with DWAF (purchases water), EWS, municipalities, farmers and communities (capacity building, development initiatives), WFWP and research institutes. They compete with other bulk water suppliers. The main conflict is with EWS.

DWAF is the custodian of South Africa's water resources. They have the *overriding* responsibility for water services and formulate national policy. Their role in service delivery has changed from provision to regulation, monitoring and support for WSA's. Their role in water resource management is in transition: ultimately water resources will be managed at catchment level by CMA's. Nominations for the Mvoti CMA are being considered by the Minister of Water Affairs and Forestry.[74] In the meantime, DWAF KZN (provincial) makes decisions and grants licenses to extract and/or discharge water to water users including: Umgeni, WSA's, farmers, industry and plantations (Sappi, Mondi, Sugar-cane growers etc). Water is described as in need of management and protection, it has economic value, social worth and access to water is a fundamental human right. Water is used for nation building and to reduce poverty. DWAF governs in the spirit of *Batho Pele* (people first). Water resources should be managed at catchment level, and bulk infrastructure invested in for national development. Co-operations are with bulk water suppliers, water users, some research institutes (WRC, CSIR etc), WSA's and the Working for Water Programme; potential competitions are with other nations[75] over water resources; and conflicts with academics, researchers and CBO's, who challenge[76] DWAF's record and reputation of success in extending affordable, sustainable water services to the poor.[77]

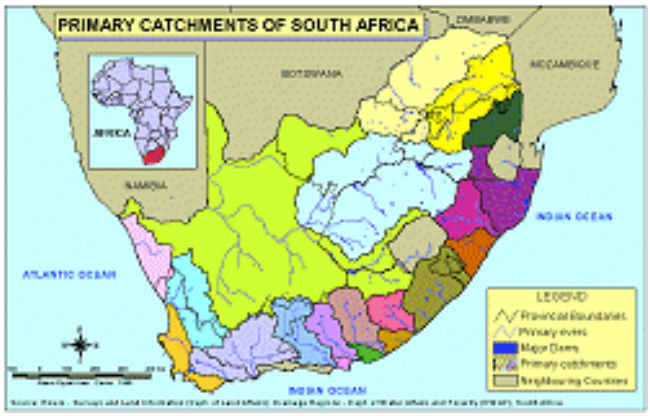


Figure 14.13 Catchment Management in South Africa

Agricultural water users (including farmers, companies, co-operatives, plantations & the Sugar Association) view water as a natural resource with economic value. They present themselves as using water to secure livelihoods, create jobs and contribute to national development. People are represented as responsible custodians who manage water carefully. They are concerned with water quality and alien plant clearance and co-operate with DWAF and WFWP over this. Water resources are managed at catchment level and agricultural users are represented in forums at this level. Technologies are used to extract water and sometimes to increase water efficiency. Co-operations are with water suppliers

[74] Interview with Chris Buckley, Head of the Pollution Research Group, 14/12/06.

[75] As well as co-operations, such as the Lesotho Highland Water Project.

[76] See Hemson, David, 'Still Paying the Price: Revisiting the Cholera Epidemic of 2000-2001 in South Africa', *Municipal Services project research report …..,* Municipal Services Project

[77] For example The United Nations Human Development Report 2006, states: "The new policy framework has achieved important advances. Since 1994, 10 million more people have received access to safe water, with coverage rates rising from 60% to 86%. Some 31 million people are now served by free basic water."

(DWAF, Umgeni), other similar users. Potential competitions are with urban water and industrial users/polluters (for example, Engen and EWS).

Water intensive industries include oil refineries (Engen, SAPREF, SASOL), chemical companies (Lanxess, Zetachem), paper/pulp production (Mondi, Sappi Saicor), metal finishing & breweries (SAB). These actors present themselves as responsible, environmentally concerned businesses, playing an important role in job creation and national development. Water is a key production input. People are portrayed as customers, shareholders and members of communities – whose concerns these actors purport to be sensitive towards. Companies purchase water from EWS. Mondi and Sapref purchase recycled water from Durban Water Recycling; and they also release effluent. These actors are concerned with reducing waste and investing in technology for cleaner, more efficient production. Co-operations are with water service providers (EWS, Durban Water Recycling), research institutes such as the Pollution Research Group and communities. eThekwini council and EWS also play a regulatory role, ensuring industry conforms to environmental standards. Key conflicts are with communities, environmental groups and CBO's. Conflicts are often sparked by pollution incidents, as much of Durban's 'heavy' industry is located in the South Durban Basin, an industrial area adjacent to a number of low-income Coloured and Indian communities which were relocated there by the apartheid state.

Figure 14.14 Engen Refinery in WentWorth: Shannon Walsh

Environmental groups portray themselves as non-government organisations concerned with *environmental justice.* Water is a natural resource, which should be conserved, and a balance struck between human and environmental needs. People are represented as citizens with voice, involved in managing natural resources. Scalar levels are local – concerns/monitoring/ action - and national/international – alliance building. Innovative technologies are used to conserve and recycle water. The environmental groups active in Durban differ in some ways: **Groundwork and SDCEA** draw on *rights discourses,*[78] are closely aligned with CBO's and community struggles against polluting companies; they build national and international alliances with researchers, NGO's and social movements, mobilising around campaigns for greater participation in decision making, social and environmental justice. **WESSA** is South Africa's oldest environmental organisation. They appear more concerned with environmental[79] than social issues, are influential in policy circles and claim to have been 'a motivating force behind many of South Africa's most significant environmental decisions' (www.wessa.org.za).

[78] The Right to a healthy environment, the Right to water and so on…

[79] As rapid population growth is seen as a threat.

Abahlali baseMjondolo is a **CBO** fighting for land, housing and basic services for shackdwellers in Durban, it claims to be the largest shackdwellers people's movement in South Africa, although it coherence and authenticity is disputed. Water is not represented explicitly, but is one of the basic services Abahlali campaigns for. People are portrayed as repressed, neglected by the state and unable to claim their rights. eThekwini council is untrustworthy. EWS is not providing adequate water and sanitation services. Technology should not be used to restrict people's access to basic services. Abahlali co-operates with communities around Durban to protest against the municipality, it also builds alliances with Environmental Groups such as Groundwork, academics and social movements, coalescing behind a campaign to reduce the gap between rich and poor, make the state more accountable and bring government to the people. Abahlali has also recently been embroiled in highly public conflicts with other organization and movement personalities, demonstrating, disrupting and forcing participant abandonment of Durban's recent Social Movements Indaba.[80]

Research Institutes

Research institutes tend to take one of the polarized positions outlined in sections 1.2 and 1.3, and to form alliances and generate conflict (often remote) along those lines. Social science institutes tend to take the critical stance, the Municipal Services project for example, is allied with social movements and represents the government and technical solutions and coercive and predatory upon the poor. Scientific Research Institutes by contrast, for example the Pollution Research Group, emphasises technical and scientific solutions to water and sanitation problems, as well as the use of community health studies benchmarking improvements. It tends to see EWS and innovative and constantly improving, and to ally with input industries, environment impact assessment processes, etc.

In sum

See the related maps in the Appendix section for visual representation of the information above, especially the Social Worlds and Positional Maps, which outline the way different groups engaged in collective action see the world and the positions they stake in relation to key debates. Some actors stake multiple positions, for example EWS' position on disconnections/restrictions is not as pro-poor as the rest of their approach to water pricing, which might explain, in part, the polarised nature of debate around their policies. Some groups of actors, who share similar characteristics, nevertheless have different positions on key parts of the debates. For example, academics and research institutions, whose theoretical underpinnings are premised on different underlying assumptions about the world. Actors have been plotted individually, when their views deviate from the norm of the 'Social World'. With regards to the positional map, most community actors are grouped in bottom right quadrant, generally satisfied with EWS, except with respect to cost and affordability. Business/industry/major users grouped in top right quadrant, satisfied with EWS, and with the conviction that water should be priced according to economic value. Social movements and some community voices are grouped in bottom right, not satisfied with EWS, think water should be more affordable for the poor WESSA (environmental pressure group) is a lone voice in top left: Water should be priced economically, and EWS needs to perform better in terms of its sustainability and monitoring roles. Democratic contender to the African National Congress, the Democratic Alliance and the Umhlanga Ratepayers Action Group are generally most concerned that infrastructure is decaying.

[80] "On the far side of left", *Mail and Guardian*, December 8-14

14.4.4 Survey Results and Recommendations

Umlazi AA/BB was the first of two pilot case studies. Field research was conducted between Thursday the 19th of October and Friday the 3rd of November. It included of six days in the field in addition to a reconnaissance visit, as well as a number of strategy and planning sessions. 48 questionnaires were administered in total. Newlands East, area 11, was the second of three pilot case studies. The research process began on Wednesday November 8th with a reconnaissance tour and was completed on Thursday November 23rd. In addition to other activities, researchers spent five days on interviews in the field. A total of 62 interviews were completed. As with the Umlazi case, interviews were conducted mainly with people living and working in the area that have either a special interest or professional stake in the health and wellbeing of the community, especially as it relates to water and sanitation services. In general, social networks in Newlands East are *denser* and more organized than Umlazi AA/BB. Strategic contacts were made more readily and better overall coverage of community networks was obtained. Key permissions – especially Department of Health – were underway from the previous case study thus ensuring that interviews with health care professionals were completed early on in the process.

Research strategy lessons learned in the Umlazi case proved transferable to the Newlands East case thereby facilitating research in this area, despite variations between the two contexts. Field researchers – especially those for whom Zulu is a first language - note that key concepts and interview dynamics play differently in different cultural contexts and that, in general, conducting interviews mainly in English in Newlands East greatly simplified the research process. More generally, civic institutions were similar in the two areas, based around key buildings, such as the clinic and library/community hall. These are meeting places for community groups and provide convenient central hubs from which to access various networks, schools, churches, businesses, etc.

The findings generated during this case study result from a standardized questionnaire (see *Final Hydropolitical Map Chapter*) and related comments participants were invited to make comments.

Questionnaire Findings

Overall, despite some variations of degree, responses followed a somewhat similar pattern in both Umlazi AA/BB and NewLands East. This may indicate that EWS's standardized approaches to water- and sanitation-related challenges are experienced similarly by some communities, despite some differing systemic attributes.

Decision-Making

As in the Umlazi case, respondents in Newlands believe that EWS makes most important decisions about water and sanitation in the area. However 37% also believe that international actors played an important role in decision-making, compared with just 14% in the Umlazi case (44[81]). In both areas, 'big business' was not generally seen as receiving preferential services (46). A relatively lower percentage of people in Newlands felt discrimination was still a factor (41% versus 61%) in decision-making (51). Just 45% of respondents felt people have voice in water and sanitation decisions compared to 74% in Umlazi (33). As noted below, field researchers hypothesized that this was related to the common expression of dissatisfaction with councillor performance.

[81] Numbers in parenthesis refer to questions numbers in the final questionnaire.

Trust and Perceptions of Competency

75% of respondents in Newlands East agreed that they trusted EWS, compared with just 51% in Umlazi (30). In both cases, approximately half the respondents also had sufficient confidence in EWS to consider recycled water in the drinking water (40). In both cases, confidence in water quality and satisfaction with pressure were very high. In Newlands, however, service satisfaction levels were lower with only half agreeing that EWS staff were helpful and well trained or that EWS responded quickly and effectively (19, 20). Indeed, comments related to these sections suggest that there may be, at times, discipline problems among EWS crews. For example, some respondents commented: 'Sometimes EWS staff are rude'; 'They are lazy, they arrive and fool around'; 'EWS staff do not explain to people-some are rude particularly to women'. Nothing like this was reported in Umlazi AA/BB

Billing and Pricing

The majority of respondents agreed that bills came regularly and were easy to pay (1, 4). However, only 59% agreed that charges were easy to understand. Only 42% felt confident that bills were accurate, compared to 58% in the Umlazi case (2). Understanding of Free Basic Water was very low at 17% compared to 41% in Umalzi (3). 81% said they knew someone who was having difficulty paying bills, compared with 77% in Umlazi. 77% of people also agreed that there were other reasons besides cost that some people do not pay bills, and as in the Umlazi case, the most often cited 'other' reason was unemployment (7). 42% agreed that the price of water was fair, compared with only 16% in Umlazi.

Infrastructure

87% of respondents believed that infrastructure in Newlands was better, or as good as other areas, compared with 75% in Umlazi (18). Most people agreed that water pressure was good. 56% of people complained about standing pools of water (11). A Further half of respondents felt that water interruptions were a problem (31). There was no clear satisfaction with current metering systems (13). Approximately half the respondents agreed that people manage to make illegal connections (16).

The Environment

82% compared with 79% in Umlazi agreed that they recycled water when possible (41). 90% agreed they were concerned about the environment. Only 50% agreed that water was a scarce resource (37), and as noted earlier, 56% agreed that new water could be an option. Most agreed that water should be subsidized. Paradoxically 77% also agreed that EWS was a business like any other business (39).

Conflicts

21% believed there had been conflicts between EWS and people living in the area and 34% believed EWS should work with armed guards for their protection (21,22). Comments for these questions revealed an important range of associated issues, but as in the case of Umlazi, most comments related to crime and safety rather than conflicts *per se*. 92% agreed that men and women have equal access to water, but 48% agreed that there were conflicts between family members and or between neighbours over who uses more water (49).

Overall Satisfaction

In Newlands, 93% of respondents tended to feel that water and sanitation services contribute to the overall health and well-being of the community (28) and 56% of respondents believed that water and sanitation services had contributed to transformation (52). 59% believed that

services in Newlands East were better than in other areas (18) (compared with 58% in Umlazi); 85% felt that services had stayed the same or improved over the last five years (compared with 70% in Umlazi). 69% were generally satisfied with water and sanitation services (compared with 87% in Umlazi) (32).

Analytical Insights from Participant Comments and Field Observations

Additional comments provided by participants are important for understanding the meaning behind some of patterns in responses. For example, in both cases unemployment was a common *additional* reason given – in addition to price – for why some people do not pay their bills, indicating that affordability concerns are elevated. Comments also indicate that levels of tension between service staff and customers may be higher in Newlands than in Umlazi AA/BB, and that staff discipline and overall response times need to improve. Yet most people, as a first measure, would phone EWS if they had a problem and overall, comments indicate that service problems are probably episodic rather than systemic.

Comments also indicated, in both cases, uncertainty around billing. Comments throughout the questionnaire also indicate a range of concerns related to poverty in the adjacent shack settlements. Yet, in Newlands the theme was not as strong and there may be an overall better level of satisfaction with the interface between area 11 and Siyanda than exists in between Umlazi AA/BB and adjacent shack settlements– although this is difficult to assert with any certainty at this point.

In Newlands, additionally, People tended to express concern that knowledge about the links between water, sanitation, hygiene and good health in both Newlands and Siyanda was not sufficiently well entrenched. Key additional observations contributed by the local research assistants included that youths often broke into the water reservoir area at night to swim.

Finally, there was an incident at the adjacent informal settlement of Siyanda. One researcher present noted (paraphrased):

> Conflict broke out as soon as people noticed a Metro car. They assumed someone had called metro to investigate ‘something’. Some felt their jobs were at risk. We were confronted with a lot of questions and hostile posturing. People wanted to know who had called us, why everyone was not told we were coming. They wanted to know who was after their jobs. They felt threatened by our presence and complained about the lack of transparency.

This incident may be indicative of high levels of uncertainty related to the weakness of municipal institutions in the area, and conversely the relative strength of ad hoc and informal political dynamics and players.

Analytical Insights from Field Researchers

In addition to official respondent comments, field researchers were asked to compile their overall impressions of the key issues in the first two case studies, based in part of conversations and field observations. It should be noted that all researchers did not participate equally in field research and views expressed are therefore partial and at times at odds with the trends in the overall data. Insights are excerpted directly from research reports prepared by field researchers, with some edits:

Field Researcher #1

Newlands appears to be a more cohesive and connected community than Umlazi AA/BB. Networks include: Health care, social work, Schools, co-operatives, churches, Civics, voluntary care networks (Home Based Care, Rape Crisis Centre), trade unions, political parties, ward development & youth forums, political parties; youth forum, transport, & community policing forums, sports clubs. Residential arrangements are different, with many people living in flats, and some confusion over who is responsible for repairs to burst pipes in communal shareblocks. Again, people drew boundaries between their community and the nearby informal settlement Siyanda, and people seemed concerned that we conduct intrerviews in Siyanda as well.

Overall people feel that water service delivery has improved in Newlands over the last 5 years. Concerns were raised over EWS slow & sometimes inadequate response to reports of burst pipes, with resentment that residents may then be expected to pay for the 'lst water'; the Environmental Health Officer noted a problem of burst/leaking sewerage pipes; complicated billing & low level of understanding about FBW; other 'issues' e.g. unemployment, alcoholism contributing to a context in which many households find it difficult to pay bills.

Health problems do not appear to be a problem in either of the case studies to date, water cut-offs, when they occur, cause problems to businesses & are an annoyance to households. There appear to be some issues in both communities around people not understanding bills and/or knowing where to get help when in arrears. Illnesses related to poor/lack of water & sanitation do not appear to be a problem.

Residential arrangements in NE (e.g. flats) appear to give rise to concerns around control over water supply e.g. when there is a burst pipe who is responsible for calling EWS and/or for fixing it? Who pays? These concerns were not apparent in Umlazi

The councillor in Newlands East, area 11, was not well networked, and community members did not appear overly impressed with his efforts. This could be a potential problem for resolving issues as the Environmental Health Officer reported it was too dangerous for municipal officials to attend community meetings and so issues were resolved at monthly multi-departmental forums attended only by the councillor. In Umlazi AA/BB both the present and former councillors were well networked, networks they chaired (e.g. ward development committee) appeared to be active and main routes for bringing problems to the attention of the municipality

Field Researcher #2

Both areas are what could be called formal suburbs or townships, which have had proper water service for a very long time even before the new democratic dispensation. However, while the majority of people in the AA/BB area own or live in an area owned by their parents or relatives people in Newlands live in flats which they may not be owning. The difference this makes is that in the former area people know and can control water-related issues where they live (for example they can recycle water where possible) whereas in the latter area people may not completely act on water issues either because there is a number of households living in the complex or because they do not own the place they are living in.

Field Researcher #3

In general Newlands East is well covered in terms of household water supply. Majority of concerns raised in Newlands East are repair related rather than general water supply problems. In one incidence EWS disconnected water from one resident, who had to move out of her house to a relative's house far from home, which subsequently led to loss of her job due to distance factor. But generally, residents raised issues related to improvement as opposed to existing problems.

Field researcher #4

Overall, people not informed or educated about water issues. Pipe burst is very common, usually at the same spot.(Most frequent at the intersection of Inanda Rd and Newlands East Rd, and people complain that it always takes a long time to be fixed.)

Key issues are that rates are too high, high unemployment, and people just not informed. In Umlazi, people have political voice about water-related issues as they can communicate with the councilors etc. there is flow and communication between the community and the leaders. Generally, people are happy with leaders.

Newlands East, on the other hand, has a "virtual" councilor, the community, irrespective of colour, are not satisfied with the leaders of the ward. For example, the Masakhane project never arrived in NE. According to most community leaders, such as pastors, since the arrival of the new councilor there has been no improvement in any sector.

In Sum

Umlazi aa/bb and Newlands East, area 11 were two pilot studies. They appear as actors on all the maps generated for this case study. However, the goal was to develop a standardized entry and research strategy for additional cases, to generate baseline data and to constitute consultative standing groups for each area, which will remain dialogue with EWS after the end of the project cycle. The previous section has summarized the views of a wide range of stakeholders, including: health care workers, community members, community leaders, councilor, teachers, business owners/managers & church leaders, etc.

A number of key recommendations emerge from questionnaire responses, respondent comments and field observations. Below, these are delineated by recommendations that are 1) similar in both cases, 2) unique to Newlands

Key Recommendations

Newlands and Umlazi

- Consider new level of clarity for water and sanitation components on municipal bills
- Renew and strengthen information dissemination strategies related to FBW, water loss insurance and debt reduction
- Debt and affordability issues require review; consider tariff structure adjustment
- Explore high value for perception of discrimination residual in decision making
- Explore high value for perception of school disconnections
- Develop conflict reduction strategic plan for bridging boundaries between differing water and sanitation pricing regimes (especially around shared water points and shared water meters in Newlands East)
- Given high values related to environmental concerns, consider when and where the legitimacy and efficacy of initiatives can be bolstered by including sustainability goals and principles.

-

Newlands East

- Visible health and hygiene education campaign
- Investigation into episodic staff discipline problems (i.e. three month trial area hotline)
- Replace any residual shared meters; clarify roles and responsibilities in tenant/landlord relations
- Diffuse tensions in Siyanda

14.4.5 Summary Remarks

The final EWS case study developed an innovative approach to bringing research back to participants and to policy makers and implementers. A municipality was selected on the basis of being capacitated, motivated, nationally and internationally networked, interested identifying the root causes of existing conflicts and stalemates and developing a dialogical process with customers. Relying on the store of qualitative data amassed during the first two case studies, tools were designed to be of use towards rapidly assessing the local hydropolitical information landscapes by identifying key issues and benchmarking levels of intensity. Survey results were interpreted in light of project data frameworks and served as the basis for informed discussion between community members and the Water Service Authority, leading to the formation of Standing Consultative Groups that will meet with the Municipality three to four times of year and directly influence policy choices and implementation strategies. To date, community response to this initiative has been positive and consultative groups have been formed successfully in two pilot areas. It is our finding that research partnerships with the water service authority are the most effective way, in South Africa, in communicating the research to the actors in empowering ways.

Discussion of the evolution of the project, how it was ultimately brought back to actors and into the policy and implementation processes of South Africa's most influential Water and Sanitation Authority - as well as the resultant hydropolitical mapping tools – is the subject of the *Final Hydropolitical Map Chapter*.

14.4.6 eThekwini Situational Map

- **Individual/Human elements/Actors:**
- Municipal Managers; Heads of Departments; engineers; technicians; consultants; facilitators; plumbers; call centre staff; councilors; councilor liaison officers; customer service agents; Environmental Health Officers; water users; farmers; activists: S'bu Zikode; Desmond D'sa; Orlene Naidoo; Community Leaders; Traditional Leaders; committee members; politicians; doctors; health workers; teachers; school principles; Community Development Workers; volunteers; Home Based Carers; Mayor Obed Mlaba; Mike Suttcliff; Neil Macleod; researchers; academics; landlords; police; security guards; tourists

- **Implicated/silent & under articulated actors/issues:**
- Children; youth; the elderly; disabled; the sick; women bear the burden; time spent collecting water; Durban HIV/AIDS hotspot; TB; unemployment; poverty; (violent) crime; threat of sexual assault at night; alcoholism; financial hardship; unemployment; escalating debt; water restrictions; illegal connections; UAW; social/community conflict; intra-household conflict; water-related illnesses (cholera, scabies, diarrhorea); Rat tailed maggots; infrastructure; municipal capacity; pollution; the environment; climate change; wildlife; marine life; drought

- **Collective actors:**
- EWS; other municipal departments; eThekwini council; Depts of Health, Education, Housing & Public Works; ANC & other political parties; Umgeni Water; Veolia; schools; clinics; hospitals; shopping centres; Westville Prison; Hotels; Body Corporates (flat blocks); churches; formal & informal businesses; co-operatives; chamber of commerce; CIVIC's; trade unions; community committees; CBO's (Abahlali baseMjondolo, SDCEA); Ratepayers Associations (Bayview Flats; Umhlanga); NGO's (Mvula Trust, WESSA); WISA; research institutes (HSRC, MSP, CSIR, PRG); EWS contractors & suppliers; private security companies; private housing developers; DWAF; Media; Industry (Lanxess, Sasol, Sapref, Mondi, Sappi Saiccor, Zetachem, SAB, Metal finishing companies); waste minimisation clubs; Eskom; Sugar Association; sugar plantations; environmental monitoring groups; nature reserves; KZN Wildlife; NPA; CMA; Durban Wastewater Recycling; WFW.

- **Key events (& drivers of change):**
- Transition to democracy; elections; RDP to GEAR; re-drawing municipal boundaries; creation of Umgeni Water; amalgamation of water service authorities & provision; creation/evaluation of EWS; increase in $ of bulk water; council & national budget planning/processes; tariff restructuring; national targets (2008); infrastructure roll-out; reduction of service delivery backlogs; govt papers, policies & legislation; National Water Act; Water Services Act; move to decentralization; introduction of FBW; cost-recovery; combining water bills with rates; increase in illegal connections; demonstrations; escalating debt; installation of water meters; restrictions & disconnections; piloting & testing new technologies; cholera outbreak; increasing burden of HIV/AIDS; drought; water interruptions; infrastructure repair/upgrades; loss of capacity; research; national & international conferences (WISA, Ecosan); pollution incidents.

- **Discursive constructions of water:**
- Water as: basic service, primary need; essential for life, precious liquid, abundant, scarce resource, common resource, undervalued, economic good, crucial to business, product, human right, social worth, key input, threatened by human expansion, essential to

- **Discursive constructions of people/orgs**
- **People** as: citizens, comrades, customers, consumers, clients, bill payers, poor, vulnerable, still oppressed, unemployed, stakeholders, empowered by knowledge, need to be educated, disadvantaged, previously

ecosystem functioning;

- balance social/environmental water needs; manage sustainably; manage efficiently; integrated water management; integrated water, sanitation & hygiene education service delivery; water quality; treated water = safe; effluent; water scarcity threatens economic growth; resources are finite; conserve/waste water; recycle water;
- water supply = business; water for all; water for domestic, productive, leisure (gardens, swimming pools) activities; industry, agriculture the environment, sustainable livelihoods, economic development, growth, quality of life, good health, community wellbeing, poverty reduction.

- **Water resources & infrastructure:**
- Sea; Durban Harbour; rainfall; groundwater; 14 rivers (Umgeni, Mooi...); reservoirs & dams (Inanda, Midmar, Albert Falls); pools of stagnant water; reticulation network; roof & ground tanks; stand pipes; water meters; full/semi pressure connections; Free Basic Water 200l/household/ day; decentralized water treatment systems (DEWATs); wastewater treatment plants; Durban Water Recycling plant; flush/VIP/UD/chemical toilets; communal toilet blocks; septic tanks; anaerobic baffled reactors; package type treatment plants (PTP's); waterbourne sewerage network; municipal & water offices; internet; media (radio, TV, community theatre); GIS; databases; swimming pools

- **Geographic/Spatial elements:**
- Coast; harbour; industrial zones (South Durban Basin), pollution hotspots; development nodes (Umhlanga) climate;

disadvantaged, participants, partners, employees, water users, accountable, responsible, wasting water, criminals, communities, neighbours, differentiated by race/class/age/gender, activists, lacking voice in Watsan services, have voice, neglected by the state/councilors, shareholders, more important than profit, affected by their environment, get away with not paying, don't understand bills, bill payers are penalized, **EWS** as: financially sound; well capacitated; losing capacity; best municipality in SA; innovator; integrated/joined-up thinker; best in the world; public service entity; business like any other; main customer; supplier; regulator; don't monitor effectively; research/project partner; trustworthy; untrustworthy; repressive, coercive; concerned with cost recovery

- **Industry** as pollutors disregarding people's health; concerned with profit; environmentally concerned

- **Discursive constructions of infrastructure/ technology:**
- **Infrastructure** as: sustainable; inadequate/ decaying; in need of capital expenditure/ maintaining/upgrading; overloaded; under pressure; improving; leaking; adequate; well functioning; water & sanitation pipes bursting; within homes = owners responsibility; legal/ illegal connections; illegal connections expensive to others; large water projects expensive/wasteful; VIPs difficult to empty/ can be a health hazzard. **Technology** as: innovative; alternative; appropriate to area; water meters best way to measure/charge for use; restrictive; coercive; demeaning; dignity enhancing; full pressure water supply & flush toilets = aspirational; 'ladder' of service; no reticulation network in rural areas; dependent on distance from centre; self-contained solutions; **alternative technologies:** job creating; pioneering, suitable for outlying areas;
- more sustainable; environmentally sound;
- **PTPs** not functioning /polluting. **Service delivery** as: demand-responsive, bottom-up, top-down, centralised, decentralized.

- **Political/historical elements:**
- Racialised apartheid era city planning; fragmented water service delivery; neglect of townships & tribal areas;

eThekwini municipal area; municipal management areas; wards; area based management; racial/spacialised city; former townships (uMlazi, Newlands East, KwaMashu); informal settlements (Unity Avenue, Jamaica); rural/ tribal areas; affluent residential areas (Durban North, Umhlanga); interface between different types of community & water pricing regimes; reallocation of resources to previously underserved areas; population growth; type of housing: (informal, hostels, flats, high density, private developments, gated communities); roads; rail & public transport networks; access to CBD; resettlement; land-ownership; golf courses; new airport; nature reserves.

Group Areas Act; forced removals (Cato Manor); municipal redemarcation; subsidization of services in some municipal areas; amalgamation of separate water utilities; service delivery backlogs; need to redress past inequalities;

- eThekwini strong financial position; pioneering implementation of FBW; violence in KZN; tribal politics; KZN as Zulu homeland; ANC/IFP politics; council politics; high HIV/AIDS incidence; Durban 2nd largest city in SA; port & industrial hub.
-

- **Socio-cultural/symbolic elements:**
- Ethnic, racial & religious diversity in Durban; public holidays; religious festivals; Zulu tradition/culture; water for: weddings, funerals, celebrations, Baptisms; water as life; water as gift from God.

- **Institutional elements:**
- Acts of parliament (Group Areas Act, Water Services Act, National Water Act, Municipal Systems Act); constitution; RDP; GEAR; national & municipal budgets; equitable share; MIG; business plans; Strategic Framework for water services; white papers; policy frameworks & implementation guidelines; IDP's; WSDP's; FBW policy; water quality standards; debt relief policy; water bills; water loss insurance; service delivery partnerships (concessions, management & service delivery contracts); consultative processes; tender processes; elections; stakeholder forums; data sets (census); Key Performance Indicators; management systems; environmental monitoring; environmental impact assessments; waste discharge charge system; hygiene education programmes

- **Major issues & debates:**
- Unemployment; tariff restructuring; tariff/rate increases; cost recovery, payment vs non-payment for services; increasing indebtedness; illegal connections; UAW; restrictions & disconnections; bills difficult to understand; accuracy of meter readings; interface between formal/informal settlement & different pricing regimes; water & sanitation for informal settlements; discrimination in water access; adequacy/ inadequacy of FBW; leaks; leaks beyond the meter; infrastructure in need of repair/ upgrading; lack of capacity; reallocation of resources; 'appropriate' technologies; adequate/lack of community voice; water disruptions; poor communication; EWS

- **Conflicts:**
- EWS & communities (disconnections); Communities & councilors (service delivery);
- Communities & the police (protests, violence)
- Informal/formal settlement dwellers (access to & payment for water)
- Communities & other municipal depts (e.g. housing)
- Neighbours (borrowing water)
- Household members (water use)

response time; trust/mistrust of EWS; EWS staff helpful/rude, well trained/incompetent;

- **Competitions:**
- Umgeni water & EWS (price of bulk water)
- EWS & other municipal depts (resources)
- Durban & Pietermaritzberg (water resources)
- Durban (domestic users/industry) & Agriculture (water resources)
- Industry & domestic users (in times of drought)
- Residents of different areas (resource reallocation, infrastructure overstretched)

- **Co-operations:**
- Neighbours ('loaning' water)
- Informal/formal settlement dwellers (formal dwellers collect 'free water' from stand pipes; informal dwellers buy/borrow/take water)
- EWS & research institutions.
- Social movements with different aims e.g. shackdwellers, environment (Durban protests)
- Social movements in SA & globally (solidarity, support)

15 Hydropolitical Map

By Dr J. Zoë Wilson with general and specific project research assistance from Kea Gordon, Eleanor Hazell, Chitonge Horman, Amanda Khan, Wiseman Luthuli, Scebi Mkhize, Jason Musyoka, Emeka Osuigwe, and Horacio Zandamela Rsearch Director: Dr Julie Trottier

15.1 Introduction

Politics is driven by perceptions. What people believe is right and just tends to shape their political behaviour. *Inter alia*, formulations of expectation, configurations of evidence and argument structures of competing or conflicting groups tend to differ. Groups in competition tend to see the world differently, while competing to define the legitimate way of understanding the problem/solution. Groups in deep conflict tend to lack any shared knowledge framework and institutionalized rules of engagement. In South Africa, debates about *how* water *ought* to be shared exhibit these qualities. This is partly an externality of the South African hydropolitical landscape itself, which is extremely diverse, fragmented and uneven – but also highly decentralized and overwhelmingly local. As a result, debates that take national prominence tend to apply only to highly specific cases that resonate in national and international networks. Actors at this level simultaneously claim to speak to strategic and pragmatic issues alive at the local, municipal and catchment levels across the country, but our research indicates this is rarely the case. Rather, taking one's political cues from national movements, in the South African case, will result in a highly distorted perception of water politics, which for historical and contemporary - as well as ecological - reasons tend to be overwhelmingly local.

Research in South Africa indicates that South Africa's hydropolitical context results from a push-pull dynamic between, on the one hand, extreme local heterogeneity and a radically decentralized institutional architecture designed to situate decision making power at the local level (guided by general principles under the Department of Water Affairs and Forestry), on the other. Much of what happens around who gets water and why, in South Africa, happens at the local, municipal level. Municipalities differ significantly from one another. The South African vision is one that sees resilience, environmental sustainability and social justice in diverse and appropriate technologies and management practices responsive to local political and environmental constraints. Its institutional tolerance for local solutions has been the entry point for progressive and innovative water sector reform, and has earned South Africa international accolades.

This extreme heterogeneity was the key problematic of the research. How a general hydropolitical mapping tool for South Africa could be designed in a way that did not distort the picture and deny or silence certain components and positions when locally applied? Indeed, taken as a whole, South Africa's water politics are most *political* when key local issues are seized upon and extrapolated to the whole, thereby obscuring, silencing and rendering invisible the diversity of political issues alive throughout South Africa's highly variable and fragmented hydropolitical landscape. One of the key findings of the research is that while local case studies revealed dense hydropolitical relations, these mapped onto highly visible national discourses – such as privatization or Free Basic Water – in few meaningful ways. Rather, dynamics tended, overwhelmingly, to be context-specific and pragmatic, relatively unrelated to the most popular national and international level debates. This was important to bear in mind, given the mandate to develop a tool which would be empowering at the local level, towards resolving urgent and immediate (as many water and sanitation related concerns are in South Africa), as well as strategic goals specific to one's own hydropolitical constellation, notwithstanding that these are often multi-scalar.

Thus, this final chapter emerges out of the lessons learned from a bottom-up 'most different' case study approach to building South Africa's Hydropolitical Map. Case studies are a good way to understand "how" and "why" questions. Here, as noted in the *Case Study and Methodology Chapter*, we sought to answer: How and why are water resources and service delivery approaches contested in any given community and how can models and lessons learned generated through this research from specific case studies, be used by stakeholders for downgrading conflicts to competitive and/or co-operative relations in South African hydropolitical settings more generally?

We relied on three 'most different' in-depth case studies comprising approximately 350 interviews. The first two case studies illustrated that situational, social world's and positional maps (cf. *Draft Hydropolitical Map*) were effective tools for illuminating the hydropolitical constellation of a particular community. They also suggested that, given South Africa's water governance arrangements, research partnerships with the Water Service Authority/Provider are critical for empowering communities through water research. That is, the first two case studies illustrated that the mapping process – and especially the end-user mapping process – could be an effective empowerment tool to help communities navigate "…unfamiliar patterns and landscapes, anticipate/verify their position in the hydropolitical constellation, and [finally] strategise around future goals." Thus, at one level, our initial strategy associated with bringing the findings back to the actors was successful. At another level, however, these early report back sessions also clarified that research partnerships with the Water Service Authority/Provider, in South Africa, are critical for empowering communities through water research.

As such, the final case study developed an innovative approach to bringing research back to participants and to policy makers and implementers. A municipality was selected on the basis of being capacitated, motivated, nationally and internationally networked, interested in identifying the root causes of existing conflicts and stalemates and developing a dialogical process with water subscribers. Relying on the store of qualitative data amassed during the first two case studies, tools were designed to be of use towards rapidly assessing the local hydropolitical information landscapes by identifying key issues and benchmarking levels of intensity. Survey results were interpreted in light of project data frameworks and served as the basis for informed discussion between community members and the Water Service Authority, leading to the formation of Standing Consultative Groups that will meet with the Municipality three to four times of year and directly influence policy choices and implementation strategies. To date, community response to this initiative has been positive and consultative groups have been formed successfully in two pilot areas. It is our finding that research partnerships with the water service authority are the most effective way, in South Africa, of communicating the research to the actors in empowering ways.

Discussion of the evolution of the project, how it was ultimately brought back to actors and into the policy and implementation processes of South Africa's most influential Water and Sanitation Authority - as well as the resultant hydropolitical mapping tools – will be the subject of the remainder of this chapter.

15.2 Project Context and Research Overview

15.2.1 South Africa's Water Sector: municipal decentralization and extreme heterogeneity

In South Africa, the social, political, economic and institutional contexts -where competitions occur over water resources and service options happen - vary widely. This variability is partly related to the highly uneven social landscapes residual from apartheid era inequalities. These are expressed in spatial as well as social terms, not limited to various forms of ghettoization,

infrastructure legacies and regimes, as well as race, ethnicity, class, age, and gender cleavages. They include discontinuous land use and settlement patterns, haphazard, dysfunctional and inefficient spatial ordering, land use mismatches, highly differentiated areas of low level population density (i.e. prosperous farms, marginalized dispersedly-settled rural communities), concentrations of poor in relatively high density areas on the periphery of rich urban cores, new affluent suburban enclaves, etc.

South Africa's post-apartheid water management architecture is designed to interface with heterogeneity while disrupting its exploitative and socially dysfunctional nature. As such, it makes explicit provision for diverse and appropriate water and sanitation technologies and management partnerships. It is also designed to disrupt the institutional mechanisms of apartheid's highly unequal distribution of water resources through the radical decentralization of authority to the local level, while attempting to recognize and integrate functional interdependencies between core and marginal areas. This is achieved, for example, by the municipal amalgamation of relatively affluent areas with disadvantaged and at times highly differentiated areas (i.e. rural with urban). Through de-centralization, it is hoped that power formerly concentrated in the central apartheid state apparatus and among white elites will be diffused and capacity engendered at various other state levels and among other political constituencies.

Ultimately, it is the vision that South Africa's new water regime will emerge (eventually) from transition as a seamless network of interconnected municipal and catchment level information and implementation management nodes (under the general principles provided by the Department of Water Affairs and Forestry) that simultaneously ensure equitable water and sanitation services and ecological sustainability, while balancing and preserving water's contribution to a vital economy. Further, it is important to note that emphasis is placed on the emergence of a water management network from the bottom up (yet bounded by general principles) *via* the interaction of decentralized governance institutions in balance with local water resources and in dialogue with a seamless web of similar governance relations across the country. It is essentially a vision of Integrated Water Resources Management which understands *best case* hydropolitical and hydrological systems as intertwined through continuous feedback between semi-autonomous yet networked nodes and based on the belief in the 'efficacy of a multiscale institution whose activities parallel the organization of the natural system' (Wilson 2002; 344). It is also important to note that this ideal is very weakly institutionalized and, at present, South Africa's water landscape could be described as uneven and fragmented.

As both the *Scoping* and *Methodology Chapters* detail, South Africa's apartheid-era water management regime has been superseded. Among the most important attributes and provisions of the new regime are:

- creation of wall to wall municipalities and radical decentralization of responsibility for and authority over water and sanitation services to the municipal level (supported by 'equitable share' transfer payments from central government);
- decentralization of water resources management to the catchment level

These float within a more general principled context comprising:

- a constitutional right to sufficient water -section 27 (1) (b) - and an environment that is not harmful to health or well-being -section 24 (b) –, as well as and the Water Services Act (Act 108, November 1997); the National Water Act (Act 36 of 1998) and Free Basic Water;
- provision for the Ecological Reserve among a number of other ecologically-minded policies;

- political commitment to Free Basic Water, which prescribes the provision of a free basic lifeline amount to all citizens of not less that 200litres per person per day (although some municipalities have opted for less);
- concept of tiered service and water and sanitation ladder (bottom tier: standpipe not more that 200meters from household; top tier: fully reticulated), which envisions community-types (i.e. rural, deep rural, urban, informal, etc) moving up the ladder through a process of continual improvement/innovation; and
- policy flexibility in terms of both technological and management options.

These attributes and provisions of South Africa's water management architecture seek flexibility in service provision arrangements, within the context of widely shared yet highly general principled policy parameters. In essence, they largely leave the means to the end open to interpretation and experimentation. They attempt to take account of South Africa's highly variable landscapes by ensuring that water managers have a wide range of tools and management options available given the complexity of the national challenges at hand.

To date, across South Africa, the new water architecture has resulted in a range of institutional arrangements and technological options, which have earned South Africa International acclaim for innovation and progress towards Millennium Declaration Goals (World Bank 2005; UNDP 2006). An important feature is that municipalities are in many ways the key sites of decision making around service obligations – bounded by, among other things, constitutional and environmental constraints. Most actors and the primary density of relations around the shared water resource, then, tend to operate at the local and/or are bound to a policy context that compels all actors to be engaged at the local/municipal level. Outside of the urban context and depending on specific water demands, the catchment level is expected to also emerge as an important decision-making level, yet most Catchment Management Agencies remain embryonic. The Department of Water Affairs and Forestry (DWAF) is responsible for the parameters of the general policy context, but more recently has begun to consider taking on a more 'hands on' regulatory and capacity-building role, as many under-capacitated and fledgling municipalities have faltered in fulfilling their constitutional obligations. The vision remains, however, one where municipalities will serve as nearly independent central nodes, which are nevertheless highly interactive with other scales of management, forming cross-scale network relations that can capture and make sense of information that is not fully realized at any specific location in the system. Essentially, the theory behind South Africa's new water management regime is based on the Integrated Water Resource Management Paradigm and mirrors onto the underlying spirit of many new global water information networks emergent around global scarcity and contamination concerns (Wilson and Bond 2007).

At the same time, however, the transition to post apartheid water management regime is incomplete. There has been a dramatic shift in scale and location at which water institutions, organizations and strategies operate. In the process of transition, the previously dominant mode of managing interscalar relations –hierarchical where controlled by the central state apparatus and radically decentralized to white property owners though a system of riparian rights - has given birth to messy transitional spaces. For example, while the Department of Water Affairs and Forestry set out the decentralized plan for water service governance and general principles and parameters, it retains neither a regulatory nor implementation function. The operationalization of service delivery is left entirely to the discretion of the District or Local Municipality, many of which lack direction and capacity. In some areas, apartheid era competencies still fill the capacity gap (cf: *Grabouw Case Study*), while in others, informal and household level subsistence strategies continue to dominate the day to day (cf: *Mseleni Case Study*). At the same time, however, some municipalities more closely mirror DWAF's ideal, marking good progress towards service targets and environmental goals (cf: *eThekwini Case Study*), while bringing seemingly more overtly idealistic goals – such as Free Basic Water – to implementation.

Fragmentation and diversity on the ground, coupled with a national strategy designed to tolerate and even foster highly differentiated approaches to water management and service delivery (within the boundaries of generally accepted norms and values such as equity and transformation) creates a push/pull effect of extreme heterogeneity. As the *Scoping Chapter* details, while formally, management scales are designed to be networked across scales- with municipalities being the key sources of information generation, distribution and collaboration (awaiting a comprehensive environmental regime to take root at the catchment level) - in reality, management scales are often eccentric, interpenetrated by different scales and types of formal and informal social organisation, with, at times, small local sites emerging as key geneses of counter-tendencies and resistance to central government de-centralisation efforts. This provides extremely fertile ground for politics. The discourses of a few local struggles have risen to the national stage (perhaps on the backs of other global struggles) – such as the anti-privatization struggles of Johannesburg - but it would be a mistake to conflate these with the struggle over who gets water and why in South Africa's varied landscapes more generally. Indeed, many of South Africa's hydropolitical dynamics are highly specific with little resonance with the wider and more global and therefore more easily amplified discourses. For example, as the results of community surveys in eThekwini revealed, many well capacitated and interested actors, such as health care practitioners, environmental health officers, councillors and teachers do not see their hydropolitical issues defined in terms of national debates around water privatization, Free Basic Water or human rights. While these might be issues, they play in very different ways at the local level. Rather most relate to highly localized issues and concerns such as the inter-community conflicts between suburbs and shack settlements, inadequate understanding of the new water regime and call response times (see *eThekwini Case Study Chapter*). These issues, however, differ significantly from those that animate the other two case studies. Thus, scaling up or down from any of the case studies, or from those that receive the most attention at the national level is unlikely to be useful towards empowering local actors to navigate their own hydropolitical landscapes more effectively.

15.2.2 Hydropolitical Mapping: a case study approach

This extreme heterogeneity was the key problematic of the research. How can a hydropolitical mapping tool for South Africa be designed in such a way as not to distort the picture and deny or silence certain components and positions? As illustrated by the *Draft Hydropolitical Map Chapter*: maps that reveal 'information about space by showing that information scaled within the boundaries of another space' will be limited (Paulston and Liebman 1994: 223). Larger scale maps, for example, have already simplified some phenomena in or out of view. Law and Singleton (2000:5) also caution that phenomena, once scaled up and magnified, are not really and necessarily *there*, but are often features of the mapping process itself. They challenge whether it is possible to get a sense of the 'big picture' by either scaling down or up. These cautions were applicable in this case.

We find, for example, that South Africa's Government water maps and institutional diagrams often reify constructions that do not exist at the local level and tell us little about the economic, social and political conflicts and how they are actually mediated in any given location. Similarly, local struggles, technological solutions and governance innovations are not necessarily visible at other sites and scales, and risk being overlooked if we set our sights at the inappropriate scale. For example, social movement activities and internationally linked water struggles often reify issues as South Africa-wide, which in reality only speak to the experience of a tiny minority of people with access problems. South Africa has become iconic for its Johannesburg-based anti-privatization struggles, yet these struggles are at most marginal to most of South Africa's citizens without access to clean water and improved sanitation, or to South Africa's growing water scarcity and increasingly competitive resource environment more generally (cf: *Scoping Chapter* and *Case Study and Methodology Chapter*)

Indeed, taken as a whole, South Africa's water politics are most problematic when key local issues are seized upon and extrapolated to the whole, thereby obscuring, silencing and rendering invisible the diversity of political issues alive throughout South Africa's highly variable and fragmented hydropolitical landscape. Indeed, one of the key findings of the research is that while local case studies revealed dense hydropolitical relations, these failed to map onto issues raised as key concerns by the most vocal social activists. Rather, concerns tended, overwhelmingly, to be context-specific and pragmatic, relatively unrelated to the most popular national and international level debates, such as privatization.

In many of the debates that characterize the national level debates, scale is meaningless, in that the referent is non-physical. Yet water resources are physical. Research indicated that scales that correlate to physical referents are more important for understanding and interacting with the hydropolitical context in terms of how to empower local actors to claim water rights, than those that are highly abstract or scaled from highly specific contexts to the national discourse space more generally. Hydropolitical scales, in South Africa, we conclude, *should* reflect the limitations and constraints of physical reality. This doesn't presume that actors have specialized or even accurate knowledge about the *real world*, but rather the finding that hydropolitical concerns are overwhelmingly local and pragmatic.

Thus, this final chapter emerges out of the lessons learned from bottom-up 'most different' case study approach to building South Africa's Hydropolitical Map. Case studies are a good way to understand "how" and "why" questions (Yin 2003). Here, as noted in the *Case Study and Methodology Chapter*, we sought to answer: How and why are water resources and service delivery approaches contested in any given community and how can models and lessons learned generated though this research from specific case studies be made useful by the stakeholders towards downgrading conflicts to competitive and/or co-operative relations in South African settings more generally? Case studies selected were (cf: related *Case Study Chapters* for more information):

- deep rural Zulu community in Northern KwaZulu Natal (Mseleni),
- former coloured Township 80km east of Cape Town in the Western Cape's fruit growing region (Grabouw), and
- South Africa's most highly capacitated and well run municipality, and this year's winner of South Africa's municipal performance awards (The Vuna Awards), eThekwini Municipality – formerly Durban Metro.

The case study approach revealed vast differences between systemic subsystems (in this case 'most different' municipalities), as well as disjuncture between the formal national level vision of interconnected management scales for service provision and water resource management as well as visions embedded in national level critiques and the highly specific challenges and constraints experienced by actors. The rest of this chapter, then, details how research devised to capture South Africa's diverse hydropolitcal*scapes* has been made useful towards the development of a general hydropolitical mapping tool applicable across diverse, fragmented and uneven contexts, and, perhaps most importantly, how key stakeholders have made use of research findings to improve the quality of stakeholder dialogue towards, ultimately, better distribution of the benefits of South Africa's water management regime.

15.3 Methodology for Impacting Policy

15.3.1 Theory Building through Qualitative Case Study Research

Cases made use of grounded-theory qualitative interview techniques to surface as much information as possible from as many perspectives and scales operative in a particular situation (see South Africa's Situational Map). For each of these cases, a set of maps were created: Situational, Social Worlds/Area, and Positional Maps – as well as other experimental maps as appropriate (cf. *Case Study Chapters* for more information). The key objective was to identify a full range of issues and related argument structures at play in 'the situation' and then to position key actors in relation to these. This served to illuminate competing interests and meaning systems (the social field) and relationships to the formal and informal institutions of governance (see also *Process Map* for *Mseleni Case Study*). Importantly, however, this technique not only serves to identify the issues, conflicts, alliances, etc., in any specific location, but also to surface, through a process of wide-ranging and open-ended qualitative techniques, the store of 'minor discourses' or minor issues and competing interpretations that constitute the political and contested nature of the information space more generally (cf. Wilson 2006). Importantly, these 'minor' discourses may gesture to broader regional, national or international issues, which may or may not interpenetrate local dynamics, despite being only marginal in any specific context or struggle.

This store of qualitative data, both the context specific 'dominant discourses' (crux of the local issue) and the more generally circulating 'minor discourses' (gesturing to non-local issues), served as the basis for an important innovation in the third case study – the creation of a rapid assessment survey questionnaire tool that has been used successfully to quickly identify locally specific issues[82] and dynamics in several eThekwini communities. It also served as the foundation for a process of engagement between actors, the Water Service Authority and researchers, designed to build *Standing Consultative Groups* that will meet on a regular basis with the Water Service Provider, in this case, eThekwini Water and Sanitation, three to four times a year.

15.3.2 Reporting Back as Implementation Partnership: from research to action

While the two first case studies illustrated that situational, social world's and positional maps were effective tools for illuminating the hydropolitical constellation of a particular community, they also suggest that research partnerships with the Water Service Authority/Provider, in South Africa, are critical for empowering communities through water research. That is, because water and sanitation issues in South Africa are overwhelmingly local, and because hydropolitical dynamics are also local and largely pragmatic, engagement with the local water service provider – or where this is non functional, local water technology (i.e. pumps, rain water harvesting tanks, etc.) specialists - is critical to the empowerment process. The research process must link to pragmatic technological and governance issues. It must also locate where these intersect with political will, even where this is embodied by local NGO's and or subcontracted Water Service Providers, such as local engineering firms (cf: *Scoping Chapter* for more information on WSPs). For example, the Mseleni Case concluded:

[82] The initial two case studies required approximately six weeks of intensive field work, while the rapid assessment questionnaire can be administered by a team of three to four student researchers in four to five days of field visits.

> Community report backs were, on the whole, well received; they were appreciated by people who are used to researchers coming, extracting information and leaving. However, I believe some community members found them a bit frustrating, as they came with the expectation that the research would lead to an immediate improvement in their water situation. Practical concerns outweighed a desire to understand the situation more deeply. The researcher was repeatedly asked to please engage with the municipality on peoples' behalf. This is revealing of the fact that the municipality was conceptualised as the responsible agent in the water situation and the agent with the power to affect change (31).

Similarly, while the Grabouw case study found that reactions from the actors during report backs included the sense that resultant 'maps could be considered a basis for co-operation or understanding within the community' (40), research at this stage did not explicitly create a link between the various actors and Water Service Authorities, despite efforts to involve the Water Service Authorities and Providers more directly.

Research also indicated that the link between research, empowered communities and the Water Service Authority is not automatic one. Indeed, in many of South Africa's municipalities, it is difficult to establish. The researcher for the Mseleni case, for example, submitted the adjacent text box as part of her case study report.

Thus, channelling the research findings from the first two case studies into a dialogue and research partnership with a committed Water Service Authority emerged as the best case next step towards effective and empowering research, as well as most effective means to insert findings into the imaginary of national level actors and processes. That is, South African policy makers are overwhelmed with meetings and research reports. This project needed a way to cut through the noise and advertise policy implications more innovatively. The third case study, then, was selected in part on the basis of municipal interest in and commitment to being a part of the research process and implementing lessons learned.

In this case, a municipality was selected on the basis of being capacitated, motivated, nationally and internationally networked, interested in identifying the root causes of existing conflicts and stalemates and developing a dialogical process with water users. The two completed case studies provided an important platform for engagement, as well as the critical store of qualitative hydropolitical data needed to develop a rapid assessment tool (including the Situational Map for South Africa). Further, eThekwini Water and Sanitation (EWS) is, as noted in the related *Background Sections*, innovative and open to unconventional technologies and partnerships, one of which is the Memorandum of Understanding with the University of KwaZulu Natal, where this project is based. Little is known, however, at this point about how to engage less interested municipalities in South Africa in the Hydropolitical Assessment Process, but this has emerged as a key core concern of the *Country Hydropolitical Assessment Process* (see Country assessment process map).

In South Africa, however, it is likely that partnerships with EWS could facilitate broader municipal interest in that it is currently considered Africa's continental leader around water and sanitation solutions in complex municipal settings (cf. Wilson 2006; Wilson Forthcoming). Further, findings and replicable results deriving from this project's partnership with EWS are slated to be carried out after the completion of the project cycle in six additional EWS served wards. The research process is also linked *via* metropolitan knowledge networks to knowledge sharing processes around fostering sustainable community voice in water and sanitation services. EWS, in partnership with this project, has taken a unique approach to community involvement, which if successful, may ultimately serve as the foundation for a national model.

At the inception of the partnership, EWS was already interested in finding solutions to conflicts profiled in *section 14.3.* Experience from previous case studies also indicated that actors elsewhere in the country were interested in seeing research serve to facilitate two way communications with the Water Service Authority. EWS sought ways of delineating their own scale from positions taken in the media by well known activists linked to national and international advocacy networks, they needed a way to begin to identify the key pragmatic concerns held by people who lived and worked in specific areas, as well as their underlying issues. Of special interest was the great store of knowledge held by people who live and work in target areas, and who are professionally interested in community health and wellbeing – such as health care workers, teachers, and pastors – or who come into contact with a wide variety of people everyday. These were people, it was felt, who would be able to shed the most light on how existing water and sanitation arrangements were playing out in the day to day. They were also people, it was felt, who would have begun to think more strategically about systems level issues from their own unique vantage. This expectation was premised, in part, on findings from the end-user mapping sessions in Grabouw, which indicated that some communities have already quite complex models of change to propose for improving the overall distribution of water system gains.

Significantly, EWS also felt ready to commit to a long term dialogical process with the communities with which it engaged.

The research process agreed as follows:

- **1. Objectives**:
- 1) Establish consultative standing groups in three areas
  2) Administer and refine customer perception questionnaire
  3) Analyze and synthesize results and propose recommendations for eThekwini response
  4) Consolidation of Standing Group and report back of the initial findings
- **2. Establish consultative standing groups**
- Building consultative groups will take a 'snowball' approach to identifying key stakeholders. This is a grounded and evidence-based approach to consultative group building. Existing area information including any pre-existing customer feedback information is reviewed, as is any information about formal and information decision-making structures, community-based organizations and faith groups, key institutions, such as clinics or schools, local businesses, and so on. This may require preliminary site visits.
- A first round of diverse stakeholders is identified, briefed about the project, queried about their level of interest and asked to name other interested or important stakeholders. This first round would include, most importantly, those working in caring and health professions. However, it is important to include as wide and as varied a group in this initial round as possible. Diversity and variation is more important than absolute numbers, and selection should be sensitive to overlapping diversity - such as race, ethnicity, income, gender, age, religion, etc.
- In a second round, those identified as potential interested stakeholder are briefed and queried in the same way. This process is expected to take several rounds until the available field of interested stakeholders appears to have been exhausted. This should be apparent by the increasingly frequency of the identification of already identified potential stakeholders. Lessons learned in each case are applied to subsequent cases.
- All stakeholders interviewed will also be administered a customer perception questionnaire.
- **3. Administer and refine customer perception questionnaire.**
- The questionnaire will be designed to evaluate

- Suitability for membership as part of the consultative standing group.
- Further information about known complaints
- Satisfaction levels with existing management interfaces, including bills, meters and payment methods
- Perceptions related to the upkeep of infrastructure, including timeliness and efficiency with respect to general maintenance and sense of general staff responsiveness and competency
- Information about general practices, such as health and hygiene practices, that may bear directly on levels of satisfaction
- Use, misuse and modifications to existing technologies
- Completeness of information held by customers
- Other opinions and mental models bearing on levels of satisfaction

- Administration of the questionnaire, especially in the first case, is expected to yield important insights and modifications. The questionnaire will be deigned to take approximately one half hour.

4. Analyze and synthesize results and propose recommendations for eThekwini response

- The completion of the three area pilot is expected to produce:

  - Recommendations for service improvement in each case
  - Recommendations related to public relations and information interventions
  - A model for establishing consultative groups and a standard questionnaire for a remaining six areas.

5. Consolidation of standing group and report back of the initial findings

- The analysis and synthesis of both questionnaire responses and the consultative group-building process will culminate in the selection of a final roster and first group meeting. At this meeting questionnaire findings will be disseminated, and participants asked to verify, modify and supplement findings.

15.3.3 Rapid Assessment Tools: a road map to hydropolitical voice

Based on the store of qualitative data amassed from the first two case studies, a standardized research methodology (see country assessment process) and questionnaire were tested and refined (see Appendix N for final version). The questionnaire measures responses along a number of themes identified during qualitative research:

1. Decision-Making
2. Trust and Service Effectiveness
3. Billing and Pricing
4. Infrastructure
5. Environment
6. Conflict
7. Overall satisfaction levels

Tools were designed to be of use towards rapidly assessing the local hydropolitical information landscapes, by identifying key issues and benchmarking levels of intensity (see the EWS Case Study Chapter for more information). Questionnaires were administered during four or five field visits by a team of student researchers. Analysis and synthesis of the research findings was followed by the development of an EWS response to key findings, which were presented at Reporting Back sessions. Survey results serve as the basis for informed discussion between community members and the Water Service Authority, leading to the formation of Standing Consultative Groups (See Appendix M for list of members now standing on the uMlazi Consultative Group, the members of which will meet with EWS three to four times a year and advise on satisfaction and service improvement issues.)

15.4 Report Backs

15.4.1 From Reporting Back to Constructive Engagement

As noted earlier, the two first case studies illustrated that the mapping process – and especially the end-user mapping process – could be an effective empowerment tool to help communities navigate "…unfamiliar patterns and landscapes, anticipate/verify their position in the hydropolitical constellation, and [finally] strategise around future goals." The Grabouw Case Study, for example, concluded:

> The mapping process clarified relationships between actors and actants. Communities articulated the clarification of roles and problems in their worlds as beneficial, and this should be seen as the benefit of hydropolitical mapping. Communities could build on the clarifications that occurred. For example, Pineview introduced suggestions such as rain tanks as an alternative for servicing their water needs. Others linked the solution of their problems to the municipality. For example Waterworks, whose map explains that the community should ask the municipality for help for more toilets. Iraq households who had not identified who the allocation/transmission of their water relied on were, afterwards, able to do so. Similarly, Siteview's end user map links accessing IDs to employment and accessing water as they would like to. These can all be seen as steps forward although not specifically orchestrating action.

> Farm workers most specifically took this process forward. They felt that visual representation was the clearest way they could express to the person who acts as the go-between the farmer and themselves the obstacles they encountered on the farm. They further requested to keep the tools to recreate their map – cardboard, colourful paper, colourful pens and glue. The GWUA similarly asked to have access to the maps and to be able to show their members the different experiences of water within Grabouw communities demonstrated by the maps. These maps could be considered a basis for co-operation or understanding within the community.

However, as also noted, the first two case studies clarified that research partnerships with the Water Service Authority/Provider, in South Africa, are critical for empowering communities through water research. That is, because water and sanitation issues in South Africa are overwhelmingly municipal, and because hydropolitical dynamics in general tend to be linked to local resources, and fixed infrastructures, and are by and large, pragmatic at the level of everyday struggles, research findings tended to suggest that engagement with local the local governance and technological nexus was key to moving research from concept to action. Further, by acting as the link between local level concerns and local Water Service Authorities and Providers, debate appears more likely to remain at the appropriate scale, and not get hijacked by national and international-level debates and actors, whose interests and mental models likely differ significantly from those playing out at more local hydropolitical scales.

Thus, the final case study used Report Back as a forum for two way dialogue between the Water Service Provider and participants. The agenda for the first meeting was as follows (See Umlazi presentation for full proceedings):

EWS CONSULTATIVE GROUP MEETING AT UMLAZI, AA SECTION.

DATE : 17 JANUARY 2007

VENUE : UMLAZI LIBRARY, AA SECTION.

TIME: 12H00-14H00

AGENDA/UHLELO

Solwezi

15.4.2 Lessons learned from eThekwini Engagement: research partnerships and sustainable gains

An important lesson from report back and end user mapping sessions conducted during the first two case studies was that sustainable empowerment gains require a strategy for ongoing engagement. For example, the Grabouw case study concluded: 'We soon realised that communities struggled to adjust to the idea of mapping. In many of the other workshops, groups had not even seen maps of Grabouw before' (39). Further, it was noted: 'The dynamics within the community delayed the end-user mapping process. Communities within Grabouw were uncomfortable with engaging with other communities, often who they held with suspicion or antagonism' (40). Gesturing again to the importance of processes over time, the Case Study also remarked: 'In the least serviced area in Grabouw the way in which communities accessed water changed through out the process. The absence of toilets was cited as an urgent need in Iraq in the first interviews, but by the end-user mapping limited sanitation had been provided changing the dynamics identified in the initial semi structured interview.' (40-41). In conclusion, Case Study Researcher Karen Peters notes:

> The important lesson learned is that communities are unfamiliar with the mapping process and extra time needs to be allocated to pursue mapping if we are to help communities understand and represent other social worlds and their position in relation to them and, plot a way forward. The mapping process is experienced as a fun process. Participants were eager to become involved in drawing symbols. Visual representation is also difficult and participants had to think through how to represent the key decision-makers and their challenges and aspirations. The benefit of visual representation is also that illiteracy becomes less of an obstacle for engaging in problematizing issues.

Similar types of conclusion were reached in the very different hydropolitical setting of Mseleni. Eleanor Hazell, for example reports: 'As numbers were large (40+) and time limited, we were not able to introduce our selection of maps to everyone, and unfortunately most of our maps were in English. In light of these significant constraints, what was envisaged in the *case study selection and methodology* (Wilson & Gordon 2006:69) in terms of empowerment through PRM tools was not achievable in 1 workshop' (31). Conclusions follow: 'The research brief was to conduct a rapid hydropolitical assessment. I believe rapid assessment and empowerment would be difficult to achieve concurrently, as empowerment takes time. I

recommend that as the hydropolitical assessment methodology is developed, thought be given to building in the empowerment aspect at the beginning of the research. Sessions could be organised to develop confidence and build skills around collecting, interpreting and presenting information, which help community members present their concerns to decision makers' (32).

Thus, a key objective for the final case study was to tie the research process to an ongoing process of empowerment and constructive engagement between community members and the Water Service Authority. This was achieved by linking the research process to the objective of creating the foundations of trust and reliable information out of which a healthy dialogical space could emerge. Participants were informed up front that research was:

1) feeding into a process of municipal service improvement;

2) would culminate in a report back session where the municipality would be present, would respond to the research findings;

3) this would be followed by general discussion; and

4) then followed by request for interested members to sit on a standing consultative group to meet three or four times a year to brainstorm and inform issues and ways forward.

These steps have taken place. Important research findings and significant trust and social capital have both been brought to bear on improving the distribution of political voice in water and sanitation issues in the area. Importantly, this is seen as a process to maintain, not an outcome achieved. The research has now been handed over to eThekwini Water and Sanitation to sustainably take the initiative forward. Pilot areas also have constituted standing groups and a permanent local point person/facilitator (local youth), who will be employed to arrange logistics, take minutes, etc. for subsequent meetings.

15.5 Country Hydropolitical Assessment Process: towards a rapid assessment hydropolitical mapping tool

The Country Hydropolitical Assessment Process provides a schematic of the research process recommended by this research.[83] This Schematic is meant to apply to new research being conducted in an unfamiliar county. Parts of the schematic that appear inside the white circle, refer to tools that are developed throughout the broader country process, and which can then be repeated in successive areas (sometimes with minor changes to the questionnaire, depending on technologies).

1) In developing areas, water and sanitation systems tend to differ significantly from one area to another. Even adjacent communities may have different technologies and management packages, as the Zambian case study illustrates well. We suggest selecting 2-3 most different case studies for the subject of wide ranging qualitative surveys. Please see the Grabouw and Mseleni Case Study Chapters for methodological insights and research tools.

2) In each case, start building the 'Situational Map.' The *Draft Hydropolitical Map* describes as follows:

[83] Pending purchase of SmartDraw or other Graphics package

> To create a situational map, first, a list is complied of as many as possible of the obvious and implicated individuals, collective, discursive, political, spatial, temporal, symbolic/cultural and other elements (actants), such as technologies, information systems, infrastructure, capacity, etc. The boundary of the map is 'the situation', and the aim to provoke the relationships among them to be revealed. Key questions are:
>
> 'Who and what are in this situation?' 'Who and what matters to this situation?' 'What elements make a difference in this situation?' 'What seems present but unarticulated?'

After an extensive search that nears completion (but is always open to revision and additions) once the same actors and elements systematically re-appear and new search terms and methods have been adequately explored, the map typically takes the form, first of a brainstormed space, then gradually of an ordered space, where terms come to rest in like-groups.

Please see the Situational Map for South Africa.

3) In each of the qualitative case study settings, conduct a wide range of interviews with diverse actors situated at multiple points in the emergent hydropolitical field. For example, in Mseleni, over 60 interviews were conducted and participants included: community members, small scale business owners and employees, people who sell water formally and informally, community garden coordinators, local water committee members, traditional authorities such as the indunas and inkosi, the ward councillor, municipal managers, engineers, technicians, project managers, community health workers, community development workers, traditional religious figures such as the sangomas, Christian pastors, teachers, doctors, environmentalists, plantation owners, a commercial forestry company, ESKOM, and DWAF decision makers.

4) Interviews should be recorded and coded. Please see both the Case *study and Methodology Chapter* and the *Case Study Chapters* for more information on coding processes. In general, qualitative information was sifted to reveal perceptions around the following issues:

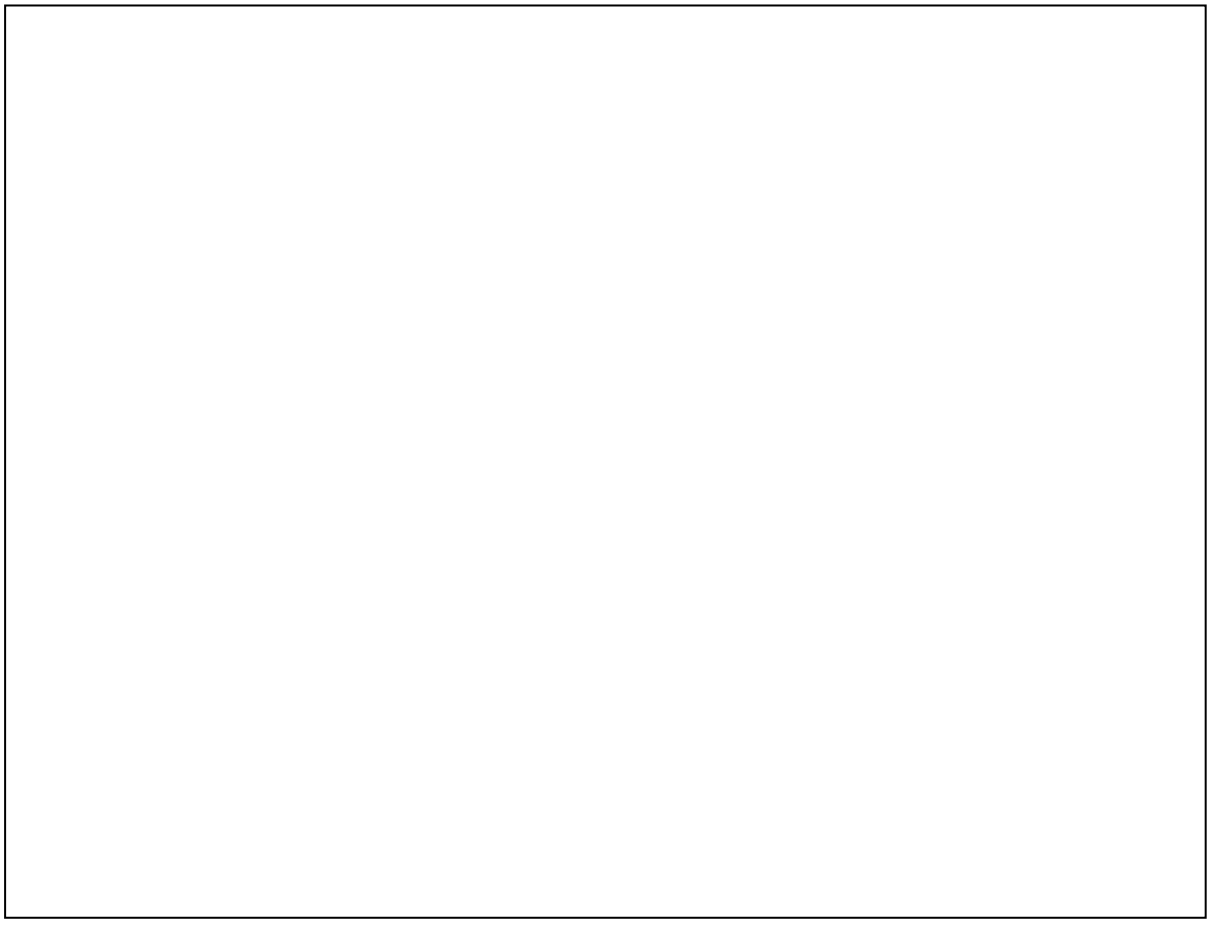
- **Representation of self**
- **Representation of people**
- **Representation of Water Service Authority/Provider**
- **Scalar level**
- **Representation of water**
- **Drivers of change**
- **Water Use**
- **Access modalities**
- **Allocation/Transmission**

5) Coded interviews were useful towards understanding the social worlds at play – that is, the various different coherent ways in which people saw their hydropolitical world. They were also useful for understanding what world views are held by which actors, and how the conflicts and alliances between actors relate to formal roles and to ways of seeing the world.

6) The wide store of qualitative data can now also serve as the foundation for a survey questionnaire. The range of issues at play should now be clear, and a questionnaire designed to capture the relative values of different potential issues in any given community. We have taken the position here, well established in the decision-making literature, that people base their opinions on mental models and incomplete information. This would be especially true of the water sector, which is not well understood by the general public. The questionnaire, then, is designed to get at a wide range of perceptions about what affects the distribution of access to the benefits of the water regime, from globalization to discrimination to low capacity or poor service.

Research experience suggests that differences in the balance of the issues present in different kinds of communities were captured, in eThekwini, with the standard questionnaire developed (see Appendix N), especially where interviewers captured comments made around questions. That is, certain questions tend to evoke different associations among different community respondents, and it is important to train survey administrators to capture and record these qualitative differences.

7) In that the objective was to constitute a consultative standing group from the survey participants we chose a snowballing purposive approach to identifying survey participants.



8) Survey results were tabulated, analyzed and synthesized and made available to the Water Service Authority to prepare a response and discussion points. Please see the *eThekwini Case Study* Chapter for more information.

9) All survey respondents were invited back to a meeting in their community where the initiatives objectives were outlined, findings reported back, responded to by the Water Service Authority and opened up for discussion.

10) At the end of the meeting it was requested that interested attendees agree to be part of a Consultative Standing Group. Please see Appendix M for the resultant members. Importantly, this is seen as a process to maintain, not an outcome achieved. The research has now been handed over to eThekwini Water and Sanitation to sustainably take the initiative forward. Pilot areas also have constituted standing groups and a permanent local point person/facilitator (local youth), who will be employed to arrange logistics, take minutes, etc. for subsequent meetings.

South Africa Situational Map

- **Collective Actors:**

- Churches/religious organizations; schools; DWAF at different levels; national/provincial/district/local depts of health, education, housing etc; hospitals; clinics; informal/formal businesses on various scales; companies; Oil refineries; co-operatives; chambers of commerce; industry networks; stakeholder forums; waste minimization clubs; farms; plantations; Sappi; Mondi; irrigation boards; Sugar Association; water user associations; Catchment Management Agencies; donor organisations (DBSA; DFID; EU; USAID etc); BPD; information networks (Interwater; WIN-SA; WISA etc); bulk water suppliers (Rand, Umgeni etc); municipalities (eThekwini; Umkhanyakude; Cape Town etc); municipal water departments; other municipal departments (health, housing, finance); treasury; SALGA; water boards (Amatola, Bloem); water companies (Biwater, Siza, Vivendi, WSSA); engineering firms (AFRICON, Concor etc); contractors & suppliers; security companies; housing & other developers; community based water providers; community committees; project steering committees; tribal authorities; CBO's; CIVICs; Trade Unions; Political parties (ANC; DA; IFP etc); Residents/ Ratepayers' Associations; Forums (APF; EJNF); the Freedom of Expression institute; Coalitions (Jubilee South Africa etc); NGO's (Amref; AWARD; Red Cross; Mvula Trust etc); bulk infrastructure projects (LHWP, Durban Wastewater Recycling); research/consultancy firms (PDG; WaterWise etc); information networks (Capnet, RDSN etc); Research institutes (CSIR; HSRC; MSP; PRG; WRC); SAAWU; training institutes; universities; environmental NGO's & monitoring groups (KZN Wildlife; WESSA; WWF etc); nature reserves ; Working for Water; the Media

- **Individual Human Elements/Actors:**

- Government Ministers; Municipal Managers; Mayors; Heads of Water and Sanitation; Engineers; water & sanitation plant operators; water & sanitation plant managers; plumbers; technicians; meter readers; debtor clerks; customer service agents; Activists; volunteers; environmentalists; water users; Community Leaders; Traditional Leaders (e.g. inkosi, izinduna); sangomas; livestock herders; livestock owners; councilors; councilor liaison officers; tourists; tourism operators; water users; Environmental Health Officers; doctors; health care staff; Community Health Workers; carers; Community Development Workers; facilitators; teachers; school principles; pastors; donors; researchers; academics; consultants; community committee members;

- **Implicated and Silent Actors/Actants**

- HIV/AIDS, TB, health/disease, diarrhoea, stomach cramps; rat tailed maggots; the elderly; disabled; the sick; people living with HIV/AIDS; women care for others; alcoholism; crime; violent crime; danger in darkness & at night; community dynamics; conflict between communities; conflict between neighbours; conflict within households; children/ youth waste water; young collect water for elders; ancestors; lack of education about water conservation; sharing & not cleaning facilities; constant immigration/out-migration; influx of job seekers; loss of healthy, working age population; influx of sick/elderly/disabled; population pressures; boundaries around infrastructure/areas; uncertainty of land tenure; lack of rights in informal settlements/tribal areas; landowners role in water allocation; indigent; poverty; unemployment; financial hardship; escalating debt; bills; lack of information about bills & debt relief; expense/cost of water; time spent collecting water; long/hard journeys; no time to do other things; collecting water = women's work; gender politics; interface between traditional/ modern; legacy of past inequalities; livestock; wildlife; marine life; environment; drought; climate change; pollution; increasing water scarcity; lack of adequate sanitation; sewage pollution; effluent from industry; water quality; power failures cause infrastructure to fail; infrastructure inadequately maintained; bad/ inappropriate infrastructure; slow service delivery; municipal (in)capacity; corruption; lack of support for struggling municipalities; lack of M&E of water use; UAW; leaks; illegal connections; lack of future/forward planning.

- **Key Events**

- Transition to democracy; elections; municipal (re)demarcation; ; amalgamation of water service providers; change of management arrangements; creation of bulk water suppliers; RDP to GEAR; National Water Act; nationalisation of water resources; Water Services Act; government policies/papers; decentralisation; change of Water Minister; Free Basic Water policy; bulk infrastructure projects; community water projects; planning/ budgeting processes; opportunities for participation in decision making; dialogue between stakeholders; change of funding arrangements; subsidies/tariff restructuring; increase in $ of raw/bulk/treated water; move towards cost recovery; escalating debt; rescinding debt; 'illegal' connections; cholera outbreak; reduction of backlogs; introduction

business men/women; farmers; farm managers; landlords; neighbours; police; security officers

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- **Discursive Constructions of water:**
- **Water as**: everything; source of life or death; basic need; no 1 priority; feeds community; human right; scarce resource; use sparingly; precious liquid; conserve water; educate about need to save water; don't get enough; health; contaminated; safe; sanitized; blessed; freedom; brings change; can lead to integration; comes from people's power; gift from God; abundant; scarce; take for granted; can be destructive; can be controlled; essential for business; economic good; commodity; can't get a good or better product; economic resource; people need water 24/7; used properly if paid for; value/price facilitates sharing; some for all; should be free; should be subsidised; Free Basic Water; everyone should pay something; cheap; expensive; cost-recovery necessary; water schemes can make money; recycle; feeds natural systems; maintains ecological processes; emotional; element; compound; molecule; need scientific verification; water system/cycle; plan for future use; journey to fetch water fun/good exercise/tiring/waste of time;
- **Water for**: domestic, productive & leisure activities, beautification, sanitation, washing, drinking, playing, building, industry, agriculture, the environment, social functions, health, healing, spiritual cleansing, livestock, food security, tourism.
-
- **Political and historical Elements:**
- Apartheid legacy; RDP to GEAR; uneven service provision; racialised planning; forced removals; neglect of townships & traditional areas; apartheid support for traditional authorities; subsidised services; fragmentation of responsibilities & services; municipal redemarcation; resource reallocation; planning to reduce backlogs; amalgamation = more resources & greater responsibility; constitutional responsibility; financial position of municipalities; (lack of) of new technologies; national & international targets; turning off communal/free water supplies; drought; demonstrations; installation of restriction devices/drips; disconnections; supply interruptions; inadequate maintenance; loss of capacity; increased demand; increased no of connections; illegal connections; migration; population pressure; increase in HIV/AIDS; natural & human disasters (fire, flooding etc); displacement following disasters; forced removals; pollution incidents; clean-up operations; environmental regulations; move to catchment management agencies; institutional evolution; conferences; global summits; education/communication campaigns; research & communication thereof.

- **Discursive Constructions of Non-Human Actants**
- **Infrastructure** as: Large/bulk/small scale; big expensive schemes; inadequate/decaying; needing expenditure & maintenance; need to upgrade/replace; rip out & start again; created by people; lack of emphasis on people; methodology of getting water to people; unevenly distributed; legacy of apartheid; means to redress inequality; deteriorating in previously well served areas; use cheap materials/cut corners to save money; leaky; huge water losses; extend reticulation networks; reach out into rural areas; overloaded; expensive; private vs communal connections; rural vs urban; dependent on well-functioning power network; problems caused by power failures; problems caused by lack of transport.
- **Technology** as: appropriate; inappropriate; gender sensitive; culturally sensitive; suitable for rural/urban areas; restrictive; coercive; demeaning; punishment; restrictions = discrimination; needs facilitation; glorified new thing; pipes like toys (don't work); flush toilets = best; water pipes = luxury; water pipes not best/only option; people transform/adapt for own needs; alternative technologies = pioneering/innovative; legal/illegal connections; **PTPs** not functioning properly /polluting; can reduce pollution.
- **Service delivery** as: bottom-up, top-down, 'centralized', decentralized, demand-responsive
- **Discursive Constructions of Human actants**
- **People** as: customers; clients; consumers; bill payers; bill payers penalized; enjoying water; wasting water; want water always; crying for water; still living without water; still oppressed; hard working; accept life situation; adjust; Good Samaritans; corrupt politicians; failing councilors; citizens; activists; actors with power; organize against you; are equal; need leaders; don't take responsibility; have voice in WatSan; lack voice in WatSan; lack

capacity (human resources, infrastructure, money, procedures, processes, skills, transparency); relationship between municipalities & national govt; local context/community history; struggle against; tribal politics & war; intervention by NGO's, church, other individuals & org; interracial/ ethnic violence; politics at council, provincial & national level; decentralization of service delivery; bulk infrastructure projects; new technologies; SA constitution; new legislation (policies, acts & papers); HIV/AIDS; FBW & implementation; consultative processes; tender processes; elections; institutional service delivery arrangements (concession, lease).

- **Major Issues and Debates:**
- From water for free to paying; tariffs & tariff changes; cost recovery; commodification of natural resources; privatization; cost of connections; private vs communal connections; non-payment for services; rising debt; debt relief; water theft/illegal connections; water restrictions; prepaid meters; disconnections; the Right to Water; poverty alleviation; unemployment; job creation; Free Basic Water (amount, funding, delivery); water for informal settlements; backlogs & sluggish pace of service delivery; lack of consultation; poor communication with people/communities; people lack voice in WatSan; transparency, accountability & corruption; (WSP/WSA) lack of capacity & finance; unsuitable infrastructure; lack of maintenance; water interruptions; leakages; slow response to problems; appropriate technologies; reallocation of resources; prioritization of projects/areas; migration patterns; population pressures; conservation; protect the environment; people wasting water; household priorities; water quality; pollution; move to Catchment Management Agencies; competing demands on different scales of water users; scarcity will increase in future

- **Non-Human Elements:**
- Rainfall; climate; drought; water resources (sea, surface water, rivers, lakes, ports, estuaries, reservoirs, rainfall, groundwater); geology; gradient; infrastructure (reservoirs, dams, tunnels, pipe networks, ground & roof tanks, standpipes, full/semi pressure connections, meters, water/wastewater treatment plants, DEWATs, flush toilets, VIP's, UD toilets, communal toilets, chemical toilets, septic tanks, anaerobic baffle reactors,

information; need education/training; apathetic; poor; indigent; unemployed; vulnerable; careless; frustrated; vandals; destructive; selfish; afraid to challenge leaders; get away with not paying; don't want to pay; are willing to pay; are already paying; can be cut off if they don't pay; self-restrict water use; meet regularly; don't attend meetings; **defined by** gender, race, class, age, rural/urban, location

- **Community** as harmonious; homogenous; heterogeneous; destructive; site of conflict.
- **Municipalities** as: businesses; social businesses; public service entities; working hand-in-hand with people; failing; losing capacity; untrustworthy; corrupt; restrictive; coercive; repressive; excellent; trustworthy; financially sound; well capacitated; out-of-the-box thinkers; national/ global innovators; the best in the world
- **Industry/companies** as: polluting; disregarding people; creating jobs; contributing to development

- **Spatial Elements**
- Apartheid era planning; fragmented service delivery; need to extend infrastructure to previously non-serviced areas; boundaries (isigodi, wards, tribal, municipal, district, catchment, provincial, national); interface between different boundaries; settlement patterns; migration; population density; interface between rural/urban; interface between traditional/modern; access to services; transport networks; industrial zones; pollution hotspots; nature reserves; golf courses; rural areas; gardens; forests; farms; plantations; townships; informal settlements; suburbs; housing developments; gated communities; privatized spaces; ports; airports; shopping centres; CBD's; development nodes; city planning; interface between formal/informal; land tenure; type of housing; distance from water & sanitation reticulation networks; housing plans; forced removals & resettlement; coast; mountains; lakes; rivers; reservoirs; geology; soil type; gradient; areas of water scarcity & availability; Catchment Management Areas; water transfers on various scales; competition between places/spaces for water resources.

- **Socio/cultural and Symbolic Elements**
- Water as 'everything'; water = life; water for rituals (funerals, celebrations, Baptisms, weddings); spiritual cleansing; Shembe pastors bless water; water = health; water is healing; ancestors bring rain; collecting river water = remembering ancestors; place in traditional/culture; racial, ethnic & religious diversity in SA.
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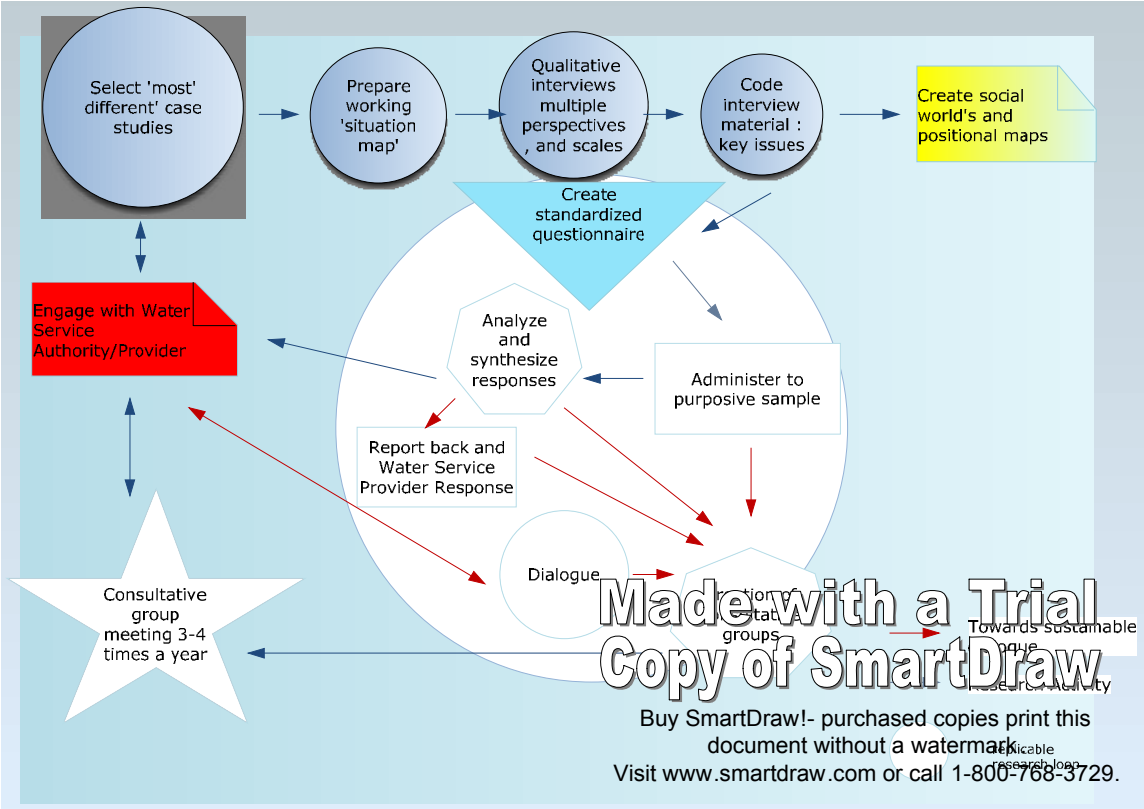
PTP's, municipal & water offices); water/wastewater purification processes; electricity supply; GIS; databases; datasets (census etc); internet; media; legislation; policies & implementation guidelines; Strategic Framework for Water Services; budgets; business plans; Key Performance Indicators; management systems; white papers; IDP's; WSDP's; water bills; water loss insurance; water quality standards; environmental monitoring systems; water related illnesses (cholera, typhoid…)

Country Hydropolitical Process Map



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End notes

[i] On the one hand, the Millennium Goals related to water and sanitation (Target Ten) appear to be specifically structured to take environmental and sustainability issues into account. Target Ten falls under Goal Seven to 'Ensure Environmental Sustainability' following immediately after Target Nine to 'Integrate the principles of sustainable development into country policies and programs and reverse the loss of environmental resources.' On the other, however, the Goals have also been a rallying point for the lucrative infrastructure input industries seeking wider markets. For example: the 2002-03 World Panel on Financing Infrastructure that reported to the World Water Forum in Kyoto. Chaired by former International Monetrary Fund managing director Michel Camdessus, the Panel brought together the Global Water Partnership, presidents of major multilateral development banks (IADB, ADB, EBRD, WB), representatives of the International Finance Corporation, Citibank, Lazard Freres, the US Ex-Im Bank, private water companies (Suez, Thames Water), state elites (from Egypt, France, Ivory Coast, Mexico, and Pakistan) and two NGOs (Transparency International and WaterAid). Camdessus called for $180 billion in capital expenditure, even though just one sixth of that would be earmarked for investments aimed at meeting drinking water, sanitation and other hygiene needs. In defiance, Public Services International (2003), whose union affiliates boast 20 million members, declared that Camdessus had produced:

> …pretty much what we expected: an attempt to resuscitate the ailing fortunes of the international water corporations... The bankers' panel pursues the goal of having private corporations manage and profit from delivering the world's water. They want these companies to serve the world's cities, and to build more dams and reservoirs... The panel's most concrete proposals are to create two new financial mechanisms to protect the water corporations: a 'Devaluation Liquidity Backstopping Facility' - intended to protect the multinational water corporations' from losses due to currency devaluation, so devastating to Ondeo in Manila and Buenos Aires, and problematic for Thames in Jakarta; and a 'Revolving Fund' to pay for the 'large fixed cost of preparing Private Sector Participation contracts and tenders.' This would likely go to international lawyers and consultants to write dense contracts to protect the corporations, which most municipalities will be unable to interpret or enforce.

[ii] Formerly City of Durban
[iii] See *Conference Documentation* for the 3rd International Ecological Sanitation Conference, 23-26 May 2005, Durban, South Africa, for multifaceted description of the technology and its limitations.
[iv] Teddy Gounden, eThekwini Water and Sanitation, email communication, June 20, 2006
[v] http://www.borda.de/conrat/Dewats_Mai05_72.pdf
[vi] Email communication, July 31, 2006, Durban South Africa
[vii] Site visits to Valley of a Thousand Hills and interview with Stephen Jonker, Community Outreach Liason, March 2005
[viii] Teddy Gounden, eThekwini Water and Sanitation, email communication, June 20, 2006
[ix] Paraphrased from: http://www.dbsa.org/Document/AnnualReport/AR2000/DbsaImpact2000.htm
[x] See *Conference Documentation* for the 3rd International Ecological Sanitation Conference, 23-26 May 2005, Durban, South Africa.

[xi] Social Movements tend to be active through the media, frequent meetings and inter-organizational dialogue – such as the Social Movements' Indaba - and through active demonstrations. Key active organization include the shack dwellers movement, Abahlali baseMjondolo, various rate payers associations, such as the Bayview Flats Ratepayers Association and the Westcliff Flat Residents Association and more environmentally concerned groups such as the Wentworth Development Forum, Groundwork and the South Durban Community Environmental Alliance, all active in the South Durban Basin. Durban is also home to a number of high profile activist personalities such as Bobby Peek, Desmond D'Sa and acclaimed author Ashwin Desai. Durban is also the site for University-Based Centre for Civil Society, which under the Directorship of Patrick Bond, plays an important networking and linking role for the movements through the coordination of a regular meetings and special events, such as the Social Movements Indaba.

[xii] Based on interviews with Brandon Pillay and Shirley Ebrahim, Bayview Flats Resident's Association, June 9th, 2004.

[xiii] 'Municipal Officials Saved From Marchers', *Daily News*, March 15, 2005, available at: http://www.iol.co.za/index.php?from=rss_South%20Africa&set_id=1&click_id=13&art_id=vn20051115093729366C598246

[xiv] Interviews conducted with Brandon Pillay and Shirley Ebrahim, Bayview Flats Resident's Association, June 9th, 2005, including review of pictures taken during armed standoff between municipal workers and residents.

[xv] There is also the question of whether the Free Basic Water Policy actually redistributes towards the poor: Every *household* in eThekwini benefits from 6kl free water per month regardless of size, income or employment status. Thus a double income household of 2 in an affluent suburb would receive the same amount of free water as a household of 10 in Bayview, with the effect of many high income single or double occupancy households pay little or nothing for water.

[xvi] Interviews conducted with Brandon Pillay and Shirley Ebrahim, Bayview Flats Resident's Association, June 9th, 2004 indicated that no community consults took place prior to 1999 while the water pricing regime was undergoing radical change.

[xvii] First reported New Focus, *Sunday Times KZN*, June 15, 2003.

[xviii] *Daily News,* March 24 2006, 'Higher water tarrifs for eThekwini residents', http://www.iol.co.za/index.php?set_id=1&click_id=13&art_id=vn20060324092606802C605221

[xix] Interview with teacher, Newlands East 14/11/06, plus others in Umlazi

[xx] 'Billions of litres of water lost annually', *Cape Times*, May 20 2003, ww.iol.co.za/index.php?set_id=1&click_id=13&art_id=vn20030520014709652C992832

[xxi] *Daily News,* August 24, 2005 www.iol.co.za/index.php?set_id=1&click_id=13&art_id=vn20050824083956428C847104

[xxii] 'Authorities step in to save KZN schools', *The Mercury,* May 16, 2003 www.iol.co.za/index.php?set_id=1&click_id=13&art_id=vn20030516011949565C340244,

'Department gets schools water running again', May 7, 2002, www.iol.co.za/index.php?set_id=1&click_id=13&art_id=ct20020507113201862E324246)

[xxiii] *Mail & Guardian*, 19 May 2006, www.mg.co.za/articlePage.aspx?articleid=272180&area=/insight/monitor/)

[xxiv] 'Development report details effects of lack of water', *Mail & Guardian*, November 9 2006, www.mg.co.za/articlePage.aspx?articleid=289507&area=/breaking_news/breaking_news__national/

[xxv] One municipal expert interviewed (Durban, 2004) noted that the Municipality 'connects more houses year after year than any other municipality despite the fact that the original bulk infrastructure was quite simplistic' It has a comprehensive plan, backed local politicians. This plan includes how much recidivism the system can withstand and commitment on the part of the Municipality more generally to 'get tough' with communities where recidivism rates spiral. In the past few years, this has led to some 'bruising encounters'. Such areas include: Inanda, Umlazi, Kawmashu, Ntuzuma (see also Desai, 2002).