THE ROLE OF RURAL WOMEN IN MITIGATING WATER SCARCITY

by

Kholisa Sigenu

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Supervisor: Prof. A. Pelser

DECLARATION

I declare that the dissertation hereby submitted by me for the fulfilment of the Masters degree in Social Sciences at the University of the Free State is my own independent work and has not previously been submitted by me at another university/faculty

I furthermore cede copyright of the dissertation in favour of the University of the Free State.

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Kholisa Sigenu
Bloemfontein
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ABSTRACT

Due to water scarcity in the world and its effect on rural women, the aim of the study was to document the strategies of rural women in Ndonga and their role in mitigating water scarcity with an aim of providing a set of recommendations. As the result of the relatively unexplored nature of women's strategies, the study was exploratory.

Firstly, the researcher confirmed that there was water scarcity in Ndonga. Through a literature search, interviews with key informants and focus group sessions with local women, the researcher discovered that women in Ndonga are vulnerable to water scarcity. What makes them susceptible to water scarcity is their status in the community. The women are left in the rural areas while men seek for work elsewhere. They also do not have proper access to water and therefore depend on natural resources. Secondly, their economic status (mostly unemployed) also makes it difficult for them to deal with stock and crop loss. Vulnerability is also due to their lack of participation in decision making.

The South African government's strategies to combat water scarcity include giving free basic water to poor households (This process is slow in rural areas like Ndonga) and to include all water users in the management of water resources. Women's local wisdom and knowledge gained through experience, cultural and ethical values should help them to create their own future. Women's strategies to cope with water scarcity are currently largely undocumented and therefore unrecognized. These strategies could, however, be a potential solution to water scarcity problems.

Strategies used by women in Ndonga have confirmed that rural women are not just victims of water scarcity but that they are able to minimize the impact of this phenomenon. The strategy of *Ubuntu* ensures that women are able to share the minimum that they have with others in order to access equipment and secure food for the family during hard times. The women have also managed to conserve water as they use micro-irrigation schemes through working together. To further ensure that there is food, the women plant and store crops. A crop such as sorghum is used to make different dishes that sustain energy.

Through communal vegetable gardens the women are able to secure some form of income for their families. However, this is still not enough money as they still struggle to afford water for non-domestic purposes. The women are also using drought resistant plants that grow naturally in the area to deal with water scarcity. Lastly, rituals, such as ***ukungqungqa***, in rural Ndonga, are seen as pivotal strategies to ensure that there is water but, as a result of deteriorating human values, such rituals might fail.

It is proposed that the authorities in Ndonga should create awareness of the looming water scarcity facing communities, to prepare them so that they are pro-active in dealing with water scarcity. Furthermore, women's participation in decision making should be strengthened by increasing the current 30 percent to 50 percent representation as women in rural areas are usually proportionally more than men. Human induced water scarcity problems, such as desiccation as a result of overstocking/overgrazing, should also be monitored and minimized. Women's income generating projects should be financially supported to ensure sustainability and empowerment. Women should also be capacitated with technical skills through their involvement in the implementation phase of community water projects, such as the installation of communal taps. Lastly, women's needs, experiences and knowledge should be documented and used in the formulation of relevant strategies in order to reduce women's vulnerability to water scarcity and to decrease its impact. This, in turn, will prevent further water degradation and environmental degradation.

Key words: rural women, water scarcity, vulnerability, decision making, coping strategies, capacity building, ***ubuntu***, food security, impact and environmental degradation.

OPSOMMING

As gevolg van ’n waterskaarste in die wêreld en die effek daarvan op landelike vrouens is die doel van hierdie studie om landelike vrouens in Ndonga se strategieë en hulle rol om die waterskaarste te versag, te dokumenteer met die doel om ’n stel aanbevelings te verskaf. As gevolg van die feit dat vrouens se strategieë relatief onbekend is, is die studie verkennend van aard.

Eerstens het die navorser bevestig dat daar ’n waterskaarste in Ndonga is. Die navorser het deur ’n literatuursoektog onderhoude met sleutelinformante en fokusgroepsessies met plaaslike vrouens bevind dat vrouens in Ndonga kwesbaar vir ’n waterskaarste is. Wat hulle gevoelig maak vir ’n waterskaarste is hulle status in die gemeenskap. Die vrouens word in die landelike gebiede agtergelaat, terwyl mans elders na werk gaan soek. Hulle het ook nie behoorlike toegang tot water nie en is dus van natuurlike hulpbronne afhanklik. Tweedens maak hulle ekonomiese status (meestal werkloos) dit ook vir hulle moeilik om vee- en oesverliese te hanteer. Hulle is ook kwesbaar omdat hulle nie aan die besluitnemingsprosesse deelneem nie.

Die Suid-Afrikaanse regering se strategieë om waterskaarste te bekamp, sluit in dat hulle gratis basiese water aan arm huishoudings voorsien (hierdie proses verloop stadig in landelike gebiede soos Ndonga) en om alle watergebruikers by die bestuur van waterhulpbronne te betrek. Vrouens se plaaslike wysheid en kennis wat hulle deur ervaring en kulturele en etiese waardes verwerf het, behoort hulle te help om hulle eie toekoms te skep. Vrouens se strategieë om waterskaarste te hanteer, is tans grootliks ongeboekstaaf en word dus nie erken nie. Hierdie strategieë sou egter ’n moontlike oplossing vir die waterskaarsteprobleme kon wees.

Die strategieë wat vrouens in Ndonga gebruik, bevestig dat landelike vrouens nie net slagoffers van ’n waterskaarste is nie, maar dat hulle in staat is om die impak van hierdie verskynsel te minimaliseer. As strategie verseker Ubuntu dat vrouens in staat is om die minimum wat hulle het met andere te deel ten einde in swaarkrytye vir die gesin toerusting te bekom en voedsel te verseker. Die vrouens het ook daarin geslaag om water te spaar aangesien hulle mikrobesproeiingskemas gebruik deur saam te werk. Om verder te verseker dat daar kos is, plant en stoor die vrouens gesaaides. ’n Gesaaide soos sorghum word gebruik om verskillende energiegewende disse te maak.

Die vrouens is in staat om deur gemeenskaplike groentetuine tog 'n mate van inkomste vir hulle gesinne te verseker. Dit is egter steeds nie genoeg geld nie, terwyl hulle worstel om water vir nie-huishoudelike gebruik te bekostig. Die vrouens gebruik ook droogtebestande plante wat natuurlik in die area groei om die waterskaarste die hoof te bied. Laastens word rituele soos ukungqungqa in die landelike Ndonga as ’n deurslaggewende strategie beskou om te verseker dat daar water is, maar as gevolg van verswakkende menslike waardes kan sulke rituele dalk misluk

Daar word voorgestel dat die owerhede in Ndonga ’n bewustheid skep van die dreigende waterskaarste wat die gemeenskappe in die gesig staar ten einde hulle voor te berei om in die hantering van die waterskaarste pro-aktief te wees. Verder behoort vrouens se deelname aan besluitnemingsprosesse versterk te word deur die huidige 30% verteenwoordiging tot ’n 50% verteenwoordiging te verhoog aangesien vrouens in landelike gebied gewoonlik in verhouding meer is as mans. Waterskaarsteprobleme wat deur mense veroorsaak word, soos uitdroging as gevolg van oorbeweiding, behoort ook gemonitor en geminimaliseer te word. Projekte waardeur vrouens ’n inkomste genereer, behoort finansieel ondersteun te word om volhoubaarheid en bemagtiging te ondersteun. Vrouens behoort ook bevoeg gemaak te word met tegniese vaardighede deurdat hulle by die implementeringsfase van gemeenskapswaterprojekte, soos die installering van gemeenskaplike krane, betrokke is.

Laastens behoort vrouens se behoeftes, ervarings en kennis gedokumenteer te word en gebruik te word in die formulering van toepaslike strategieë ten einde vrouens se kwetsbaarheid vir ’n waterskaarste te verlaag en die impak daarvan te verminder. Op sy beurt sal dit die verdere agteruitgang van water en die omgewing voorkom.

Sleutelwoorde: Landelike vroue, waterskaarste, kwesbaarheid, besluitneming, hantering strategieë, kapasiteitsbou, ubuntu, voedselsekuriteit, impak, en omgewingsdegradasie

Chapter 1

METHODOLOGICAL FRAMEWORK

1.1. INTRODUCTION

The people-environment debate has been long-running, but has developed rapidly in the last decade, moving up national and international agendas (Binns 1995: 1, WWAP, 2003: 5). Water issues in the people-environment debate were made one of the top priorities in the World Summit on Sustainable Development held in Johannesburg in 2002. This is because the world's thirst for water is likely to become one of the most pressing issues of the 21st century (WRI, 2002: 1). Water stress[1] and water scarcity are now the single greatest threat to human health, the environment, global food supply, as well as economic and social development (IDRC, 2002: 1).

Water stress and water scarcity affect many regions today and will become more pronounced as the world population reaches 9 to 11 billion (Schmandt, 2001: 1). According to the IWMI (2000: 1), it is estimated that, by 2025, 1.8 billion people will live in countries or regions with absolute water scarcity. Most of these countries are in Sub-Saharan Africa. Although these countries have high annual averages of available water per capita, many of them already, or soon will, face water stress or water scarcity conditions. South Africa is one of the countries likely to join the water scarcity ranks by 2025. People who will be mostly affected by water scarcity are those living in the remote rural areas in Africa, as nearly 1 billion rural inhabitants worldwide still lack access to water (Ravenga & Cassar, 2002: 1).

In the African context, African rural women are the first to be affected when there is water scarcity. Women in rural areas are more vulnerable than men because they are more responsible for water related duties (Sass, 2002: 1). They are responsible for both domestic and agricultural duties that require the use of water. Women also suffer because people with the lowest status

[1] See paragraph 2.2 for the definitions of water stress and water scarcity

and wealth in the social hierarchy often suffer disproportionately when water supplies are limited. When there is water scarcity, women have to travel longer distances in search of water. Sometimes, young girls who help their mothers have to drop out of school and this has some bearing on low literacy levels among women. Women are also in closer contact with polluted water or water of poor quality and are therefore more vulnerable to water-borne diseases, such as cholera, as they lack time and energy to select clean and safe water for domestic purposes (Sadie & Loots, 1998: 15; Sass, 2002: 3). What makes it more difficult for women is that during hard times their husbands migrate to seek employment elsewhere, while women depend solely on the few natural resources they have, including less food. Traditionally this was not a problem, because people would simply move to other resources of water during the dry season, but rapid population growth, more densely populated human settlements and environmental degradation are hampering this migratory lifestyle (Garden-Outlaw & Engelman, 1997:8).

To help ensure a more sustainable and productive use of water resources it is important to document the experience of women in water management and conservation. Understanding the experience of women will help to determine appropriate and sustainable interventions. Municipalities should not design plans and allocate budgets without consulting with their communities, including women. The system of local government should promote community participation in governing (Urquhart & Atkinson, 2000: 33). Rural women should therefore be given the platform to voice their concerns pertaining to matters that affect their daily livelihoods, such as their role in ensuring water security for their own communities (Kuzwayo, 2002: 13).

In more detail, the study aims at highlighting the state of freshwater resources in the world and in South Africa and how the involvement and the indigenous knowledge of rural women can help in mitigating water scarcity.

1.2. PROBLEM STATEMENT

"Humanity has reached a turning point. The world can continue with present policies, which increase poverty, hunger, sickness and illiteracy and cause the continuing deterioration of the ecosystem on

which life on Earth depends. Or it can change course towards sustainable development (Department of Environmental Affairs and Tourism, 1998: 3)."

At the United Nations Conference on Environment and Development (UNCED) – known as the Earth Summit - held in Rio de Janeiro in 1992, it became apparent that nations should change their policies, which considered development as purely economic development and neglected the integration of economic, social and environmental development. To make it easier for the nations to change their policies, 27 principles were adopted in the Rio Declaration, which defines the rights and responsibility of nations as they pursue human development and well-being (Hoppers, 2002: 5). About six of the chapters developed during the Summit emphasized the importance of taking due account of those who depend on natural resources for livelihoods by facilitating the active involvement and participation of all concerned, particularly communities at local level. They also encouraged full participation of indigenous people, especially in rural areas, and lastly they encouraged the involvement of women in all decision-making.

One of the reasons for a need for a change in conventional development policies, was environmental degradation. Environmental degradation has resulted, inter alia, in the degradation of natural resources and the increased impoverishment of rural communities. Water is one such resource that has been seriously degraded and exploited, resulting in water scarcity and stress in many regions of the world. According to the World Resource Institute (WRI, 2002: 2), the water situation will get worse over the next 30 years. As a result of climate change, increased demand for water resources, drought, pollution, poverty and population increase,[2] water is becoming scarcer and this means an increased burden on rural women (UNFPA, 2001: 5; WRI, 2002: 2).

According to the WRI (2002: 2), the projected increase in water scarcity will mostly occur in developing countries, where population growth, poverty, industrial and agricultural expansion will be greatest. On the other hand, per capita consumption continues to rise in the developed countries as well. In developing countries accelerating pollution of usable water supplies, especially in rapidly urbanizing areas, has also aggravated water scarcity. In addition, in developing countries, 90-95 percent of sewage and 70 percent of industrial waste are dumped untreated into surface water, polluting the water supply (UNFPA, 2001: 5).

Leonard (2003: 3) argues that Africa's water supply is currently the most vulnerable in the world. Although Africa appears to be endowed with abundant water resources, the water is unevenly distributed. While there are parts like Central Africa and the Congo region where there

[2] See causes of water scarcity in Chapter 3

is abundant water, there are sub-regions and countries in Africa that are experiencing water scarcity. Northern African countries are already experiencing water scarcity. Although sub-Saharan African countries have a high annual average of available water per capita, some of them already, or soon will, face water stress or scarcity conditions as well (Ambala: 2002: 1).

According to the Southern African Regional Poverty Network (SARPN, 2002: 1), water scarcity can be detrimental to Africa's development as water is seen as vital in all forms of development. African countries have come together and formed a partnership, The New Partnership for Africa's Development (NEPAD) (SARPN, 2002: 1), which provides a platform for a comprehensive integrated development plan. This development plan is designed to address key social, economic, and political priorities in a coherent and balanced manner. This initiative depends upon the extent to which Africa's human, economic, technological and natural resources can be applied to this new vision. Water can therefore play an important part in this development. The SARPN (2002: 4) argues that water issues that should be looked at if sustainable development is to be achieved, should include the following: energy, transport, agriculture, access to markets of developing countries, water and sanitation, integrated water resource management, management of shared river basins, disasters such as floods and droughts, climate change, water supply and sanitation services, poverty reduction, health, and environmental initiation.

South Africa is already facing water shortages in many areas. It is also one of the African countries that is expected to have water scarcity problems by 2025 (de la Harpe, 1998: 7; Pelser, 2004: 191). South Africa contains large areas of arid and semi-arid land, with most water under private ownership and control, and a rapidly growing demand for water from a large urban population. The urban population has higher expectations regarding water supplies than in the past (Population Action International, 2003: 3).

Supply and management of water have contributed largely to water scarcity in South Africa. Prior to the 1994 elections, the South African government had neither the jurisdiction to, nor interest in, serving the homelands. The old Water Act that was drafted in 1965 ensured that water was mostly used by a small dominant group that had privileged access to land and economic power (de la Harpe, 1998: 9; Higham, 1998:2). Rural South Africans had to survive with the supply of available water from natural resources.

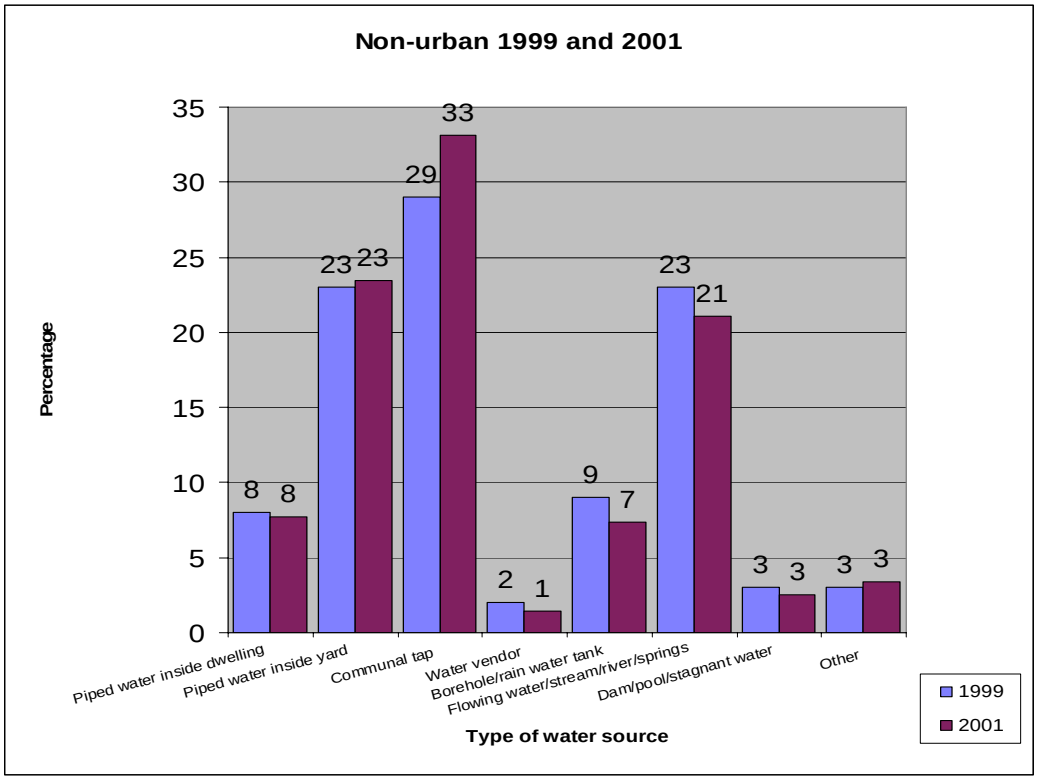

Figure 1.1: Household water sources in South Africa 1999 and 2001
Source: South African Institute of Race Relations (2000: 153), Statistics South Africa (2003)

Figure 1.1 shows that, in 1999, non-urban (including semi-urban) areas had only 8 percent piped water at home, and an additional 23 percent on the property. Most rural people used water piped from outside their property (29 percent), from rivers or streams (23 percent), and from boreholes (9 percent), thus often having to travel long distances. Water was therefore located outside the property for over three-quarters of the population. Of this majority, 39 percent had to walk more than 200 metres for water access. This translates into roughly 30 percent of rural inhabitants whose conditions did not meet at least one of the RDP guidelines[3] for access to water. When water is obtained over such distances it usually takes up to an hour to fetch, with 33 percent of rural women (39 percent in the rural areas) taking 30-60 minutes, and 11 percent (14 percent in the rural areas) more than an hour. Almost half of the population in rural areas (48 percent, and 22 percent overall) also reported that the supply of water is not always sufficient for their needs. This compares poorly with the smaller urban areas where only 11 percent suffer from shortages, and the metropolitan areas where the figure is 9 percent. During natural disasters such as drought, which causes water scarcity, populations in urban areas suffer less impact than the rural population who do not have an adequate water supply (CASE, 1998: 2).

[3] Water resources should be less than 200 metres within reach.

In 2000, the current democratic government promised to the poor the delivery of 6000 litres of free basic water per household per month. This would supply a household of eight with 25 litres of free water at government target levels and a household of four with 50 litres per person per day, as recommended by the World Health Organisation (DWAF, 2001: 21). In 2002, this programme had reached an estimated 27 million people with 239 municipalities implementing the scheme. Despite this success 12 million people were not able to access this water, as their municipalities had not started the scheme. The reason for this was cited as being lack of capacity and management systems and in some rural areas, financial constraints. Seven million mainly rural South Africans did not receive the water because there was no infrastructure for the supply of water. Figure 1.1 shows that in 2001 there was no difference in the number of people receiving water inside the yard. However, there was a 4 percent increase in the number of people who sourced their water from a public tap. This meant a decrease in the number of people receiving water from the water vendors, boreholes and water tanks and from flowing water (rivers and springs).

Only 45% percent of the people in the Eastern Cape were able to access this free basic water. The Eastern Cape is one of the poorest of South Africa's nine provinces, with a predominantly rural population, high unemployment, and poor access to social services (Mehta & Ntshona, 2004: 9). Mehta & Ntshona (2004: 9) also argue that the free basic water policy is difficult to implement in rural areas and as a result these areas encounter a massive backlog. On top of these managerial problems, the Eastern Cape's summer rainfall is expected to decrease by 25 percent as a result of climate change and water demand is expected to increase due to urbanization (DEAT, 2002: 60).

The old Water Act in South Africa did not only ensure that water was used by a small dominant group but also took an authoritarian (undemocratic), centralized approach. Government made all the decisions concerning water issues (de la Harpe, 1998: 9). The National Water Act (Act No. 36 of 1998) changed this approach. The present government realized that, without public participation, the goals of water resource management could not be achieved. The National Water Act provides for the progressive establishment of local committees. The Minister of Catchment Management Agencies establishes these committees. The purpose of establishing the committees is to delegate water resource management to the regional or catchment level and to involve local communities, within the framework of the national water resource strategy established in terms of Chapter 2. This Water Act thus promotes the management of water resources at the lowest level. It facilitates the involvement of communities and other stakeholders

in decision-making. This approach is in line with international trends towards integrated water resource management (de la Harpe. 1998: 9).

It has been widely demonstrated that the effective management of water resources for economic and social development as well as for environmental protection, requires an integrated approach (DWAF, 2001: 14). To achieve this, appropriate management approaches have to be developed at a number of levels, starting locally with water users (civil society, women, the youth), moving to catchment level, and then to national and regional level. The participation of those who depend on natural resources for livelihoods can therefore assist in ensuring sustainable development (SARPN, 2002: 7). Including rural women in this integrated approach is important. Before the 1994 election of a democratic government in South Africa, rural communities evolved a holistic, traditional scientific knowledge of their land and natural resources. Their ability to practise sustainable development of natural resources has been limited by economic, social and historic factors. Women in particular are seen to have considerable knowledge and experience in managing and conserving natural resources as they are left in rural areas to fend for themselves while their fathers, brothers and husbands go to big cities in search of work. However, the role of women in achieving sustainable development has been limited by such barriers as discrimination and lack of access to schooling, land and unequal employment (DEAT, 1998: 49). For many years South African women had also carried the brunt of non-existent or poor water services and hence are key stakeholders in the water sector. Their needs and responsibilities also differ from those of men in relation to water services.

The world is therefore in search of a new human-centred vision for development. All agencies and players at alternative levels of policy formulation are seeking to promote paradigms of sustainable human development and innovation that build on knowledge resources and insights existing in communities (de la Harpe, 1998: 9; Hoppers, 2002:5; Urquhart & Atkinson, 2000: 19). A human-centred vision is important because, despite a drive to provide and manage water and sanitation in rural communities, there are reports of project failure.

According to Hemson (2002: 25), a central issue to be considered in the failure of water projects is women's non-participation in the design, planning, implementation and management of such projects. Water projects have traditionally been a male dominated process. This is regardless of the fact that women are primarily responsible for ensuring a supply of water to the family and are also responsible for many other water related duties. Women in rural communities have directly depended on natural resources (including water resources) all their lives, and

therefore would a have better understanding of and their own perceptions about natural resources.

Despite the fact that women are knowledgeable about water resources, they remain largely uninvolved at some levels of policy formulation and decision-making and monitoring of water resources. The question of how the low level of women's participation affects the longer-term sustainability of water is a complex one. The argument is that water programmes would be more sustainable if those, whose lives are most affected, were in control of them (Hemson, 2002: 25). Another argument has shown that even when women occupy positions of some authority, their participation and decision-making appears to be subordinate to male authority in practice (Hemson, 2002: 27). This limited participation in decision-making means that women's perspectives, needs, knowledge and proposed solutions are often ignored. Sustainable development will be an illusive goal unless women's contribution to water management, including mitigating water scarcity, is recognized and supported. Involvement of women at all levels of water management and in policy formation can therefore help to mobilize the potential of water for development and ensure that water does not become a constraint to sustainable development.

1.3. RESEARCH AIMS AND OBJECTIVES

The broad aim of this study was to document the experiences and strategies that have been used by rural women in Ndonga (Eastern Cape, South Africa) when they experienced water scarcity, with the intention of sharing their experiences with local authorities and presenting a set of recommendations for improving their situation. This will help in building on and improving local strategies for sustainable development in rural areas.

In order to achieve the broad aim the specific objectives were:

- to document historical events of drought/water scarcity in South Africa and in the Eastern Cape in particular;
- to document women's cultural, political and economical roles in mitigating water scarcity;
- to assess the extent to which women in Ndonga participate in decision-making concerning water resources by identifying their role in water conservation;
- to identify the positive and negative impacts of existing water infrastructures on women in Ndonga having access to water;

- to generate alternative ideas from the women in maintaining sustainable water availability and supply for the villages in Ndonga;
- to produce a set of recommendations that will empower rural women's role in mitigating water scarcity.

1.4. RESEARCH DESIGN

The researcher, with the help of Mr. L. Ndaba (Department of Agriculture and Land Affairs in Queenstown) and Mr. S.K. Fudumele (Councilor of Ward 6 in the Emalahleni Municipality), identified the Ndonga area in Lady Frere in the Eastern Cape province as a proper site for the study (See Annexure A). Lady Frere's water supply is currently poor. Most wards do not have access to formal water supply. Most people are drawing water directly from service reservoirs supplied by boreholes or from natural water resources (rivers and springs). Some of these resources are not working or are inadequate (Emalahleni Municipality, 2003: 20).

The target group for this study comprised women residing in Ndonga. The researcher targeted women because the study's aim was to establish the role of these women in mitigating water scarcity. Understanding their role was important because of several reasons. Firstly, Emalahleni Municipality (and most rural areas in the Eastern Cape) consists of significantly more women (55 percent) than men (45 percent) (Emalahleni Municipality, 2003: 20). Secondly, the women are also still largely responsible for domestic water and they collect their water from untreated water supplies. Thirdly, most black women in rural African countries are also functionally illiterate and not open to outsiders. As a result they find it difficult to voice their opinions when they are in a setting with their male counterparts (Hemson, 2002: 25). The last two facts have also prompted the researcher to use an ethnographic research design. This type of design allows the researcher to observe the participants instead of the participants having to read or write, as is the case with surveys and other quantitative designs. It allows the researcher to be in the natural field setting and therefore have an in-depth insight of the rural women's situation. However, being in the natural setting also resulted in the possibility of bias by the researcher. The researcher opted for a participant observation study, which provided an in-depth description of the role of women in mitigating water scarcity in the chosen area.

1.5. RESEARCH METHODOLOGY

A multi-disciplinary approach was used in this study. In order to identify, assess and achieve the research objectives, the researcher conducted:

- a literature review;
- face-to-face interviews with key informants and officials in the water sector in the Chris Hani and Emalahleni Municipalities;
- focus group sessions with a selected number of local women, and
- an interactive workshop with all women in the community.

According to Mouton (2001: 148) in order for the researcher to capture the essence of the descriptions rooted in the life-worlds of participants and produce insider perspective of the actors and their practices, it is best to use qualitative methods. By utilizing a qualitative approach, an attempt was made to understand the experiences of rural women faced with harsh conditions as a result of water scarcity. Their complexities, richness in knowledge and diversity of their lives could only be captured by describing what really goes on in their everyday lives.[4]

1.5.1. SAMPLING

According to Babbie (2004: 166) many research situations often make it inappropriate for a researcher to use probability sampling, which is considered as the most scientific and most reliable form of sampling. In these instances non-probability sampling becomes the most appropriate form of sampling.

The researcher commenced off by selecting the Eastern Cape, especially the Chris Hani Municipality, as the area of interest. This was because of her familiarity with the area. As mentioned above, with the help of the Dept of Agriculture and Land Affairs and Mr SK Fudumele, Ndonga, in Emalahleni Municipality, was chosen for the study as an appropriate site. It is important to note that Ndonga is a rural settlement in the former Transkei homeland; it consists mainly of female-headed households and is also characterised by poor socio-economic conditions. These conditions are exacerbated by climate change, poor access to social services and reduction in water resources during droughts (Emalahleni Municipality, 2003: 17). These conditions, together with the culture of this area, determine the role and experiences of Ndonga women. Their roles, problems and experiences are documented below and serve as a

[4] The sample profile is discussed in more detail in paragraph 4.2.

demonstration of the impact of access to water for rural women and the role that rural women can play in mitigating water scarcity

Despite the fact that the Ndonga area had nine villages of about 320 to 3368 members each in 2003, the women for the focus groups were selected from only three of these villages. The researcher opted for Percy, Hala2 and Ntlalontle as the three villages for this particular study. The villages were conveniently sampled, considering that their water supplies differed significantly. Each of the villages had certain characteristics that are worth mentioning.

Table 4.2 below shows that in 2002 *Percy* had a population of 2 520 members. They got their water supply from a borehole, a 1 x 275kl reservoir and 26 communal standpipes. These standpipes meet RDP standards.

On the other hand, *Ntlalontle* had a population of 3 000 members. This population is larger than that of Percy but they received their water supply from a borehole and 6 communal pipes.

The last village, in *Hala2,* had a population of 2 850 people. Their water supply is dependent on a spring. This spring has poor quality water and is below the RDP standard.

Table 1.1: Status of water supply in the three chosen sites

Village name	Population	Existing water supply	Current water projects
Hala2	2 850	The main water source is a spring.	Construction of a 1x245kl reservoir and a 1x410kl reservoir with the main water source being a spring. The installation of 697 yard taps
Ntlalontle	3 000	The main water source is a borehole.	Reticulation from a 410kl reservoir at Hala2. The installation of 6 communal standpipes
Percy	2 520	Bulk rural water supply (meeting RDP standards), 1x275kl reservoir and a borehole	N/A

Source: DWAF (2002: 6)

The next paragraph discusses in further detail the manner in which data was collected. In the discussions of the in-depth interviews and the focus groups, the researcher further discusses the sampling methods used.

1.5.2. DATA COLLECTION

Firstly, the researcher conducted a literature study. In addition, the researcher used both in-depth personal interviews and focus group sessions to collect data. The interviews and focus groups were chosen because these methods ensure easy accessibility to the villagers. Mr. S. K

Fudumele, who is the local councillor of ward 6, helped the researcher by organizing the relevant participants for the focus group. In both in-depth interviews and focus groups the researcher assured the participants of anonymity and none of the participants were coerced into participating. Instead they saw this study as a "chance to help improve their livelihoods".

⊙ LITERATURE REVIEW

The researcher conducted a study of relevant sources concerning water scarcity in the world, in Africa and in South Africa. These sources on water scarcity were consulted in conjunction with sources concerning the role of women in water resource management. The sources were consulted in order to understand problems under investigation and to realize the extent of the work already covered, concerning the problem. Sources used included books, newspapers, journals, reports and official documents from the Department of Water Affairs and Forestry and the Department of Environmental Affairs and Tourism.

⊙ PERSONAL INTERVIEWS

The interviews were conducted with a technical official and four ward councillors, three of whom were women. The ward councillors were purposefully selected from a list obtained from the Emalahleni Municipality. One key informant from Amanz' Abantu consortium was also interviewed. This consortium is acting as a Programme Implementation Agent (PIA), to develop water and sanitation services in rural areas in the Eastern Cape Province. This was a purposeful sample because the researcher identified key informants (See Annexure B) concerning water issues for an in-depth investigation (Neuman, 1997: 206).

The researcher did not experience many problems in securing appointments with the respondents as she met the respondents at their preferred venues. The only problem encountered was that the respondents were scattered all over the Municipal area. This cost the researcher more time in trying to schedule the appointments (See annexure C).

According to Mouton (2001: 197), personal interviews focus on the norms, values, perceptions and the beliefs of indigenous people which are often taken for granted. This method was mainly used to collect data that would help in structuring questions for the focus groups. The findings in the interviews therefore helped the researcher in identifying central themes and issues that informed the contents of the focus group. The interviewees also elaborated more on the socio-economic and socio-cultural impact of water scarcity and informed the researcher of women's

involvement in decision making in this area. During these interviews the researcher spent most of the time listening rather than posing detailed and focused questions.

The researcher used a tape recorder to capture the responses of the interviewees. Issues that were raised by these key informants included the following;

- The importance of working together as communities;
- The inclusion of women in decision making;
- The participation of women in water related meeting and committees
- Strategies to encourage women to participate more;
- The role government can play in integrating women into water issues;
- What women can do to assist government with water conservation;
- The impact of water infrastructure on women

⦿ Focus groups

Focus groups comprised one group of women from each of the three selected villages, thus three groups in total. There were 12-15 participants in each group (See Annexure D). The groups comprised women only because, as Hemson (2002: 27) has established, women's participation and decision making appear to be subordinate to male authority. The researcher wanted the women to talk openly about their situation without being intimidated by the presence of men. Women tend to be subdued when around men as men are seen as superior than the women (Lubisi, 1997: 325).

Mr S.K. Fudumele, who is familiar with the area, purposefully selected women for the focus groups from the three villages. He mostly chose women who were involved in community vegetable gardens and who were prominent in their respective villages. The focus groups were used in order to obtain women's opinions on a deeper level in order to identify issues to explore further the perceptions of the villagers about drought and water scarcity. The topics (See Annexure E) they discussed were an extension of what was already said by the key informants. Focus groups also elicited more response from the participants and they allowed the researcher to identify disagreements on relevant issues concerning perceptions of drought/water scarcity.

During the discussion, the researcher offered the participants some refreshments, to help relax them and to encourage further discussions.

1.5.3. DATA ANALYSIS

All the interviews and focus group discussions were recorded using an audio tape recorder. The first step in analysing both the focus group data and the interviews was to transcribe the contents of the sessions. The researcher then had an interactive feedback workshop with all participants on all the findings. Some of the recommendations in the study are based on the outcomes and inputs of participants in the interactive workshops.

1.6. STUDY FRAMEWORK

This study consists of five chapters focusing on the following:

Chapter 1 Introduction and Methodological framework

Chapter 2 Water stress and water scarcity in the world

Chapter 3 Rural women and the management of water resources

Chapter 4 Water scarcity, vulnerability and resulting strategies: the case of Ndonga women

Chapter 5 Conclusion and recommendations

1.7. THE VALUE OF THIS STUDY

This study would be of great value to people interested in mitigating water scarcity. More importantly, it will encourage the involvement of women in participating in their community and realizing their role and value because of their knowledge of their environment and their sharing of traditional knowledge about strategies used during times of water scarcity.

What has prompted this study is the awareness of the looming water crisis in the world and the fact that women will be vulnerable to this crisis. The next two chapters will thus discuss the issues of water scarcity and the current situation in terms of involvement and vulnerability of women to water scarcity.

Chapter 2

THE LOOMING FRESH WATER CRISIS IN THE WORLD

2.1. INTRODUCTION

Water is the source of life and a basic human right. While this is the case, since the beginning of the twentieth century, the Earth, with its diverse and abundant life forms, including over six billion humans, has been facing a serious water crisis (WWAP, 2003: 4).

Water covers about 70 percent of the earth; of that more than 1,4 million km³ (2.5 percent) is freshwater. But only 0.5 percent is accessible groundwater or surface water that plants, land animals and freshwater birds and humans can use (UNFPA, 2001: 11). Less water is accessible because much of the water resources fall as rain too far from human settlements, runs to the oceans in floods or is trapped as icebergs. Although the amount of freshwater remains about the same from year to year, it is continually renewed through the water cycle, which is powered by solar energy and the earth's gravity. No new water enters the cycle and no water ever leaves the cycle. The supply of water is essentially fixed, and the balance between humanity's demands and the availability of quality water is already precarious. Water may therefore be the resource that defines the limits of sustainable development (UNFPA, 2001: 4). The future of the world depends on the use (domestic, agricultural and industrial) and management of this finite and vulnerable resource (National Population Unit, 2000: 33).

Worldwide, 54 percent of the annual available freshwater is being used. If consumption per person remains steady, by 2025 we could be using 70 percent of the total because of population growth alone (Engelman et al., 2002: 132; UNFPA, 2001: 5). Water use and demand can be affected by change in the demographic variables of a country's population, i.e. changes in the size, growth, structure and distribution of a population. In its turn, the impact of these demographic variables on water resources depends on the specific lifestyle of the population, or

differences in lifestyle between various sectors of the population (Pelser, 2004: 173). During the period 1990-2000, global population increased by 15 percent (from 5.27 to 6.06 billion). Population growth in Africa alone was almost double the global average (Ashford, 2004: 10). This has meant that an estimated 620 million additional people increased the pressure on available water resources by 2000. According to WHO/UNICEF (2000: 7), extraordinary work was done in the water sector to serve an ever-increasing population. However, despite all the efforts made and the results achieved, there remains a backlog of 1.1 billion people worldwide without access to improved water supply.

The availability of water also varies considerably within countries and the situation is further complicated by frequent droughts as well as inappropriate water management programmes (Ambala, 2002: 1). According to the WRI (2002: 1), much of the projected increase in water demand will occur in developing countries, where population growth, as well as industrial and agricultural expansion, will be greatest. However, per capita consumption continues to rise in the developed countries as well.

As a result most African countries are experiencing water stress, water shortage or water scarcity. Many others will soon face water stress or water scarcity conditions. In most countries in sub-Saharan Africa water is unevenly distributed although these countries have high annual averages of available water per capita (Winpenny, 1999: 2). Table 2.1 shows some of the countries in sub-Saharan Africa that are projected to encounter water scarcity problems by 2025. South Africa is one of these countries.

Table 2.1: Projected water-scarce and water-stressed countries of sub-Saharan Africa in 2025

Water-scarce countries (less than 1000 m³/capita)	Water-stressed countries (1000 – 1700 m³/capita)
Burundi (269)	Burkina Faso (1 237)
Cape Verde (258)	Ghana (1 395)
Comoros (620)	Lesotho (1 057)
Djibouti (9)	Madagascar (1 185)
Ethiopia (842)	Mauritius (1 575)
Kenya (235)	Mozambique (1 598)
Malawi (361)	Nigeria (1 078)
Rwanda (306)	Tanzania (1 025)
Somalia (363)	Togo (1 280)
South Africa (683)	Uganda (1 437)
	Zimbabwe (1 005)

Source: Pelser (2001)

Aggravating the problem is the underdevelopment of water infrastructure in many countries, which means that there are great regional differences between the availability and use of water. The quality of water, especially for rural villagers, is a cause for concern and a public health hazard (UNFPA, 2001: 12).

Amidst all these problems, the latter part of the twentieth century up to the present has been an era of large world conferences[5] that are trying to deal with the water crisis. The rest of the chapter focuses on the looming water crisis in the world. Firstly, however, the concepts "water shortage", "water stress" and "water scarcity" are clarified. The researcher then discusses the causes of water scarcity and will also give an idea as to who is vulnerable to water scarcity. Lastly, issues raised at international conferences that have led to the awareness of water scarcity are discussed, and the recommendations already made for the way forward are examined.

2.2. DEFINING WATER STRESS, WATER SCARCITY AND WATER SHORTAGE

Water stress and water scarcity affect many countries today and will become more evident as the world's population reaches 9 – 11 billion by 2050 (Schmandt, 2001: 1). Worldwide, the demand for water is growing rapidly, and in many countries the cost of developing new supplies is becoming prohibitive. Simultaneously, increasing water pollution is worsening the imbalance between water supply and demand. As a result water stress and water scarcity are affecting many regions today.

The popular usage of "water scarcity" explains a situation in which there is insufficient water to satisfy normal requirements. However, Winpenny (1999: 1) is of the opinion that this common definition is of little use to policy makers and planners as there are degrees of scarcity – absolute, life-threatening, seasonal, temporary, cyclical, etc. Terms such as water scarcity, shortage and stress can be used interchangeably, making it difficult to define these terms. On the other hand it is important to analyse them in order to allow comparison between different countries and regions. Pelser (2001: 14) argues that there are three categories of water availability that are commonly used.

The first category refers to water abundance. This category is applied to countries with more than 1 700m³ of water available per capita per year for all human needs (household use, food production and other economic activities). The second category consists of countries with water stress. These are the countries with fresh water resources of 1 000 to 1 700m³ per capita per

[5] See paragraph 2.7

year and these countries often have major problems occurring in drought years. Water stress is also seen as a symptom of water scarcity or shortage (Schmandt, 2001:1; Winpenny, 1999:1). In the same category are countries that are considered water scarce, with internal renewable water resources of less than 1 000 m^3 per capita per year (Engelman, et al. 2002:132; Winpenny, 1999: 1). Water scarcity is also defined as an imbalance of supply and demand under prevailing institutional arrangements and/or prices or as excessive demand over available supply potentials which are difficult or costly to tap. The last category consists of countries with water supplies that drop below 500m^3 per person per year. This situation is often referred to as absolute scarcity or water shortage. These countries have low levels of water supply relative to minimum levels necessary, or its reciprocal, namely, the number of people dependent on each unit of water.

Most figures say nothing about the quality of the water provided, although as a general rule, the scarcer the water becomes, the more likely it is to be polluted due to the increasing pressure on each bucketful to serve human needs (Engelman, et al. 2002:132). Researchers have also noted that water scarcity is crossing national boundaries via the international grain trade. What this means is that, in an increasingly integrated global economy, water scarcity – traditionally a local issue – is quickly becoming an international issue (Brown, 2000: 12).

2.3. EXTENT OF WATER SCARCITY IN THE WORLD

The WRI (2002: 2) has argued that, globally, water supplies are abundant, but they are unevenly distributed among and within countries. In some countries water supplies are literally shrinking and groundwater reserves are being depleted faster than they can be replenished by precipitation. This situation has already caused serious water shortages to develop in some regions. Engelman, et al. (2002: 134) are of the opinion that the pressure on water supplies hampers efforts to reduce the number of people who lack access to safe water. In turn, lack of supply and distribution services are responsible for an estimated four million deaths annually, mostly of infants and young children,[6] and this is a hindrance to sustainable development.

Growing shortages of fresh water are leading to tension along the many rivers shared by nations. Some of these rivers include the Nile, the Danube, the Tigris and Euphrates, and the Ganges. These rivers were once thought to be providing more than enough water for all. But under today's economic and demographic conditions, development of water resources by upstream countries reduces levels downstream (Engelman, et al., 2002: 133).

[6] Note: paragraph 2.3 is an overview of water scarcity in the world and does not include an overview of the causes of water scarcity. These causes are discussed in paragraph 2.5

Given the need of all human beings for water, not to mention those of a million other species who inhabit water bodies, the global water situation is expected to become considerably worse over the next 30 years, without major improvements in the way water is allocated and used.

In the year 2000, 508 million people were living in 31 water stressed or water scarce countries, and it is estimated that by 2025, between 2.4 and 4.2 billion people (over 45 percent of the global total) will be living in countries that cannot meet the requirement of 50 litres of water per person per day to meet basic human needs (UNFPA, 2001: 12). Table 2.2 demonstrates some of the countries that are water scarce and those that are projected to have water scarcity problems by 2025.

Table 2.2: Countries experiencing water scarcity in 1955, 1990 and 2025 (projected), based on availability of less than 1,000 cubic meters of renewable water per person per year

Water scarce countries in 1955	Countries added to scarcity category by 1990	Countries added to scarcity category by 2025 under all UN population growth projections	Countries added to scarcity category by 2025 only if they follow the UN medium or high projections
Malta	Qatar	Libya	Cyprus
Djibouti	Saudi Arabia	Oman	Zimbabwe
Barbados	United Arab	Egypt	Tanzania
Singapore	Israel	South Africa	Peru
	Kenya	Iran	
	Rwanda	Ethiopia	
	Burundi	Haiti	

Source: PAI, 2002

According to Engelman, et al. (2002: 133), affluent and developed countries rarely experience water scarcity. On the other hand, when water is scarce, the poor tend to suffer the most. The poor are mainly constituted of rural inhabitants in the developing world. People of the Middle East, North Eastern and Southern Africa and of Southern Asia will be especially vulnerable.

Leonard (2003: 3) considers Africa's water supply as currently the most vulnerable in the world. While Africa uses about 4% of its renewable freshwater resources and some countries have abundant lakes and rivers, countries in arid regions are already dependent on their groundwater reserves. 14 African countries are already subject to water stress and scarcity, and a further 11 will join them by 2025. Today, countries in the Middle East and North Africa are most seriously affected by water scarcity, but sub-Saharan African countries will join them over the next half-century. In 2000, only 62 percent of people in Africa had access to safe water. Furthermore, people in urban areas often have better access to water than those residing in rural areas. In 2000, 85 percent of the population in urban areas had access to water in comparison with 47 percent in rural areas. What is more is that the demand for water is expected to grow by

at least three per cent annually until 2020 (National Population Unit, 2000: 18; UNFPA, 2001: 24; World Global Trends, 2005: 4). Different continents and countries are and will without doubt experience water scarcity differently. In addition, people in different social structures in one country may experience water scarcity differently.

2.4. VULNERABILITY TO WATER SCARCITY: THE SOCIAL STRATIFICATION FACTOR

According to Pelser (2001: 21), social vulnerability to water scarcity varies not only by regions, but by social group as well. Vulnerability is defined as an aggregate measure of human welfare that integrates environmental, social, economic and political exposure to a range of potentially harmful threats (Leonard, 2003: 3).

In virtually every country, socio-economic factors greatly influence access to water. People with the lowest status and wealth in the social hierarchy, often suffer disproportionately when water supplies are limited. It is therefore very important to look at the most vulnerable and where they are located (Pelser, 2001: 21). Except for the fact that Africa's water supply is currently the most vulnerable in the world, there are also specific categories of vulnerable people and social sectors. These vary between cultures and environments. These categories may differentiate between at least three social levels of particular vulnerability: (i) individual level; (ii) household level (rural areas), and household level (urban areas). For the purpose of this study only the first two levels are briefly discussed.

2.4.1. INDIVIDUAL LEVEL

According to Pelser (2001: 21), specific individual characteristics enhance the vulnerability of people to water scarcity. These characteristics include the following:

- Women, and particularly those with special nutritional needs during and after pregnancy;
- Children, especially those who are less resilient in terms of nutrition or who are already malnourished;
- The elderly, who may suffer from lack of mobility and less mental awareness;
- Disabled and disease-stricken people, who have special needs and require personal assistance and care for survival.

In developing countries, women and children, especially girls, are the most vulnerable to water scarcity. This is because they are generally the ones responsible for almost all water related duties in the households and they often have to travel long distances for collection of the

resource. They are also vulnerable because they constitute a higher percentage of people in rural areas (Onyango, 2003: 1; UNFPA: 2001: 12)[7]

2.4.2. HOUSEHOLD LEVEL: RURAL AREAS

At the household level, vulnerability is likely to be determined by socio-economic status and means of securing a livelihood. About 1.1 billion people do not have access to clean water and these shortcomings are often pronounced in rural areas, where 29 percent of residents lack access to clean water (National Population Unit, 2001: 4). There are at least four categories of vulnerable households in rural areas. These are:

- Smallholder farmers, who may be resource poor with limited access to land, on marginal lands, and with varying degrees of access to financial and development assistance. Although this is the case these people depend on these unavailable resources (Sass, 2002: 2)
- Pastoralists, who are ill-equipped to access development resources, yet operate in regions with pronounced climate hazards.
- Landless labourers, who rely on temporary employment and are often on the verge of poverty, with little ability to accumulate savings and invest in more productive and sustainable activities. In general the rural landless are women and they are typically more sensitive to food shortage.
- Destitute people, who are often forced out of economic activities because of ill health, retrenchment and other causes. They are often ill-equipped in terms of dealing with natural disasters.

In sub-Saharan Africa, rural people are the most vulnerable to water scarcity as a result of prolonged droughts. Approximately 75 percent of the population in African countries is rural, the majority of whom are small farmers (Pelser, 2001: 24). These farmers are largely poor and illiterate, and at the mercy of harvest failure. The rural poor of sub-Saharan Africa are therefore people who have no real security against adversity occasioned by water scarcities.

[7] See paragraph 3.4 for the impact of water scarcity on rural women

2.5. THE CAUSES OF WATER SCARCITY

The future of the world depends on the use we make of fresh water today. For decades water has been used for public and domestic needs, industrial production and agriculture (irrigation). Worldwide water use has tripled over the last half-century, with 54 percent of the annual available fresh water being used (Brown, 2000: 1). If consumption per person remains steady, by 2025, 70 percent of the total could be used because of population growth alone. If per capita consumption everywhere reached the level of more developed countries we could be using 90 percent of available water by 2025. Such predictions assume no change in the efficiency of water use. It has been estimated, however, that relatively low-cost technologies could double agricultural productivity per unit of available water (UNFPA, 2001: 11).

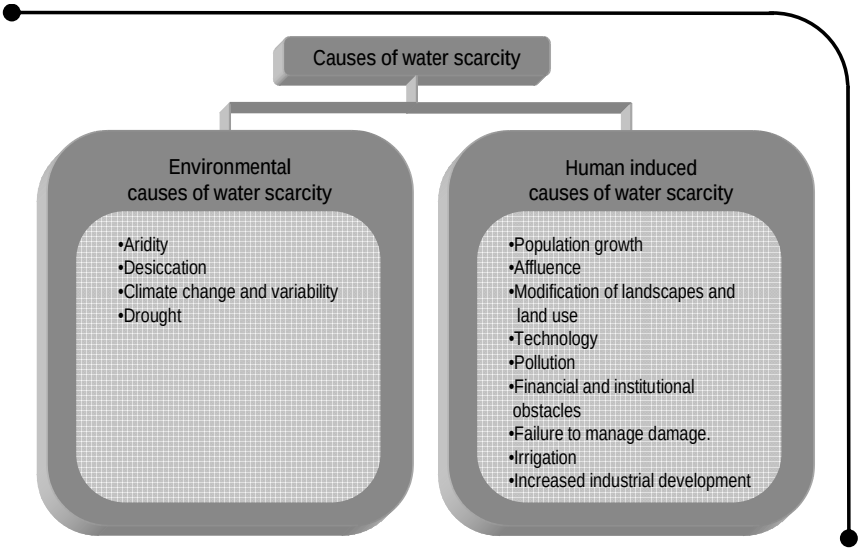

Figure 2.1: Causes of water scarcity

According to Brown (2000: 1), 70 percent of all the water withdrawn from rivers or from underground sources is used for irrigation, 20 percent is used by industry and 10 percent for residential purposes. There are discrepancies in the manner in which water is used in different countries. The discrepancies are more evident if one compares the developing and the developed countries. This difference in water use results in different ways in which these countries contribute to water scarcity. Furthermore, many countries use unsustainable means to meet their water needs (UNFPA, 2001: 13). The manner in which water is utilised can therefore either sustain or further deplete water resources.

According to Winpenny (1999: 2), some causes of water scarcity are natural (environmental) while others are human induced (physical), meaning that the impact of natural processes can be aggravated by human responses. Tyler and Miller (1996: 458) identify four natural causes of

water scarcity. These are aridity, drought, desiccation and water stress. Climate change and variability are also classified as environmental causes of water scarcity.

In contrast to the views of Tylor and Miller (1996: 458), Spillman (2003: 1) and Winpenny (1999: 2) explain the causes of water scarcity in terms of human behaviour that can modify the physical environment in a way that makes useful water scarcer. These causes include: growth in population numbers and incomes, affluence (consumption per person), technology (impact per consumption), modification of landscapes and land use, contamination of existing water supplies, financial and institutional obstacles, and failure to manage damage.

Although the causes of water scarcity are seen to be either natural or human induced, discussions below will show that these causes are interrelated.

2.5.1. ENVIRONMENTAL CAUSES OF WATER SCARCITY

Environmental causes of water scarcity are sometimes termed natural causes. As already mentioned, classified under natural causes of water scarcity are aridity, drought, desiccation and, water stress, climate change and variability. Tylor and Miller (1996: 458) define aridity as a normal, long-term shortage of water caused by a dry climate. Africa, the Middle East and Southern Asia are examples of countries with arid and semi-arid areas. Drought, on the other hand, is defined as a period in which precipitation is much lower and evaporation is higher than normal. At least 80 arid and semi-arid countries, in which nearly 40 percent of which the people live, experience long drought years (Tylor and Miller, 1996: 458). Desiccation is defined as a dry up of the soil because of such activities as deforestation and overgrazing by livestock. Finally, water scarcity can result from water stress. When water stressed countries go below 1 000m^3 per person per year as a result of drought or another cause, the countries will encounter water scarcity. Drought, climate change and variability are discussed in detail below.

⦿ DROUGHT

Drought seems to be a major cause of water scarcity. It is the condition of abnormally dry weather in a region where rain is usually expected (Backeberg & Viljoen, 2003: 3). This scarcity of rain causes a serious imbalance in the hydrological system that, for example, leads to water supply reservoirs and wells drying, which in turn leads to crop damage. Drought severity is measured by its duration, the degree of moisture deficiency and the size of the affected area. This phenomenon can last from a few weeks to many years (Backeberg & Viljoen, 2003: 3).

Drought's impacts and effects are categorized as social, economic and environmental. These categories are highly interrelated. Environmental impacts include damage to natural habitats, reduction of water levels, reduction of cloud cover, increased evapotranspiration, lower accessibility to water, reduced water quality, decreased water resources, lack of feeding and drinking water, more water-borne diseases, etc. (NDMC, 2002: 1).

Drought affects the poor to an overwhelming extent. It is the poor who usually experience the loss of life, property, livestock, livelihoods, crops, as well as the diseases that often result. Among the poor, women and children are the most vulnerable (Francis and Jahn, 2001: 4). Some examples of the high costs of drought are illustrated in Table 2.3 below (Vogel, Laing & Monnik, 1998: 1)

Table 2.3: Social and Economic Impacts of Climate and Rainfall Variability in Selected African Countries

Country	Event	Year	Impact
Ethiopia	Drought	1983/84	300,000 deaths
South Africa	Drought	1991/92	20 million affected $2 billion relief
Zimbabwe	Drought	1991/92	45% decline in agricultural production 11% decline in GDP 62% decline in stock market 9% decline in manufacturing 15% reduction in power generation
Kenya and Tanzania	El Nino Rains	1998	Infrastructure destroyed Disease and economy-wide damage
Mozambique and Sudan	Floods	2000	Deaths Homes & infrastructure destroyed Economy-wide shock

Source: (Vogel, Laing & Monnik, 1998: 1)

According to Kunst & Kruse (2001: 4), droughts affect women by reducing the domestic water supply. Droughts also have a negative impact on women's time management. When nearby wells and water sources run dry, women have to search for water in the surrounding areas. They are obliged to travel long distances to obtain water. The greater the distance, the more time women need to fetch water. Lastly, droughts can lead to serious crop losses. This can result in women being unable to be responsible for supplying their families' food and pursuing domestic farming activities.

⊙ CLIMATE CHANGE AND VARIABILITY

Another reason for the critical water situation in all world regions is climate change. There is a majority view that global warming is occurring and increasing (Brown, 2000: 6; UNFPA, 2001: 19; Winpenny, 1999: 2). It is predicted that climate change will have disturbing changes over the next

few decades. UNFPA (2001: 19) estimates that the earth's atmosphere will warm by as much as 5.8˚ C over the coming century. This rate has been unmatched over the past 10 000 years. If this phenomenon persists, climate zones are likely to migrate, leaving the climate of some regions drier, others wetter, and all more variable and unpredictable. The high temperatures are already being accompanied by less predictable, more common and more severe storms, floods, droughts, heat waves, avalanches and windstorms (UNFPA, 2001: 19).

According to Pelser (2004: 189), an increase in drought and water scarcity is an obvious consequence of warmer temperatures. This in turn will result in decreasing agricultural and fisheries productivity in warm, subtropical and tropical areas. This will be a result of high temperatures in countries that are supposed to have low or moderate temperatures, and summer rainfalls that are expected to decrease by between 5 percent in the Northern regions and 25 percent in the Eastern and Southern regions of the world (DEAT, 2002: 60). Regions dependent on water (e.g. major farming areas and large population centres) will therefore experience greater water scarcity, while others will become more humid.

Southern regions in ecologically vulnerable tropical regions, small islands or large deserts, are more likely to be hardest hit by climate change and least able to adapt. Africa's biota, for example, is presented as by Leonard (2003: 1) as fragile and unable to withstand violent conversions. African governments are also seen as least prepared or capable of responding proactively to changes that are largely not of their making or under their control. Despite the fact that Africa has contributed the least to global warming, it will be the hardest hit by climate change Leonard (2003: 1).

2.5.2. HUMAN INDUCED CAUSES OF WATER SCARCITY

⦿ GROWTH IN THE HUMAN POPULATION

Given the fact that human life depends for its needs on the environment, it is clear that population and the environment are interlinked. Thus changes in a country's population will hold implications for the environment. The main demographic outcomes of population change are population size, growth, structure and distribution. The impact of these population variables on the environment is dependent on the specific lifestyles of the population. The main element of lifestyle relevant to environmental impact is the particular production and consumption patterns employed to fulfil human needs and desires (National Population Unit, 2000: 27).

According to the National Population Unit (2000: 28), population size and population growth impact on the environment in two crucial ways (second one is discussed under affluence): Firstly, the larger the population the larger the basic needs that have to be provided through use of the natural resources base (in this case water). Population growth is a large contributor to water scarcity and an increased demand on water resources. The world's population has literally tripled over the past 70 years and water use has grown sixfold. By 2020 the world population is projected increase up to 7.9 billion; 50 percent more than in 1990 (UNFPA, 2001: 11). Most of this growth will be in countries whose inhabitants currently have low levels of household water consumption, and in which the use of water-intensive appliances is likely to grow (Engelman, et al., 2002: 135). Domestic water use and water use for agriculture and industry has increased significantly.

Domestic (municipal) water use is directly related to the quantity of water withdrawn by populations in cities, towns, housing estates, domestic and public service enterprises. The public/municipal supply also includes water for industry that provides directly in the needs of urban populations. This demand consumes high quality water from the city water supply system (UNESCO, 2000: 2). The volume of public water use depends on the size of an urban population and the services and utilities provided. In many large cities, present water withdrawal amounts to 300-600 litres per day per person. Water withdrawal is up to 10 times greater in Europe and Northern America than in some parts of Africa and Asia.

UNESCO (2000: 2) has also predicted that by the end of the 21st century, the specific per capita urban water withdrawal will increase to 500-1000 litres per day in the industrially developed countries of Europe and North America. On the other hand, in the developing, more agricultural countries of Asia, Africa and Latin America, public water withdrawal is a mere 50-100 litres per day. In certain individual regions with insufficient water resources, it is no more than 10-40 litres per day of fresh water per person. This might change as these countries try to conform to fulfilling their people's basic water needs.

Much of the projected increase in water demand is expected to occur in developing countries, where population growth, industrial and agricultural expansion will be greatest. According to Rosegrant (2002: 2), water use for households, industry and agriculture will increase by at least 50 percent in the next 20 years. Given the need of all human beings for water, not to mention those of millions of other species who inhabit land and freshwater bodies, population growth will

eventually require reductions in per capita use of water and better conservation practices (Engelman, et al., 2002: 135).

⊙ RISING LEVELS OF CONSUMPTION

As has already been mentioned, an increase in water demand is expected in developing countries, but per capita consumption continues to rise in the industrialised world (WRI, 2002: 2; UNFPA 2001: 13). This is because the level of development and a subsequent interpretation of what the "good life" entails probably holds serious implications for people's desires for material well-being and consumption. Thus, in more affluent populations that rely on consumer goods for their satisfaction, population size becomes relevant in relation to the already high and unsustainable levels of consumption that will obviously rise as the population grows (National Population Unit, 2000: 28).

Rising incomes in recent decades have led to an increase in meat consumption in many countries. This requires substantial additional inputs of grain and water use/withdrawal, as 40 percent of the food supply now comes from irrigated land. Irrigation therefore plays a disproportionately large role in the world food economy (Brown, 2000: 1).

Land irrigation has been practised for years through the necessity to maximize food supply for humanity, but the dramatic expansion in irrigation land mainly took place during the 20th century, with irrigation becoming the principal water user in many countries. Indeed, agriculture is now reckoned to be the largest consumer of water worldwide as it uses two thirds of the available fresh water (UNFPA, 2001: 13). Most African countries are mainly agricultural countries, and because there is a great variety of climatic conditions, crop composition and watering techniques, the values for specific water withdrawal range from 20 000-25 000m^3/ha. The growth in the demand for food is thus the single most important cause of pressure on water resources.

Industrialised countries have already significantly increased efficiencies in agricultural water use by introducing better watering techniques. These techniques – for example, drip irrigation instead of flood irrigation – are increasingly available in developing countries but cost and cultural issues must be addressed (UNFPA, 2001: 11). Although the developed countries demand greater food supply and have proper techniques for irrigation, they are the ones that put more pressure of the water resources of the developing countries.

For example, the African continent as a whole is primarily agricultural and this activity accounts for 70 percent of all the water use in the world, but this figure varies considerably from

one region to another. Arid regions, where irrigation plays an important role in agriculture, have the highest level of water withdrawal. North Africa alone represents more than half of the agricultural withdrawal of the continent. Almost all of its countries' irrigation comes from the Nile (Leonard, 2003: 3; World Global Trends, 2005: 4). According to Brown (2000: 5) the fastest growing grain market in the world today is North Africa and the Middle East and all countries in these regions are facing water shortages. There are currently 250 million people in the Nile basin and that number is expected to double by 2025 (Leonard, 2003: 3) In addition to irrigation, there may also be the problem of supplying rural population and livestock with high quality fresh water in many developing countries located in arid regions (UNESCO, 2000: 4).

According to Rosegrant (2002: 2), increased competition for water will severely limit the availability of water for irrigation, which in turn will seriously constrain the world's production of food.

- **POOR FARMING PRACTICES (IRRIGATION, MODIFICATION OF LANDSCAPES AND LAND USE)**

As water, in the quantitative sense, is used today primarily to produce food (Spillmann 2003: 1) worldwide, irrigated agriculture is responsible for approximately 38 percent of the world's food production. While irrigation seemed to be the key to successful agriculture, the methods used turned out to have severe drawbacks, such as over-exploitation of existing fresh water reservoirs (Swanson, 2001: 2).

Food supply can be threatened by badly planned and poorly built irrigation systems that reduce yields on one half of all irrigated land. The degradation and land use conversion of watersheds and catchments may reduce the amount of usable water available downstream, if there is greater run-off (e.g. temporary floods), which cannot be captured. The construction of dams in the past has, for example, resulted in environmental disruption, displacement of long-settled populations, loss of agricultural land, silting and denial of water to downstream areas. These same processes can reduce existing water storage capacity, foe example, silting reservoirs (National Population Unit 2000: 33). Major land use also changes, for example, large-scale deforestation, or drainage may also induce microclimatic changes leading to lower humidity. Localized desertification may result from unsuitable farming and animal husbandry practices (Winpenny, 1999: 2).

Large amounts of water diverted for agriculture might have disastrous effects as less than half of all water withdrawn for irrigation purposes actually reaches the crops. The rest soaks into

unlined canals, leaks out of pipes or evaporates on its way to the fields (UNFPA, 2001: 16). New irrigation schemes are being used but they are also causing significant increases in water related diseases. Looking at alternative methods of irrigation and land use, from rural women's experiences, can help avoid or reduce some of the already existing problems in this sphere

⦿ INCREASED INDUSTRIAL DEVELOPMENT

Industrial development has had a huge negative impact on freshwater supply. Water in industry is used for cooling, transportation and washing, as a solvent and sometimes also enters the composition of a finished product. The volumes of industrial water withdrawal are quite different within individual branches of industry and also within different kinds of production, depending on the technology of the manufacturing process. Again it depends on climatic conditions since, as a rule, industrial water withdrawal seems to be considerably less in northern than in southern regions of the world, where higher air temperatures prevail. The development of industrial water withdrawal is one of the main causes of water pollution in the world. This is because much of the intake is discharged as waste water into natural water courses, for the most part untreated or partially purified (UNESCO, 2000:3).

Many developing countries undergoing rapid industrialization are now faced with the full range of modern toxin pollution problems, that is, eutrophication, heavy metals, acidification, persistent organic pollutions (POPs), while still struggling with the traditional problems of poor water supply and lack of sanitation services. Industries face a critical dilemma, namely, how to balance increased production goals while sustaining the national resources that power industrial use. After a number of years of excessive water use, it is clear that water consumption in industry can have very damaging effects on the local environments as well as on larger ecosystems. Industrial water used is expected to increase in developing countries as a result of the need for economic growth (National Population Unit 2000: 34).

⦿ CONTAMINATION OF EXISTING WATER SUPPLIES

The water available for human use is shrinking because pollution from agriculture, industry, and other human activities is degrading water quality in many rivers, lakes, and groundwater sources (Livernash & Rodenburg, 1998: 34). Pollution of normal water supplies effectively destroys part of the water resource, and forces its users to turn elsewhere or reduce their consumption. This may happen to surface supplies or groundwater. Pollution is mostly the result of industrial effluent, agro-chemical run-off from fields, the casual disposal of human excreta or the release of insufficiently treated sewage from municipal works. In developing countries, 90-95

percent of sewage and 70 percent of industrial wastes are dumped into surface water where they pollute the water supply (UNFPA, 2001: 6). These high volumes of industrial and household effluent often overwhelm municipal treatment capacity and contaminate surface water and groundwater. In many industrial countries, chemical run-off from fertilizers and pesticides, and acid rain from air pollution require expensive and energy-intensive filtration and treatment to restore acceptable water quality.

⦿ FINANCIAL AND INSTITUTIONAL OBSTACLES

According to Winpenny (1999, 3), in many cases a country's water potential is not realized because of financial shortages and institutional failures. Water is potentially available, but is not being fully captured because of the way in which water provision is organized and managed. Many water authorities are short of funds to invest in improving and expanding their systems, or even to maintain and operate their existing ones. Government typically fail to recover their costs, and to collect all of what is due to them. Many public-owned water institutions are inefficient and some are corrupt. Their capacity to implement cost-effective provision in tune with public demand is often lacking. The water they have at their disposal tends to be mal-distributed, favouring old-established customers, who tend to be more affluent households and industries with good political connections. Waste and leakage is at a high in many systems. Rural areas also tend to be the last to be considered as they have the worst infrastructures (National Population Unit 2000: 33).

⦿ A FAILURE TO MANAGE DEMAND FOR WATER SUPPLY

Economists predict that a useful commodity, such as water, which is offered free or at a low price, will inevitably become "scarce" in the sense that demand will outstrip supply at the prevailing price (Winpenny, 1999: 3). In many domains water is available free or at a price well below its true cost production, and in that sense water providers have created the scarcity they grapple with today. They are literally subsidizing the consumption of a necessity, which is growing scarcer. This kind of subsidy can often have unintended negative consequences. It can lead to wasteful resource use, environmental damage, and growing financial strain on government budgets (Livernash & Rodenburg, 1998: 15). Rural people, on the other hand, will battle with privatization of water as they are used to getting a free supply of water. Water therefore becomes an expensive commodity. This is because resource subsidies are difficult to dislodge once they become established, but there are cases in which they are reduced or removed without disrupting rural economic development.

Brooks and Winfield (2002: 1) have also highlighted that governments usually choose between two bad management alternatives. These alternatives are:

- The decision that they (government) alone should manage water resources.
- The decision to offload water management onto local authorities without investigating those authorities with the competence or the money or the support to protect the public interest, and without adequately overseeing their work.

These approaches tend to focus on large-scale, capital-intensive dams and diversions that carry enormous social, environmental and economic costs and that, more often than not, benefit the rich rather than the poor. On the other hand, poorly prepared municipalities lack the capacity either to protect public health or to conserve an endangered scarce resource, or even to deliver the water as demands grow with population and economic activity.

These discussions highlight that water scarcity is not just – or even primarily – an inevitable natural phenomenon, but is heavily influenced by human behaviour, social customs and government policies. According to UNDP (2003: 7), to ensure better management water should be treated as an economic, social and environmental good. All these aspects are interrelated and when policies focus on only one of these aspects the others suffer. Secondly, water policies should focus on the management of water and not just on the provision of water. Government should also facilitate and enable the sustainable development of water resources, including a regulatory framework.

2.6. THE STATE OF FRESHWATER RESOURCES IN SOUTH AFRICA

Although South Africa has freshwater from lakes, rivers and springs, it is a semi-arid country and its water is unevenly distributed. South Africa's freshwater system is also largely determined by its climate, rainfall and the landscape over which water falls. The average rainfall in South Africa differs from year to year and it is about 450mm – 500mm per year. This average is just over half of that of the world (860mm). It has high temperature climate variability with distinct seasonal rainfall patterns. It has high spatial climatic variability, with higher rainfall occurring on the East coast, and the country becoming progressively more arid towards the West. It has high solar radiation due to a low degree of cloudiness and high evaporation rates – except for small areas on the coast and certain escarpments where evaporation exceeds rainfall (DWAF, 2002:3; National State of the Environment report, 2002: 1; Schreiner & Naidoo, 2002: 5).

South African rivers are also small when compared to the rivers in other countries. The Orange River, for example, carries only 10 percent of the water volume of the Zambezi River. The country itself shares many of its large rivers, such as the Orange and Limpopo River, with other countries (DWAF, 2002:3). All major rivers have been dammed or modified to meet the demand for water, reducing water flow, causing many rivers to become seasonal and reducing the productive capacity of flood plains. Rivers and lakes are deprived of their usual flow of water by storage and diversion, leaving the land starved of water (National Population Unit, 2001: 33).

With the predictions in Table 2.1 that South Africa is facing water stress conditions and will soon be subject to water scarcity, it is estimated that all conventional water resources will be fully utilized by the year 2026 (National Population Unit, 2001: 33). As in the rest of the world, causes of water stress in South Africa also include population growth, increased water demand, contamination of water, financial and institutional obstacles, pollution, climate change and drought.

Rapid population growth, particularly during the 1960s, 1970s and 1980s, has caused (and still causes) serious depletion and degradation of water resources in South Africa, and yet demand is constantly increasing (Alexander, 2002:1). However, recent projections have shown that population growth in South Africa has since declined. According to Pelser (2004: 175), the total increase of the South African population is expected to be 8.4 million over the next three decades, that is, from 44.7 million in 2001 to an estimated 53.2 million in 2031. This decrease in population growth is said to be the result of the HIV/AIDS epidemic and the fertility rates that are declining more rapidly than anticipated.

An increased demand for freshwater resources in South Africa is another result of the increase in economic activity and changes in land use. Groundwater demand has increased from approximately 1 790 million m^3 in 1980 to about 2 000 million m^3 in 2002 (National State of the Environment Report, 2002: 4). There is also an increase in demand for water because, prior to the 1994 elections, the South African government had neither jurisdiction nor interest in serving the homelands (Higham, 1998:2). Apartheid policies left South Africa with a great disparity in wealth and access to both services and natural resources. Under apartheid the white minority had access to a high level of services such as water, sewage, transport, electricity, land and housing, equal in most cases to the service levels of the developed world. Large sections of the black community, on the other hand, had little or no access to basic services (de la Harpe, 1998: 9; Schreiner & Naidoo, 2002: 1).

After the first democratic elections in 1994, water had to be evenly distributed to all the people in the country. The South African government committed itself to providing poor areas with 6 000 litres of free water per month for drinking, sanitation and hygiene, as well as water for agriculture as these supplies are critical for poverty alleviation (Schreiner & Naidoo, 2002: 1). (See more about the water policy in paragraph 2.7). Access to clean drinking water in South Africa therefore improved by 30 percent between the year 1999 and 2001. According to the South African Institute of Race Relations (2000: 330), in 1999, there were 7 345 232 people who had access to potable water in South Africa. By 2001 this number had increased to 9 550 002.

The percentage of people in each of South Africa's nine provinces who had already received free basic water[8] in 2001 were: Limpopo 35 percent, Eastern Cape 45 percent, Northern Cape 54 percent, Mpumalanga 42 percent, North West 56 percent, Free State 97 percent, KwaZulu Natal 42 percent, Gauteng 98 percent and Western Cape 85 percent (South African Institution of Race Relations, 2000: 346). Some people are still not able to access this free water because many rural municipalities are experiencing a financial crisis, a huge backlog in infrastructure and lack of capacity to deliver services (Dladla, 2000: 12).

Demand for water will increase further in the future. Table 2.4 illustrates the expected increase of nearly 52 percent in water demand over the next 24 years in South Africa.

Table 2.4: Water demand in South Africa: 1996 and 2030

User group	% Contribution to gross domestic product (GDP)	Volume use, 1996 (million cubic meters per year)	Predicted volume use, 2030 (million cubic meters per year)	% Increase
Urban & rural	-	2 171	6 936	219,5%
Mining & industrial	37%	1 598	3 380	111,5%
Irrigation & afforestation	6%	12 344	15 875	28,6%
Environmental	-	3 932	4 225	7,5%
TOTAL	-	20 045	30 415	51,7%

Source: National Population Unit, 2000: 33

Not all fresh water in South Africa is of good quality. Some of it is polluted. Across the country, everyday, organizations and individuals contaminate the water quality in the country's rivers and streams groundwater and wetlands (DWAF, 2002: 3). Water pollution in South Africa occurs as a result of wastewater from industries and mining, agricultural fertilizers, erosion, domestic waste,

[8] Free basic water: In 2000, the current democratic government promised to the poor the delivery of 6000 litres of free basic water per household per month. This would supply a household of eight with 25 litres of free water at government target levels and a household of four with 50 litres per person per day, as recommended by the World Health Organisation (DWAF, 2001: 21).

lack of sanitation and many other activities. According to the National Population Unit (2000: 35), approximately 2 600 mega litres of domestic and commercial wastewater is processed every day. This is a costly exercise because it means that people have to pay more for water. Many freshwater systems have therefore reduced quality of water for domestic use, irrigation and industrial use due to high levels of industrial effluent, agricultural run-off, domestic and commercial wastewater and sewage, acid mine drainage and litter. Groundwater is also threatened by seepage from landfill sites (National Population Unit, 2000: 35). Large populations have also attributed to the deteriorating quality of South Africa's water resource with urban areas being particularly stressed.

Climate change will also contributed to the scarce water resources in South Africa. Higher temperatures are expected all over the country as they fluctuation by up to 4.5˚ C per annum. Summer rainfall on the other hand is expected to decrease by 5 percent in the Northern regions and by up to 25 percent in the Eastern and Southern Cape (DEAT, 2002: 60).

Lastly, drought is a cause for concern in South Africa. Unfortunately, South Africa is familiar to this type of disaster. During the 1980s and 1990s, for example, severe droughts resulted in social, environmental and economic losses at both national and local levels. One's chances of experiencing a disaster such as drought are usually strongly linked to one's vulnerability to the event. People are described as vulnerable to disasters depending on the extent, to which they are likely to be damaged or disrupted by the impact of a disaster (Department of Constitutional Development, Local Government branch, 1997: 3). Women in rural South Africa are more vulnerable to drought because they are responsible for collecting water for domestic purposes. They also have less access to water than their male counterparts and people in urban areas. Table 2.5 below shows that only 7 percent of rural women are able to access water from a source inside the dwelling as compared to 93 percent of urban women. In 2001 the majority of rural women in South Africa were still far more dependent on rivers, streams and springs as water sources than to women in urban areas.

Table 2.5: Household water sources in South Africa according to area and gender in 2001

Type of water source	% of Household weighted			
	Non-Urban		Urban	
	Male	Female	Male	Female
Piped water inside dwelling	10	7	90	93
Piped water inside yard	29	30	71	70
Piped water on community stand: distance less than 200m. from dwelling	47	58	53	42
Piped water on community stand: distance greater than 200m. from dwelling	51	64	49	36
Borehole/rain tank/water vendor	83	89	17	11
Flowing water/river/spring	97.5	99	2.5	1
Stagnant water/dam/pool	92	95	8	5
Other	49	62	51	38

Source: Statistics South Africa (2001)

Stemming from the above discussion, an important point on the international water agenda is combating water scarcity. A number of conferences have been held in the last few years to address, amongst others, the issue of water scarcity. South Africa has also made great strides in reducing inequality pertaining to access to water.

2.7. International and South African water policy frameworks

The Mar del Plata conference in 1977 initiated a series of global activities regarding water. Of these the International Drinking Water and Sanitation Decade (1981 – 1990) brought about a valuable extension of basic services to the poor. In addition to this the International Conference on Water and the Environment in Dublin in 1992, set out the four Dublin Principles that are still relevant today. Principle 1: 'Fresh water is a finite and vulnerable source, essential to sustain life, development and the environment'; Principle 2: 'Water development and management should be based on a participatory approach, involving users, planners, policy makers at all levels; Principle 3: 'Women play a central part in the provision, management and safeguarding of water'; Principle 4: 'Water has an economic value in all its competing uses and should be recognized as an economic good'.

The UN conference on the Environment and Development (UNICED) in 1992 produced Agenda 21, which, with its seven programme areas for action regarding freshwater, helped to mobilize change and heralded the beginning of the still very slow evolution in water management practices. Both the International Conference on Water and the Environment in Dublin and the UNICED, placed water at the centre of the sustainable development debate. The second World Water Forum in The Hague in 2000, continued this process. All of these meetings set targets for improvement in water management, very few of which have been met.

However, of all the major target-setting events of recent years, the United Nations Millennium Summit of 2000, which set the Millennium Development Goals for 2015, remains the most influential. Among the goals set, the third goal was the most relevant to water: This goal set out to halve the proportion of people without access to safe drinking water;

All these principles and goals need to be achieved while protecting the environment from further degradation. The UN recognized that these aims, which focus on poverty, education and health, could not be achieved without adequate and equitable access to resources, and the most fundamental of these are water, land and energy.

The Hague Ministerial Declaration of March 2000 adopted seven challenges as the basis for future action. These have additionally been adopted as the basis for monitoring progress regarding the World Water Development Report:

1. Meeting basic needs – for safe and sufficient water and sanitation;
2. Securing the food supply – especially for the poor and vulnerable through the more effective use of water;
3. Protecting ecosystems – ensuring their integrity via sustainable water resource management;
4. Sharing water resources – promoting peaceful cooperation between concerned states, regarding the different uses of water through approaches such as sustainable river basin management;
5. Managing risks – to provide security from a range of water related hazards;
6. Valuing water – to manage water in the light of its different values (economic, social, environmental, cultural) and to move towards pricing water to recover the costs of service provision, taking account of equity and the needs of the poor and vulnerable;
7. Governing water wisely – involving the public and the interests of all stakeholders.

A further four challenges were added to the above seven to widen the scope of the analysis:

8. Water and industry – promoting cleaner industry with respect to water quality and the needs of other users;
9. Water and energy – assessing water's key role in energy production to meet rising energy demands;

10. Establishing knowledge base – so that water knowledge becomes more universally available;

11. Water and cities – recognizing the distinctive challenges of an increasingly urbanized world.

The International Conference of Freshwater in Bonn in 2001 continued the process. Coming up to 2002 and the World Summit on Sustainable Development (WSSD), UN Secretary General Kofi Annan identified WEHAB (Water and sanitation, Energy, Health, Agriculture, Biodiversity) as integral to a coherent international approach to sustainable development. It became clear that water is essential to success in each of these focus areas. The WSSD also added the 2015 target of reducing by half the proportion of people without sanitation. Thus 2002/2003 was a significant staging post in humankind's progress towards recognizing the vital importance of water to our future; an issue that now sits at or near the top of the political agenda. The sequence is continuing as 2003 embraced not only the Third Water Forum in Japan, but was the International year of Freshwater. These conferences, the preparations that preceded them and the discussions that followed, have sharpened people's perceptions of the water crisis and have broadened understanding for a proper response (WWAP, 2003: 5).

2.7.1. The South African water policy framework

After a long struggle with apartheid created by the past regime, South Africa is now committed to redressing the wrongs of the past, particularly in relation to racial and gender discrimination. The South African democratic government is also committed to the eradication of poverty. In relation to access to water and water services, government has outlined a number of policies. Mehta & Ntshona (2004: 5) have acknowledged that the South African government stands alone internationally in endorsing the constitutional right to water, but have also argued that these policies have been informed by several dominant settings in water management which include an emphasis on cost recovery. These policies include the following: the Constitution of the Republic of South Africa (Act 108 of 1996), the Reconstruction and Development Programme (RDP), the white Paper on Water and Sanitation (1995), the Water Service Act (1997), the White Paper on a National Water Policy for South Africa (1997) and the National Water Act (1998)

According to de la Harpe (1998: 7), the Constitution is important to water law as it encompasses the following:

- Everyone has a right to have access to sufficient food and water;

- Everyone has a right to an environment that is not harmful to his or her health or well-being;
- The environment must be protected for the benefit of all people living now and in the future (sustainable development);
- National government is the custodian of the sources of water, such as rivers, ground water and dams; and
- Local government is in charge of municipal water services.

Following the Constitution was the Reconstruction and Development Programme. Schreiner and Naidoo (2002: 1) have summarised the RDP as an integrated and sustainable programme of action that deepens the democratisation of South Africa. Meeting the basic needs of every South African is one of the basic principles of the RDP, as is the developing of human resources and building the economy. However, central to water issues is the right of access to water for all. It also states that water management has three main goals: meeting every person's health and functional requirements, raising agricultural output and supporting economic development.

The National Water Act followed the RDP. This Act concerns management, protection and allocation of water. According to de la Harpe (1998: 9), the National Water Act recognises that water is a natural resource that belongs to all people in South Africa. This differs from the past water Act that only gave the permanent right to use water to those people who owned land (farms and other properties). The new Act recognises the need for a more equitable (fair and equal) distribution of water. The only right to water is water for basic human needs (such as water for drinking, for food preparation and for personal hygiene) and water for the environment. The new Act also encourages the participation of all people in water resource management. Instead of an authoritarian way of decision-making in water management, the water resources are managed as depicted in Figure 2.2.

The Minister and the Department of Water Affairs and Forestry are the custodians of the nation's water resources and recognise the need to use water beneficially in the public interest. The Catchment Management Agencies on the other hand promote the management of water resources at the lowest possible level. The Water User Association is the direct link to the community as it enables people within the community to pool their resources (money, human resources and expertise) to more effectively carry out water-related activities (de la Harpe, Ferreira & Potter, 1998 27). The new Act therefore facilitates the involvement of communities and other stakeholders in decisionmaking.

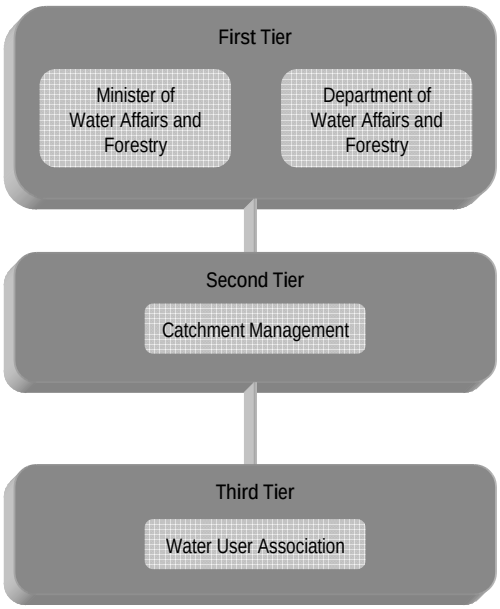

Figure 2.2: Overview of water resource management institutions in South Africa
Source: de la Harpe, et al., 1998

The Act has as one of its key governing principles, the Water Service Act (Act 108 of 1997). This Act gives legal force to the mandate of the RDP. It is the governing legislation for water services and sanitation. Its goals are as follows:

- All people living in South Africa have access to an appropriate, acceptable, safe and affordable basic water supply and sanitation service. This goal has resulted in the provision of free basic water to all citizens. In February 2001, the government announced that it was going to provide a basic supply of 6000 litres of safe water per month to all households free of charge (based on the average household size of eight people).
- All people living in South Africa are educated in healthy living practices (especially with regard to the use of water and sanitation services) and the wise use of water.
- All water service authorities are accountable to their citizens, have adequate capacity to make wise choices (related to water service providers) and are able to regulate water services provision effectively.

- The prices of water and sanitation services reflect the fact that they are both social and economic goods
- All water service providers are accountable, cost-effective, efficient, and viable, and implement appropriate and gender equity policies.
- Water and sanitation are provided: equally, affordably, effectively, efficiently, and sustainably and, more important, are gender sensitive (taking into account the different needs and responsibilities of women and men with regard to water services and sanitation).
- Water and sanitation services are effectively regulated with a view to ensuring the ongoing achievement of these goals.

These policies have paved a way forward for South Africa. However, the most important conference to raise the importance of including women in environmental management was the Fourth World Conference on Women held in Beijing in 1995. This conference's title was "Platform For Action" (PRB, 2001: 3). The conference recommended the strengthening of women's participation and leadership as part of a holistic, multidisciplinary, and intersectoral approach to sound environmental management. The following actions were highlighted at the conference:

- Ensuring opportunities for women, including indigenous women, to participate in environmental decision making at all levels.
- Facilitating women's access to information and education, thus enhancing their knowledge, skills and opportunities for participation in environmental decisions.
- Taking measures to integrate a gender perspective in the design and implementation of, among other things, environmentally sound and sustainable resource management mechanisms, production techniques and infrastructure development in rural and urban areas.

2.8. Conclusion

This chapter has demonstrated that as much as water is one of the basic necessities of human life, it is increasingly becoming a scarce resource. Although access to safe drinking water is key to enhancing both human well-being and securing sustainable livelihoods, millions of

people have no access to water. Currently the world is using more than half of its freshwater resources and the demand is increasing yearly.

It is clear that the Asian and African continents are experiencing the most severe shortages in water. At the same time, these two regions need this resource for agriculture, as there is an increased demand for food. Considering the causes of water scarcity (both environmental and physical) in the world, new management strategies should be considered. In short, the conferences that set goals and principles to deal with water scarcity should play a major role in the formulation of these strategies. The international conferences and the South African Water Act have clearly indicated the importance of including women in any decision making concerning water resources.

The chapters that follow are based on some of the principles, goals and challenges set out at the international conferences and by the South African policies. Particularly important to this study are those that encourage the involvement of the public and the interests of all stakeholders and those that ensure the knowledge base - so that water knowledge becomes more universally available. The South African government has even encouraged gender sensitive policies: policies that take into account the different needs and responsibilities of women and men with regard to water services and sanitation. The importance of including women when developing policies is discussed in more detail in chapter 3.

Chapter 3

RURAL WOMEN AND THE MANAGEMENT OF WATER RESOURCES

3.1. INTRODUCTION

The previous chapter has clearly demonstrated that there is a looming water crisis in the world. According to the discussions in Chapter two, the developing countries will bear the brunt of water scarcity because there is bound to be more demand for water in these countries.

In Chapter two, the researcher has also mentioned in passing that women, especially, those in rural areas, will be more vulnerable to water scarcity. A number of environmental policy frameworks have therefore looked into the plight of these women and one can note that women are now encouraged, through policies, to participate in environmental decisions. They are also encouraged to access information and education in order for them to make sound decisions. Environmental policies are also starting to integrate a gender perspective in the design and implementation of sustainable resource management mechanisms, production techniques and infrastructure development in both urban and rural areas.

One such policy is the South African National Water Act. This act supports the involvement of all South Africans in decision making with regards to water issues and the right to access water. The Water Service Act (Act 108 of 1997), on the other hand, indicates that water and sanitation are to be provided equally, affordably, effectively, efficiently and sustainably to all South Africans. More important is that water provision should be gender sensitive. What this means is that it should take into account the different needs and responsibilities of women and men with regard to water services and sanitation.

This chapter is therefore a discussion that highlights the reasons why it is important to include women in environmental and water management. Firstly, the researcher discusses some of the theories that illustrate women's involvement in environmental issues since the 1950s. The theories bring to light the following, that the environment has been degraded because women have been devalued and that women, especially those in rural areas, are vulnerable to environmental degradation because they are extremely dependent on natural resources,. Furthermore, the chapter discusses the way forward for women and how they can be of more value in mitigating water scarcity.

3.2. WOMEN AND DEVELOPMENT

According to Bell (1998: 134), the first three decades of development efforts, 1950s – 1970s, gave scarcely any consideration to gender issues. Women were largely invisible, both as actors in and potential beneficiaries (or victims) of the development process. There was not a single feminist theory of development. Some approaches tried to insert women into existing development models. Others criticized this approach, saying it is simply fitting women into dominant male-centred models (Serote, Mager & Bundlender, 2001: 155). In the 1970s and 1980s the equity and efficient approach challenged women's participation in development.

The first book to acknowledge women in development initiatives came in 1970 and it was a form of revelation. Ever since, feminism,[9] has had a profound influence on development studies, just as it has in the social sciences in general. It has brought a significant sensitization to the differential positions of men and women in development situations, and particularly the importance of power and status (Serote et al., 2001: 155).

In recent years, a gender and empowerment approach has attempted to transform existing gender relations through a more equal control of resources and equal sharing of work burdens. Scholars and development organizations now see improving the status of women both as an end on itself and also as one of the most significant means of reducing rapid population growth, improving the life expectancy of poor children and conservation of natural resources to protect the environment (UNDP, 2003: 8).

[9] Feminism is a movement run for and by women who believe that women suffer injustices or oppression because of their gender (Serote, et al., 2001: 156)

Recent research in many different settings has arrived at a new understanding of the links between gender relations and environmental management, which carries very different policy implications; chiefly, that state the necessity:

- to understand that men's and women's interests and incentives may be very different;
- that women must not be expected to participate in or contribute to resource use practices from which they themselves will not benefit, and they must, at least, be paid for labour contributions to a project on the same terms as men;
- that local project management procedures must be designed to give real representation to women's interests.

It is vital that policy makers avoid focusing exclusively on women's subsistence roles, and recognize the importance of their market-related activities as well as their range of livelihood choices. They should take into account that women generally have less command over cash than men, and that where men control household expenditure, they may not give proper weight to women's interests or priorities (Joekes, et al., 1996: 1).

Two theoretical perspectives have been particularly evident and influential in the literature and policy framework concerning gender and the environment. These are the women and the environment approach and eco-feminism.

3.2.1. Women and the environment approach

The first theoretical approach grew out of the 'women and development' debate in the 1980s. The 'women and the environment approach' emphasizes the important role of women as environmental resource managers, stressing in particular their vulnerability to declining in resource availability. The viewpoint advocates the need to develop programmes directed at assisting women. Such programmes treat men and women separately, with women's projects running parallel to and separate from men's programmes. These programmes are also designed for women and not by women (Joekes, et al., 1996: 1). This approach assumes that women have a natural affinity for nature. This theory also ascribes high spiritual value to women's environment-related sustenance activities, such as the everyday provisioning of water, fuel wood and food, as well as to the reproductive sphere in general, and sees women as environmental nurturers who promote environmental conservation. This contrasts with men's urge to control and manipulate the natural world for economic reasons and to socially subordinate women. This philosophy places the burden of environmental regeneration and conservation on the shoulders

of women, absolving men from environmental responsibilities. Advocates of this view seek respect and support for women's efforts to conserve the environment (Barrett & Browne, 1995: 31; Joekes et al., 1996: 1).

3.2.2. Eco-feminism

The second approach, and one more relevant to this study, is known as eco- feminism, which derives from the philosophy of feminism. The concept of eco-feminism considers that there is a distinct relationship between women and the environment (Shrestha, 2001: 111). To be more precise, it considers that there is a link between the domination of women and the domination of the environment. It has been argued that the domination of the environment originates together with social domination of all kinds – across, not only gender but also race, ethnicity, class, age and other forms of social difference treated as hierarchies. Eco-feminism therefore approaches the problems of environmental degradation and social injustices from the premise that how we treat nature and how we treat one another are inseparably linked (Bell, 1998: 164; Gaard, 2001: 158). Eco-feminism scholars argue that there has always been a relationship between women and the environment. However, the relationship has not always had a negative impact on the environment.

⊙ Historical-conceptual connections

Women-nature associations clearly existed prior to the modern era. They simply did not have the negative environmental consequences seen today. This is because, today, there are different available technologies, different belief structures and normative constraints. During this time humans were unlikely, or physically unable, to create large-scale changes in their surroundings. The reality of human induced changes in the local environment was small enough to be practically non-existent, especially by modern standards. But, despite the inability to make large impacts, the early creation of linkages between women and nature paved the way for later ideas (Neuschler, 2001: 5).

In the early period of recorded history, many inhabitants of the West, primarily Europe, believed in an earth goddess creator and a nurturing mother earth (Deoxy, 1997:1; Neuschler, 2001: 5; Tripod, 1996: 1). Beinart & McGregor (2003: 73) also discuss a number of African female mediums, shrines, chieftainesses and goddesses who had and still have power and control over the environment. These women are able to make decisions with regard to environmental, social and sometimes political issues. They are able to determine which areas can be cultivated and which not, where trees can be planted and where not, where streams and pools can be used and

where not. They also control the agricultural year, providing seeds and directing areas in which fire can be used for clearing the land (Beinart & McGregor, 2003: 83). Even South Africa has its own Queen Mujaji (put into leadership in the 1880s), the rain queen who was respected because of her political, ceremonial and rain making powers. However, her successors have less authority (The Suppressed Histories Archives, 2005: 5). These earth goddesses and shrines together with the feminine earth were to be served by humankind, in order that she might in turn be pleased enough to serve and grant blessings of resources upon them. Implicit in the view of the female and mothering earth were certain constraints on behaviour. Women were thus respected and given some form of power in their societies. Where this was the case, it is easy to see that a greater "Mother Earth" received similar treatment (Plant, 2005:1).

Though these ideas and reverence prevented widespread environmental degradation, the women-nature connections that would become a problem in later times were clearly already beginning to emerge. In modern times, the idea of "Mother Earth" is not nearly so beneficial to the environment.

⊙ MODERN-CONCEPTUAL CONNECTIONS

In the 15th to 16th century the viewpoint of an earth goddess became less popular. The pastoral tradition saw nature and women as passive, simply allowing humankind to act as they saw fit. Humankind was thus given hands to transform the earth's resources and was given dominion over them (Neuschler, 2001: 8). The dominion of the environment therefore originates together with the dominion of women. The culture climate of dominion has been built on dualism. Men were associated with; culture, reason, mind, machine, master and public. On the other hand, women were associated with nature, body, slave, emotion and private (Bell, 1998: 167; Gaard, 2001: 159). This concept became more popular with the spread of the Christian religion. Men had to have dominion over everything (including the environment) and women had to submit to them. The concept of nature as female allowed the earth to be consequently devalued due to the devaluation of women. Western metaphors such as: "broke virgin land" and "bosom of the deep" are strikingly sexual and devaluing. The gender of the environment in these examples, sometimes implied, sometimes overly stated, is female (Bell, 1998: 163). Both the earth and women therefore became simply gifts to mankind for his use or pleasure.

These Enlightenment ideas have created an idea of modernity and development that is still used today. The Western world has developed through the exploitation of its own and other's resources, and has a quality of life envied by other countries. This idea has resulted in the

degradation of the environment, yet many developing countries looking at this model have been reluctant to change their patterns of development in response to environmental problems. In general, the assumption has been that the western view of progress is seen as possible for all countries (Neuschler, 2001: 8).

The idea of rationality is also still highly privileged. Since women are seen as being without reason, unscientific and less rational, they have been excluded from general governance. They have been left out of environmental governance as well because environmental science and the international environment movement have been largely cast as the domain of men. Instead of being included in environmental governance, women had been seen as the problem (as consumers, not as producers) and they have not been allowed to instrument any substantial changes in production policy, instead being forced to rely on making their voices heard through their response to policies aimed at them by others, especially in developing countries. Secondly, they have been seen as victims and, lastly, as saviours of environmental degradation (Neuschler, 2001: 16).

3.2.3. How should women now relate to nature?

However, things have changed since the 19th century. Some eco-feminists advocate for women to turn around the current paradigm of valued "gender" characteristics. It is an approach often called "revalorizing" the female or the feminine (Neuschler, 2001: 16). In other words "feminine" values such as cooperation, community, caring and emotion would be valued over "masculine" values such as opposition, individual, self and reason. This approach has been criticised as it is seen as continuing to imprison women in the sphere of reproductivity and family and perpetuating their exclusion from the true humanity of the public world of culture, work and public life (Plumwood, 2004: 50). Again, the substitution of a traditional female for a traditional male model of the human does not address the issue of distortion of both male and female roles. An eco-feminist perspective that could be of great value is the one that realizes that there are times and situations in which the character of each trait of a pair is needed. These eco-feminists advocate a different form of logic, one that recognizes grey areas and interdependence, and one that recognizes difference without making hierarchies. People should be able to make a distinction that respects the diversity and inter-activeness of the world and that does not rely on absolutist, mechanical and hierarchical boundaries (Bell, 1998: 167; Plant, 2005: 2).

In order to combat environmental degradation it is important to recognize women's relationship with the environment. It is important to note that women's environmental roles and

responsibilities are different from those of men and that including women in decision making might improve the chances of sustainable development. The way in which women relate to a number of different natural resources in rural areas, is explored briefly below.

The following section illustrates why women, especially rural women, are more vulnerable to degradation, by discussing their interaction with the environment. Firstly, the researcher will focus on their interaction with other environmental resources (such as access to land and access to forests) but will later concentrate on their interaction with the water resource.

3.3. RURAL WOMEN AND THEIR ROLES IN THE ENVIRONMENT

In most regions of the world, men play a greater role than women in the exploitation of natural resources for commercial use, but women in Africa are substantial users of environmental resources (PRB, 2001: 1). According to UNFPA (2001: 37), the direct and critical relationship between women and natural resources draws its strength not from biology - that is, not because women are born female – but from gender, and the created roles and responsibilities that continue to fall to women in households, communities and ecosystems throughout the world. Traditional gender roles have resulted in women having responsibility for domestic activities such as food preparation, water and fuel wood collection, childcare and maintaining family health. In rural areas of developing countries, they are also main managers of essential household resources like fresh water for the household, fuel for cooking and heating. Men, on the other hand, benefit from water use via irrigation and its economic value. Through their roles in production, reproduction and community management, women, more so than men, have responsibility for environmental use, for the redistribution of environmental resources and potentially for the destruction or conservation of these resources (Barrett and Browne, 1995: 32; UNFPA, 2001). These roles have been shaped by the theoretical constructs already discussed. They have been shaped by the view that men should dominate women and that women are not capable of making scientific and rational decisions and should therefore remain in the domestic sphere.

To understand how gender shapes activities that affect the environment, it is necessary to examine women's activities within the environment. But before discussing women's activities, it is important to examine their status with regards to land ownership, as most of their activities are directly linked with land.

3.3.1. RURAL WOMEN'S ACCESS TO AND CONTROL OVER RESOURCES

Women are often poor. In 2001, over 1.2 billion people were living on less than one U.S. dollar a day. The majority of those in poverty were women (PRB, 2001: 2). Because they are poor, women depend on land, water and forests for subsistence and income. Rural women have to exploit natural resources for their survival. Their choices are limited and their responsibilities might appear to an outsider to be less than ideal. Under a closer look their choice proves to be a more sensible course of action, given the constraints they have to work within.

Despite the fact that rural women are substantial users of the environment, they hold in connection with the environment, not more than 1 percent of land (Davidson, 1993: 5; Neuschler, 2001: 19; UNFPA, 2001: 39). Economic, social, institutional, and legal constraints affect women's and men's rights to own land and control resources. National law or local customs often deny women the right to secure title or inherit land. Even if they have access to it for farming, their tenure is often costly and uncertain. Women's social status (their land rights are linked to their marital status) especially in developing countries, limits their secure and independent access to land (Ranger, 2003: 72). They often lose these rights if they are divorced or widowed. The fact that in many countries, rights are linked to women's marital status, has proved to be a problem because women, the poor, and other marginalized groups are less likely to invest time and resources or adopt environmentally sustainable farming practices on land they do not own (Sass, 2002: 2). In Bangladesh, for example, it was found out that providing women with access to irrigation water was ineffective if they did not have access to land, credit, seed and fertilizer. By providing these resources to women, as well as negotiating lease agreements with landowners, women's income from irrigation activities increased by as much as 10 times above what they would have earned in wage labour or in traditional female activities (Khosla & Pearl, 2003: 1).

At the same time, in many developing countries most productive land remains in the hands of relatively few people – the commercial (mainly white male) producers. Under formal and informal resettlement programmes, poor women have either become landless, or have been forced onto the less productive areas where yields are lower and output is of poor quality. Attempts to grow subsistence crops in highly marginal land – on land, which may be unstable, dry or subject to water logging, pest-ridden and disease-prone - results in soil erosion and the related destruction of water and forest resources (Davidson, 1993: 5).

Women's right to own land and inherit land should be enforced; individual and communal security of land tenure should be guaranteed, and women should have access to credit, and to

agricultural extension and resource management services (UNFPA, 2001: 39). Without ownership of land or secure access to it, women are denied access to credit, training, have no collateral to improve their lives, and cannot engage in the long-term conservation practices they traditionally used. Unable to use land as collateral to obtain loans, women have difficulty in adopting new technology and hiring labour when needed. Such insecure land tenure influences women's use natural resources (PRB, 2001: 2; UNFPA, 2001: 39).

Because women are not able to fully use land for long-term conservation and economic practices, they are obliged to use forests, water and other natural resources for energy, food supply, building, medicine, etc.

3.3.2. RURAL WOMEN, FORESTS AND ENERGY

Women are the main collectors of fuel wood and fodder for domestic use. Forests therefore play an important role in the lives of poor women. Forests are not only important in protecting watersheds, regulating water flow and maintaining soil fertility, but they provide benefits such as food, fodder, fuel, building materials and medicines (Shrestha, 2001: 112).

According to Neuscher (2001: 19), when there is environmental degradation - from logging, agricultural development, migration and resettlement, and cutting for fuel wood and charcoal - women are disproportionately affected. When there is deforestation, women's lives in developing countries are more likely to be adversely and directly affected. Women have to travel longer distances in search of wood for fuel. This leaves less time for them to participate in income generation and other activities to improve their standards of living. Less wood also mean that women may reduce cooking time, with the consequence that they and their children eat poorer food, sometimes dangerously undercooked. It also means that crop and animal wastes, normally used to maintain soil fertility, become substitutes (Davidson, 1993: 7).

3.3.3. RURAL WOMEN AND WATER

However, more important to this study are rural women and their water role and responsibilities. When it comes to fulfilling daily water needs, research again proves that men and women have different responsibilities and interests. What this means, therefore, is that, in terms of gender[10], demands for adequate water supplies differ greatly. During the 20th century, researchers Barrett and Browne (1995: 33) discovered that in rural Africa women were the end-

[10] Gender refers to the socially constructed roles and responsibilities of women and men, in a given culture or location.

users of water in the domestic sector. They provided nearly all the water for the household. They were responsible for collecting water, carrying water, controlling its use and also overseeing the sanitary arrangements. Neuschler, (2001: 19) and Shrestha (2001: 113) also revealed that women in rural areas usually spend more than six hours per week collecting water and wood for domestic purposes, indicating that this trend is continuing.

Women are also involved in production, which utilises water. Both men and women work in agriculture to sustain food production. Agriculture is the main basis of the economy, which contributes to raising living standards of the majority of people in developing countries. Again, women in these countries play an important role in agriculture production and land use. Shrestha (2001: 112) has noted that women are major producers of food in terms of value, volume and number of hours worked. They grow vegetables, fruit and grain for home consumption, often, as in much of Africa, producing most of the staple crops. Women make up more than half (51 percent) of the world's agricultural force. In Africa, of the total economically active female population, about 80 percent are engaged in agricultural tasks. African women therefore spend a great deal of their time in agricultural activities for income and for food supply. Even though this is the case, they still do not own much land and therefore do not have adequate access to water. Men, on the other hand, have primary responsibility for harvesting and storing crops and maintaining equipment.

As economic opportunities open up, women in developing countries are growing, processing and marketing non-food products made from natural resources (Hemmati, 1999: 1; Sass, 2002: 1). In some agriculture related activities, female labour mostly contributes to field preparation, ploughing, cold breaking, weeding, seeding, food processing, irrigation, hauling to the threshing floor, threshing and cleaning, drying and storing. Women also produce cash crops, both for their own accounts, and as hired labour on commercial and family farms (Davidson, 1993: 5). Cultivatable land and adequate water supply are therefore the basic resources for meeting food needs and often for servicing livelihoods. Considering rural women's responsibilities in respect of using water resources, the looming water crisis in the world will definitely have a negative impact on their lives.

3.4. THE IMPACT OF WATER SCARCITY ON RURAL WOMEN

According to Francis and Jahn (2001: 4), water related disasters affect the poor to an overwhelming extent. It is the poor who usually severely experience the loss of life, property,

livestock, livelihoods, crops, and who are predominantly affected by diseases that often result when water is scarce.

The impact of water scarcity on humans differs, depending on whether it is chronic and long term, periodic and unpredictable, or regional and local (Winpenny, 1999: 3). The effects vary according to local climate, vegetation, geology, institutional arrangements and government policies. Water scarcity also affects men and women differently.

African rural women are the most suppressed and impoverished in the society. They are therefore proportionately more vulnerable to the impact of water scarcity than men. According to Onyango (2003: 1), rural women in developing countries are more impacted by weather and climate hazards because as has already been demonstrated above, women's daily interactions with the environment to meet household needs are endless (PRB, 2001:1). Women and children are the most vulnerable[11]; in fact they are fourteen times more likely to die in a disaster than men (Francis & Jahn, 2001: 4). Women are also vulnerable because, in any population they lead in numbers and in disparity of employable skills.

Women also tend to be more vulnerable because they often stay at home in rural areas while men look for work in urban areas. The women are rarely trained as professional natural resource managers with policy-making ability, yet they are the key actors in environmental management activities. In addition to these geophysical constraints, other socio-economic constraints leave many women and people in the rural periphery with little to protect themselves from shocks. Poor health care, limited access to education, information and technical assistance, and higher urban unemployment, reduce the opportunities for out-migration and lower the remittances sent back to the villages (The World Bank, 2003:17).

According to Alexander (2002: 2), water is an important source to the socio-economic advantage of any society, both as a means and as an end in itself. Water scarcity caused by the negative changes in the environment is too detrimental and injurious to women's lives, particularly in rural areas. This is due to the fact that society perceives water management as a woman's gender role and its absence is blamed on them whether or not it is their fault. Yet the socially approved means of water collection in most African rural societies are limited to their heads (having to carry water in their heads over long distances) (Alexander, 2002: 2). The decisions as

[11] Vulnerability refers to being prone to or susceptible to damage or injury.

regards the design of water technologies are made without women's input. Women in rural areas usually experience the following problems when there is water scarcity:

3.4.1. HEALTH PROBLEMS

According to WHO (2002: 1), in spite of the literature on women's role and responsibilities in relation to water provision and use, little research has been carried out to establish the effects on women of insufficient and poor quality water in terms of household coping strategies, the health impact of water carrying, or the differential impact on women of water-borne diseases. This is despite the fact that the rural poor are disproportionately affected as they lack access to water and are thus highly exposed to water related health hazards (Pelser, 2004: 190). A large percentage of the infectious and parasitic diseases that plague the developing world are associated with inadequate water. In addition, in many places women spend time actually working in the water washing clothes, for instance, and so may be more often exposed to water-borne diseases. Diarrhoea is said to be the real culprit. Diseases that are prevalent when water quality, water quantity, water accessibility and/or sanitation are deficient can be grouped into four categories, namely: water-borne diseases, water-washed diseases, water-based diseases and water related disease. An important aspect of primary health care should therefore be the provision of clean water in adequate quantities. For many people in developing countries this is one of the most difficult problems to cope with. Women's lack of time and energy affects selection of water sources and can limit the availability of safe water at home and in the fields. The high time and energy cost of fetching water therefore govern women's perceptions of the importance of hygiene in disease prevention.

The problem of water scarcity and long distances is further compounded by the fact that water-storing devices at home are in most cases either lacking or inadequate, both in terms of quantity and quality. Poverty in rural areas makes it difficult for households to acquire and establish good storing devices. Even where drums are used as storing devices, they are often uncovered and become good breeding spaces for mosquitoes, rendering water unfit for consumption and subjecting people's lives to further health compromising conditions. To exacerbate the situation, as has already been mentioned, cattle herders, both older men and young boys, take their animals to drink from the same water source used for collecting domestic water. This normally pollutes the clean water that could have been drawn by women. Most water sources are not protected or fenced against animals (Lubisi, 1997: 316).

One other impact of water scarcity on women's health is the fact that, in rural areas, the most common method of transporting water is on the heads of women, in clay pots, gourds and Gerry cans whose capacity varies from 20-30 litres. Carrying such heavy weights over long distances often results in serious deformities, headaches, osteoporosis and other bone diseases and exhaustion of the body, and this is particularly bad and life threatening for pregnant women as their legs swollen. Many women, particularly in Africa, do not use or ride bicycles which are energy saving, not because they cannot but, because riding bicycles is socially not acceptable to women (WHO, 2002: 1).

Water scarcity also means that the journey to and from the water source on a daily basis is never safe, as it is always marred by accidents, which have tragic consequences. Women have to balance heavy loads in their heads making it difficult for them to look where they are going. Women and young girls are also not safe as they are at risk of being assaulted while they are doing this duty far away from home and in the early hours of the day or late at night. Some women have to leave their young ones at home while they travel long distances to get water and this puts the children at risk of being assaulted as they are left alone or with their young siblings.

3.4.2. TIME AND ENERGY

Some of the health problems in relation to water are blamed on time and energy spent in selecting quality water. This is because water sources in rural areas are often situated far from the reach of most women and an average of 5km is travelled to reach the water source. This distance increases during the dry season when most springs and wells drying up, leaving women with no other alternative but to walk further distances in search of water

The amount of time and energy women spend on household duties can dramatically increase as water resources are depleted (PRB, 2001: 3). During the dry seasons, women's nights become shortened as they wake up in the early hours of the morning to go and search for water (particularly drinking water) when it is still clear, as they usually share water with animals that are led by men to the same resource as the one used for household purposes. They also have to wake up early because other members of the family, especially the elderly usually require tea/coffee and porridge in the early hours of the morning and they expect fresh water (water that did not "sleep" overnight). *Oomakoti* (A Xhosa name for brides) are usually forced to do these duties. Unfortunately, in this season water sources are unreliable and water supply is limited to late in the evening or the early morning hours of the day. When women must travel further

distances and take more time to collect water, girls are often taken out of school to assist. Women also have to abandon other duties.

While some of the problems, like seasonal change and the coming of the dry season, together with the subsequent water shortages, are seen to be explicit enough to be understood, most communities do not acknowledge and recognize this as a difficulty on the part of women and hence as something that calls for adjustments to the time taken fetching water. In most rural areas married women and young girls are often battered by their husbands and male kin whenever they come back late, past "normal hours" for collecting water. This difficulty is often mistaken to be a search for sexual adventure with other men, rather than necessary adjustment to the changing environmental conditions in order to meet their gender roles (Lubisi, 1997: 315).

3.4.3. Decreased nutrition for families

According to PRB (2001: 4), women are often forced to change their families' dietary practices when there is a lack of potable water. Nutrition suffers when water shortages force households to economise on water by shifting to less nutritious foods that can be available even when there is no water, or by skipping meals all together. Although these nutritional changes affect all household members to some degree, women and female children bear the greatest burden and they sometimes eat less and least often.

3.4.4. Impact on economic conditions

The water crisis has kept rural women in a cage of poverty in all its manifestations -both physical and social - because their time is wasted, which could have been used to engage in gainful economic activities. Lack of water also impacts on economic activities. It leads to extensive crop failures and death of livestock, which are usually their meals and income. For girls in rural areas the future also becomes bleak as they are sometimes taken out of school.

3.4.5. Poor infrastructure

In addition, most water projects implemented in rural areas, worldwide, usually put great emphasis on training the males in the repairing of the pumps and boreholes whenever breakdown occurs. While this is not a bad strategy, it is shortsighted, as most of these trained males are never available at the times they are needed, given the nature of their work, and they cannot be blamed, as they need to survive. Women are never trained in this regard and this adds to their problems. Even in areas where water can be piped, women are never put consulted during the design and or location of the pumps, and the result is that in many cases the handles are often

difficult to reach and heavy to use. The availability and reliability of the water source is not a reflection of utility and appreciation by the end users.

3.5. Rural women and their involvement in the management of water resources

Despite the fact that women are more vulnerable to the impact of water scarcity than men, they are most often excluded from decision making. Similar to environmental management, women are hardly visible in public management of water resources. One mistake that was made in the past when it came to managing precious fresh water, was that governments around the world typically chose between two bad alternatives. Some governments decided to off-load water management onto local authorities without empowering these authorities with the competence, or the money, or the support to protect them and without adequate overseeing of their work (Brooks & Winfield, 2002: 1). In these cases even if the community was involved, women were not included, or when they did participate, it was often at local level and with minimal influence over project planning. They were kept out of decision-making responsibility and excluded from all technical management.

Other governments decided that they alone should manage water resources. In developing countries this centralization preference has been generally reinforced by big foreign aid donors. Decision making, design planning and implementation of water projects have often been based on a single sector, which was a top-down approach. What this means is that for too long the provision of water and sanitation through water projects has been a male dominated process. There has been no holistic concern or a sense of partnership and shared responsibility between men and women (Hemson, 2002: 25).

3.5.1. The impact of excluding women from water management

The subordinate position of women in rural water management has been strongly contested in policy. This is because researchers agree that the low level of women's participation affects the longer term sustainability of water projects (Hemson, 2002: 25; PRB, 2001: 3), as a large portion of the population (sometimes more than 50 percent) is not included (Onyango, 2003: 2). Exclusion of women from water management is also contested because:

- Excluding women has often denied them access to adequate water supply.

- Failure to address gender biases in community organization undermines project performance. Projects often fail. Hemson (2002: 25) has argued that, despite a drive to provide water to rural communities, there are reports of project failure, especially when men make decisions on behalf of women. For example, authoritative males would assign jobs to women. Sometimes the women neglect these tasks because they are added to their already overloaded work schedule, and often many of the male imposed rules are sometimes impractical. Failure to take women's activities into account can thus lead to polices that criminalize activities without meeting their needs.
- The water related tasks prove to be counter-productive. Since men lack the incentive to carry out work related to domestic water provision and sanitation, which they feel to be within women's domain, men usually focus on water for irrigation and commercial farming. They sometimes divert water from rivers and construct dams, and as a result the flow of water decreases. Women will consequently find it difficult to find water as it becomes scarcer downstream.
- If one group is excluded, water policies usually become less efficient and effective (Francis & Jahn, 2001: 1).
- It also means that women are often not well prepared to deal with natural disasters, such as drought.

Basically, what this means is that women's needs, knowledge, perspectives and proposed solutions are often ignored.

3.5.2. Recognition of women's capacity in water management

In the 20th century there has been a shift in thought, which acknowledges that the world should stop planning, designing and implementing projects without recognizing women's knowledge regarding water issues. Globally, most government guidelines, projects designs and program policies are starting to incorporate a gender dimension (Brook & Winfield, 2002: 1). Countries in Mexico, other Latin American countries and countries in Africa have started to include women in decision making (Hemmati, 1999: 1; Hemson, 2002: 25; PRB, 2001: 3). Women are now perceived as sources of knowledge on the subject of sustainable water management practices. Over the years, women have accumulated an impressive store of water management wisdom. They have been ones to collect water, choosing their sources according to certain criteria such as accessibility, availability, distance, time, quality and use (PBR, 2001: 3).

Women are therefore invaluable as environmental educators and communicators, both within the family and the community. Many problems can thus be avoided if women are consulted on such items as local sources of water, the location of the well or the design of a pump. Furthermore, including women will have the following advantages (Botes, 1999: 4):

- It counteracts an attitude of people in authority who usually make decisions for other people who are beneficiaries but who, as a result, are prevented from taking responsibility for their own lives.
- It will make women less dependent and more self-reliant on local wisdom and knowledge to create their own future.
- If they are involved women will also improve ownership of development inputs, outputs and outcomes.
- It improves commitment and encourages self-actualisation and self-confidence of local vulnerable groups (for example, women).
- If the women are taking part, in grassroots and stakeholder planning, programmes are more aligned with indigenous norms and values.
- By reflecting on women's interests and needs, costly errors can be avoided and there are more efficient and effective programmes.
- Lastly, it makes development more sustainable.

The incorporation of women into the management of water resources in the public sphere is, however, still very complicated. Some of these propellants and impediments towards women's involvement are discussed below.

⦿ Position of women on decision-making bodies

In a study that has been conducted on women's participation in water committees, the most common and striking issue which emerged, was the poor participation of women in water projects. Men dominate most of the water committees, as women are the first to elect the men when given a chance to have a voice. The few women that have been elected onto these committees are often passive or they take a back seat. Their presence in the committee often has little or no impact on decision making. Women are then generally involved during the implementation when they provide labour (Lubisi, 1997: 325).

Lubisi (1997: 325) also observed that women on the committees were not free to express their views or to participate in decision making. The women were only there to fulfil the then quota of 30 percent expected by policy and supported by the funding agencies. The statistics show that women occupy less powerful positions in committees (vice secretary, bookkeeper and ordinary positions), as the primary leadership positions are committee signatories (chairperson, secretary and treasurer). Women therefore tend to take secondary or supportive positions, as auxiliaries to the main positions, as 'vices'.

Even when women occupy positions of some authority, their participation and decision-making appears to be subordinate to male authority in practice. All surveys show that women have a low level of verbal participation in committees, that women defer to men on major issues, and that they encourage men to deal with external agencies. An explanation for this can be the socio-economic and traditional gender relations in rural areas in particular.

⊙ Rural women's decision-making in the presence of men

It seems that the traditional social setting intrudes on the post-apartheid modern institution within the rural areas, eroding the advances made through policy that affirms women's position within committees. The question of deferred participation is an issue that does not affect water committees alone and appears to encompass the whole range of modern institutions in the rural areas. The evidence is that representation of women in itself has not brought about the anticipated change, in bringing decision making more in line with the majority of users or in greater democratic practice. In all-women committees it appears that women overcome their sense of inferiority because they do not have to perform in front of men. The difficulties arise in the presence of men, which leads to a dramatic inhibition of women's confidence and participation. Most of the time women do not feel comfortable on the water committees because they receive poor support from both male and female community members. They feel they have neither the community's respect nor support for their involvement in the water committee.

On water committees there is also evidence of an autocratic style of leadership in contradiction of the notions of participatory democracy. In many committees the chairpersons or technical administrators, who are mainly men, lead all discussions, which may effectively minimize the involvement of other committee members. This may represent the incapacity and lack of initiative of other committee members, but at times it is clearly the intention of 'dynamics individuals' to control outcomes.

⊙ GENDER INEQUALITY

The proportion of women receiving education is now taken as one of the primary indicators of human development. The practice in many developing countries has been to sacrifice the educational opportunities of daughters for those of sons, although this is now changing. In the past women were not allowed to go to school as this was viewed as a waste of time and money. They were expected to spend most of their time in the fields while men received their education. It was believed that there was no need for a woman to receive education because her traditional role was that of housewife and mother. As a result most women did not attend school, which clearly would have affected their self confidence (Lubisi, 1997: 325). However, in the most traditional sectors of South African society there is still less attention given to women's educational advancement. Certainly the educational standards of women participating in water committees is generally lower than those of the men, with a high proportion having less than standard six (eight years of schooling) and only 37 percent having continued further. These figures indicate fairly severe educational disadvantages, which certainly would inhibit women from having a more active role (Hemson, 2002: 27).

Hemson (2002: 27) highlighted the fact that adult basic education and training has had a poor record in the urban areas and an even poorer one in rural areas, and yet the women participants in all-women committees and water committees urgently need such educational support. Women need better training, better education and greater power and authority to be involved from the outset in planning, implementation and evaluating policies and projects (PRB, 2001: 3)

Another reason that was given to explain women's low levels of participation is that culture does not permit their greater involvement. Women identified South African culture as one of the important factors contributing towards poor participation in decision making (Lubisi, 1997: 325). In the rural context the weight of the past bears heavily on the present, particularly on the need to observe customary practices, both as valuable in themselves and to avoid conflict with the local political order. The research reveals that although many women want to be part of decision-making on key services that would relieve them of hard labour, they also generally agree with the patriarchal notions of women's inferiority to men and the traditional status quo. Surprisingly, there appears to be little difference in the viewpoint of uneducated and educated women. It is therefore very common in the rural areas to have young girls and women having no say in family matters involving decision making and pushing men and boys to the fore when dealing with such issues.

Lubisi (1997: 325) also emphasizes the fact that most of the women do not talk during meetings because they are not sure as to whether what they will say will make sense. They believe that, because most of the men are literate, they (men) can do better than them. The community at large also prefers to elect educated men to serve in their committees. Women are usually not considered and this in itself is disempowering.

⦿ WOMEN'S ATTITUDE TOWARDS EACH OTHER

It was found that in many cases women are jealous of one another. There are very few active women in communities and other women often criticize them. Those who criticise others often claim that the women on committees think they are better than others. There is also a tendency to say that if a woman talks in a meeting she wants recognition from men. To avoid a conjugal fight, women therefore prefer to remain silent. Women are even jealous about minor things such as the clothes they wear. All this demotivates a woman who is prepared to take an active role in the community (Lubisi, 1997: 326).

⦿ TIME FACTOR AND CULTURE

The normal practice in rural areas requires that a woman wakes in the morning, cleans the house and yard, fetches water, cooks, goes to the field, fetches firewood and looks after the children. All this is done without the involvement of men and is considered normal. This means that women do not have time left to devote to other activities taking place in the community. Women spend up to 15 hours a day doing home chores while unemployed men spend only 6 hours at this. In some communities where the majority of men are working, meetings are held from 18:00. Women often have a problem with such times, especially those whose husbands are working locally. Due to the problems such as crime and the fact that it is considered immoral for women to go out and meet with men while their husbands stay at home, they are normally unable to participate in such activities (Lubisi, 1997: 326).

⦿ POOR COMMUNICATION

Important messages do not reach women and it becomes difficult for them to participate during mass meetings. Often, important meetings are held in the community without women knowing about them. This is because development organizations and consultants, when visiting the community, usually go via the Civic *Induna* (Xhosa name for chief) and other local structures such as the RDCs or Forums. These local structures usually comprise men only (Lubisi, 1997: 326).

3.6. PROGRESS MADE TOWARDS THE INCLUSION OF WOMEN IN WATER MANAGEMENT

Despite the above-mentioned problems, there have been a number of important advances and recommendations with regard to the involvement of women in water resource management. There are, for example, committees headed by and composed of women, and others in which women are gaining experience and confidence. General democratic advancement in countries, in which the goal of a non-sexist society is often spelt out by the political leadership, has led to a positive change in attitude towards women. Women feel they gain new knowledge and insights and are empowered by attending meetings. Men accept their involvement and participation in committees and the women have the opportunity to learn new skills, leadership and self-confidence (Lubisi, 1997: 325).

Women also feel empowered by certain external intervention. Men readily accept women facilitators from external agencies, as they do not pose a threat to the position of men in the community. Rural women also view them positively as they reinforce the notion of capable leadership by women, and stimulate women's participation (Lubisi, 1997: 325).

The attitude of men towards women's empowerment is an important factor in women being able to consolidate the advances made. Men overwhelmingly support the idea of women's participation and empowerment within the new political system. They acknowledge that men cannot decide for women anymore. They think women should be involved in decision making, otherwise they might reject those decisions made and the process will have to start over again, but these men insist on the male prerogative: 'We live by our customs'. There is also evidence that some men do not encourage women's (especially their wives) participation, nor combat the notions of inferiority felt by women in mixed groupings. Despite agreement with the idea of change, when women are actively engaged the in decision-making process, some men are reported to react negatively and to feel uncomfortable in sharing power and responsibility with women (Lubisi, 1997: 325).

The common sense argument advised by development practitioners is that projects would be more sustainable if those whose lives are most affected were in control of them. FWCW (2002: 2) has also indicated that if women are not included in decision making and policy formulation, sustainable development will be an elusive goal. Women's contribution to environmental management should therefore be recognised and supported as their lack of representation limits their influence over public policies and programs (PRB, 2001: 5). Experience has proved that

female-headed ministries of water resources and the environment involve the ministries of women's affairs in their projects; problems are considered from different angles thereby adapting them to the real needs of the community (IHP, 2003: 2).

Collecting gender based information is also a crucial step towards developing gender-responsive policies and programs. Data that provide information on women's and men's resource use, access to resources and participation in water decision-making contributes to sound policies. According to PRB (2001: 5), currently gender-based information is rarely used in national environmental policies or programs. Another important issue is the commitment of government, at the highest level, to incorporate a gender perspective into its national water policies. Gender policy declarations are important because they demonstrate a government's intent to address gender concerns; provide a reference document for technical staff that are working on national policies and programmes and provide the basis for action to develop the capacity of both women and men to address gender concerns.

Lastly, just as women need to be more involved in decision-making, management and maintenance, so men should participate in hygiene education and sanitation, and should be encouraged to offer up a fair share of the time and labour which is often expected of women. There should be shifting away from the usual assumption that, when executing projects, men are responsible for the public sphere and women for the private sphere (IHP, 2003: 1). But most important is that only when women take part in decision making will their lives improve (Sadie & Loots, 1998: 15; Sass, 2002: 1).

3.7. Conclusion

In order for women to be less dependent on water policies developed on their behalf and to be more self-reliant, they need to participate in water issues. Their local wisdom and knowledge of cultural and ethical values should help them to create their own future.

Up to the 1970s women were largely absent from the public sphere. Their absences in policy development proved to have a negative impact in their lives. However, in the 1970s it became important for women to improve their status in order for them to improve their lives. Local project management procedures were proposed to give a true representation to women's interests. In the environment sector this was supported by the women-and-the-environment approach and the eco-feminists approach. The woman-and-the-environment approach advocated the need to develop programmes directed at assisting women. These programmes had to keep in mind that

women are environmental resource managers and are particularly vulnerable to declines in resource availability. This approach was, however, criticized for having programmes designed *for* women and not *by* women. This approach was also criticized for separating women's values as nurturers of the environment from those of men whose relationship with the environment is that of controlling nature.

The eco-feminist approach therefore argued that women do have a relationship with the environment. Embedded in this theory is the opinion that dominion over women is the same as dominion over the environment. According to this approach, women were historically respected and were able to make public decisions. During this time they controlled the environment and the environment was respected as well. During the modernization era, however, both women and the environment lost this respect and were devalued. The eco-feminists therefore advocate that both women and men use their different values to conserve and manage the environment without making hierarchies.

Rural African women, who are substantial users (domestic and reproductive roles, agricultural roles and as managers) of the environment should therefore be given an opportunity to make decisions about environmental issues. In order for any policies to work though, women should have access to land. It is also important to have access to other natural resources such as forests and water. Access to resources reduces the time women spend in search of these resources. Instead their energy is channelled towards economy enhancing projects. However, most important is for them to be able to formulate policies and to manage their resources.

Because most rural African women do not have access to water, they tend to be more vulnerable to water scarcity. When there is water scarcity, their health is usually at stake. They waste time and energy and they live in poor economic conditions without any incentive to improve their lives. But, because they depend on the natural water resources, rural women can be a knowledge base about this resource. Their experiences, culture and value can contribute greatly to informing policy about water issues in their communities. They are able to give insight about the strategies they had used when faced with water scarcity.

The researcher has selected a rural village in South Africa, called Ndonga. This village serves as an example in demonstrating the impact of gender roles on access to water resources and as an exploration of their knowledge of strategies to mitigate water scarcity.

Chapter 4

WATER SCARCITY, VULNERABILITY AND RESULTING STRATEGIES: THE CASE OF NDONGA WOMEN

4.1. INTRODUCTION

Literature discussed in Chapter three on women and water emphasizes the dependence of rural women on natural water resources. It also highlights the fact that women's needs, interests, responsibilities and experiences with regard to water use are different from those of men and should therefore be singled out as such. What the literature has emphasized is that women are mostly responsible for domestic water use whilst men are involved in agriculture. This means that women have little say about production and market related issues. The previous chapter also has demonstrated the minimum presence of women in decision making with regard to water issues, and when they are involved their needs and experiences are sometimes not strategically addressed but are rather assumed to be general problems.

The fact that women are not fully involved in water management and decision making is a concern. This is because water related disasters, such as water scarcity, affect rural women to an overwhelming extent. Up until recently women in South Africa were hardly recognized in terms of their knowledge with regard to water issues. Water was managed by the state. Water disasters, such as drought, water scarcity and floods, have significantly been managed by government and donors without the consultation of relevant stakeholders. Most decisions were therefore recommended by men or by foreign donors who did not know much about their beneficiaries.

This changed when the National Water Act was adopted. This policy encourages gender sensitive water delivery. The Act is also in its early stages of incorporating women (at least 30 percent) in water management. However, there are currently many challenges hindering the incorporation of women into public spheres. However, participation of women and local

community means that women should not just be victims of environmental disasters. Policy makers should rather assess women's current situation and therefore build sound and relevant policies.

The purpose of this study was not to separate the roles of women from those of men in the community or from those of government, but rather served to highlight women's specific problems and experiences regarding a gender sensitive plan to mitigate water scarcity. The aim of this study was therefore to take stock of the water situation and water delivery in Ndonga. Secondly, the researcher highlighted the vulnerability of rural women to water scarcity. Lastly, the researcher explored strategies the Ndonga women use in order to cope with water scarcity. With all this knowledge the researcher suggested courses of action that could be used to mitigate water scarcity and conserve the water resources. These strategies are relevant as they take local issues into consideration and the strategies specifically target Ndonga women's needs.

In order to get the desired results, the researcher did background literature search on water issues in Ndonga; put together a number of questions to local authorities familiar with the water issues and the situation the women are faced with, and had three focus group discussions with women in Ndonga.

4.2. WATER SCARCITY IN NDONGA

Although the Eastern Cape is said to have abundant water it is seen as one of the worst off provinces regarding access to fresh water. The Eastern Cape, of which some parts were in the former Transkei homelands, has inherited a massive backlog with regard to water supply and sanitation. Only 45 per cent of the population in the Eastern Cape had received free basic water in 2001 (Statistics South Africa, 2001). Most of the municipalities in this area have had problems delivering water because they lack financial and institutional resources necessary to implement the water policy (Mehta and Ntshona, 2004: 9).

It is also important to investigate water issues at local level as these can be influenced by community adaptations and social institutions that protect natural resources (Biggs, et al., 2004: 16). What this means is that regional and provincial views of water scarcity may differ from basin and local view. Water is unevenly distributed in different areas and even within one region. When one focuses on an area that appears uniform at the regional scale, localized area of excess and deficit appear. According to Biggs et al. (2004: 15), at local scale, socio-economic factors usually determine household water availability. In chapter one literature also showed that different levels

of stakeholders experience water availability differently. As a result, the researcher decided to select Ndonga in the Eastern Cape. Mr. S.K. Fudumele (Former Councillor of Ward 6 in the Emalahleni Municipality) identified the Ndonga administrative area in Lady Frere as a proper site for the study. This area is situated ±70km from Queenstown. It falls under the Chris Hani District Municipality and constitutes ward 6 of the Emalahleni Local Municipality. Ndonga consists of nine (9) villages. These villages are: Maqhubela, Hala 1, Hala 2, Lamoen, Cegceyana, Ntlalontle, Greyspan, Trust and Percy (See Annexure A and Figure 4.1).

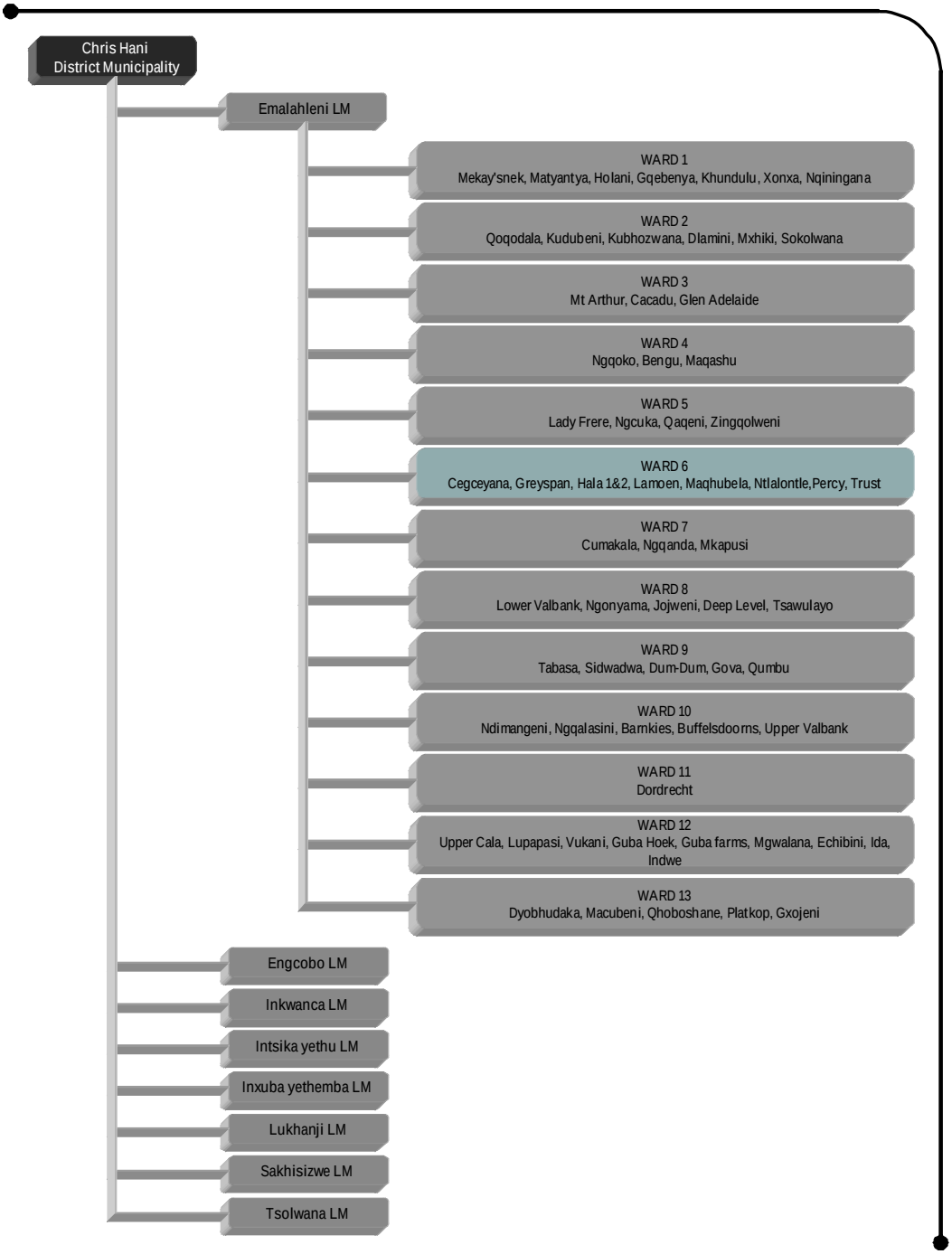

Figure 4.1: Breakdown of Chris Hani District Municipality and Emalahleni Municipal Wards

In order to fulfil the first two objectives of the study, the researcher did a literature search on the climate of Ndonga and the surrounding areas. The researcher also asked the participants in the focus groups to discuss some of the problems they encounter with regard to water issues. A

participant from Percy had this to say about the water situation in Ndonga: “Water is so scarce in this area, that when I travel and see water in other areas I wish I could transport the whole dam or stream to my own village”.

4.2.1. CAUSES OF WATER SCARCITY IN NDONGA

In Ndonga, water scarcity is a result of both environmental and human induced causes. Literature and the focus group discussions highlighted the fact that Ndonga is experiencing a number of water problems, resulting in water scarcity. Water scarcity in this area is a result of its climate, drought, desiccation, inadequate water supply and silting of dams. These are analysed below.

- **CLIMATE**

The DWAF (2002: 17) indicated that the climate in this municipal area varies from arid to very cold highveld. It falls mainly into two climate zones, namely: arid and semi-arid moderate midlands’ and arid and semi-arid cold high-lying land. The arid climate of Ndonga means that there is a normal, long-term shortage of water in the area caused by a dry climate. Rainfall in the area varies dramatically, depending mostly on altitude. Ndonga is cold in winter and it rains in summer. The summer rains have a 70 – 80 percent precipitation that occurs in the form of thunderstorms. These storms are of high intensity and are sometimes accompanied by hail. Only 20 – 30 percent of the rainfalls occur during winter. The area therefore experiences snowfalls on the Stormberg plateau and the high lying mountainous areas.

Ndonga temperatures are also characterised by extremes. During the summer months, the maximum temperatures often exceed 40°C in the low-lying areas. Minimum temperatures in winter months in the high-lying areas are often well below zero and frost is a common occurrence throughout the area. As a result of the high summer temperature, surface water evaporates rapidly. The high temperatures are also expected to increase by 5 percent as a result of climate change (DWAF, 2002: 16).

- **DROUGHT**

Sometimes there are prolonged spells of drought in Ndonga (DWAF, 2002: 17; Stimie, 1997: 10). In 1999, the northern region of the Eastern Cape (Dordrecht, Molteno, Indwe, Lady Frere, districts) was experiencing water problems as a result of what was reported by several local people as persistent drought conditions (Raasch, 1999: 1). Again in 2004, The Eastern Cape, together with six other South African Provinces (Limpompo, KwaZulu Natal, Northern Cape, Free

State, Mpumalanga and North West), was declared a disaster area because of drought conditions from 2002 to 2003. Because the weather station in Lady Frere was closed the researcher used a station in Queenstown to demonstrate the years in which the area was hit by droughts. Queenstown has the same climatic conditions as Ndonga. Figure 4.1 demonstrates the years in which there was drought. Rainfall of 100mm and below in summer indicates drought (South African Weather Service, 2006). The area is demonstrated as having been highly affected by the 1999 and 2002-2003 droughts.

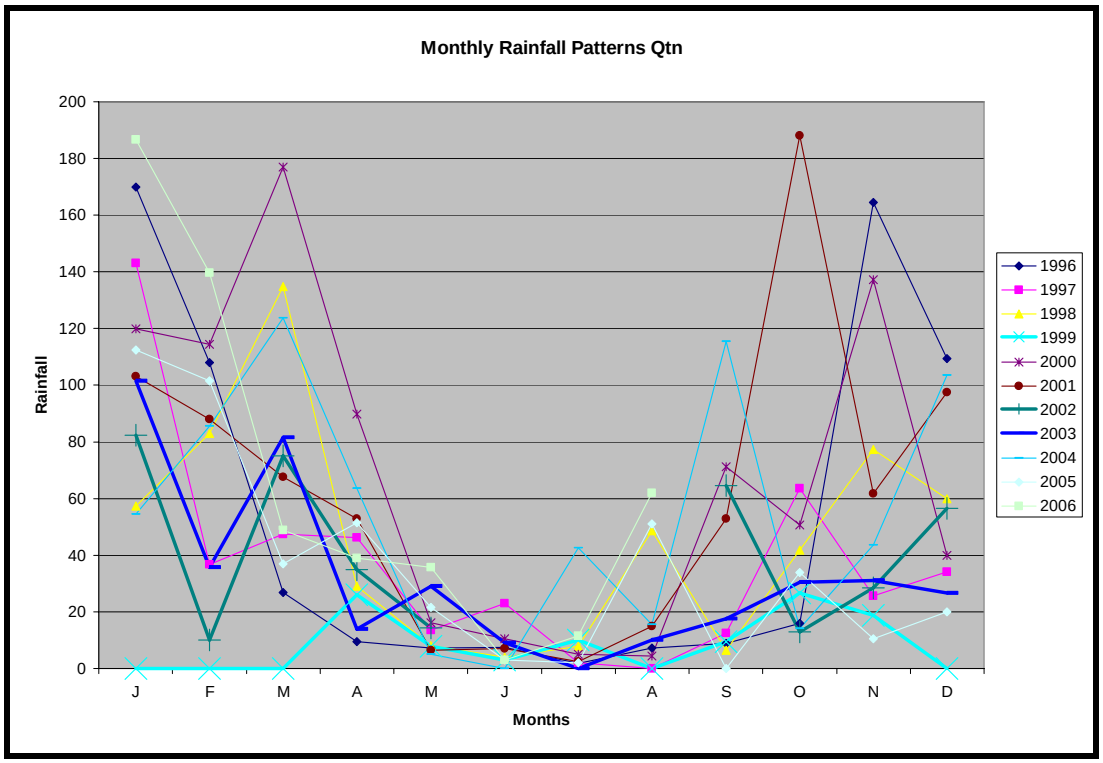

Figure 4.2: Queenstown's monthly rainfall patterns from 1996-2006
Source: South African Weather Service, 2006

These droughts result in reduction in water resources, significant reduction in the rainfall and reduced crop yields and livestock losses.

⊙ DESICCATION

In chapter 2, desiccation was defined as the drying up of the soil as a result of activities such as deforestation and overgrazing. As in many other rural South African areas, livestock ownership is central to the identity and livelihoods of the Ndonga community. According to Biggs, et al. (2004: 24), owning livestock means savings and status, an ability to participate in rituals and cultivation. However, overgrazing as a result of overstocking, damages the soil especially in already arid and semi-arid areas. Despite this, Emalahleni's stock rates usually exceed the

recommended agricultural rates by more than 40 percent (Biggs, et al., 2004: 24). This has results in the drying up of the soil and soil erosion, causing dongas in the area, hence the name Ndonga.

⊙ INADEQUATE WATER SUPPLY

In addition to these problems, large areas of Emalahleni Municipality do not have access to a safe water supply. Some existing water supplies are not functioning or are inadequate. According to the Chris Hani District Municipality (2003: 5), there is a backlog in the former homeland areas of the Transkei and Ciskei, whereby a municipality such as Emalahleni has far greater percentage of population utilising untreated water supplies when compared with urban municipalities. Statistics show that women in rural Emalahleni mostly source their water outside their dwelling place as opposed to 11 percent in urban areas of this municipality (Chris Hani District Municipality, 2003:5). However, the municipalities are working hard at decreasing the backlog in potable water supply (DWAF, 2002: 16). Ward 6's current water situation is summarised in Table 4.1 below. The table shows that, of the 20 148 population of Ndonga, 6102 people (30 percent) have no formal supply of water, while 14046 (70 percent) have a supply equal to the RDP standards. There is no village in the area with a water supply in excess of the RDP standards (DWAF, 2002: 9).

However, results from the focus groups depict a different picture. When the women in the different groups were asked about the water problems in their villages, all groups mentioned a number of obstacles with regard to the water supplied by government.

Table 4.1: Current water situation in Ward 6 (Ndonga) of Emalahleni Municipality

Village Name	Population	Water Source	Bulk Supply	Final supply	General
Hala1 and Hala2	5700	Spring		Direct supply	Poor quality, below RDP Standard
Cegceyana	402	Borehole			Poor quality, below RDP Standard
Lamoen	318	Borehole	Reservoir	6 Communal standpipes	Equal to RDP standard
Greyspan	2440	Borehole	Reservoir	7 Communal standpipes	Equal to RDP standard
Ntlalontle	3000	Borehole		6 Communal standpipes	Equal to RDP standard
Percy	2520	Borehole	Reservoir	26 Communal standpipes	Equal to RDP standard
Maqhubela	3368	Spring	Reservoir	4 Communal standpipes	Equal to RDP standard
Trust	2400	Spring	Reservoir	5 Communal standpipes	Equal to RDP standard

Source: DWAF, 2002

Table 4.2 portrays some of the problems the women experienced. In all groups the women were displeased with the fact that water was sometimes not available from the taps. The greatest concern from one of the participants from Percy was that sometimes they would have to go for about a week without water coming out of the taps. Respondents from Ntlalontle (which is reported as having 6 functioning communal taps) concurred that communal taps in their village do not function most of the time and they still depend on one borehole for their water supply. Instead, the communal taps, when operating leak, as a result of leaking pipes that were not installed properly. Most of the time the taps are turned off because the leaking water damages a local graveyard and the water is wasted. These finding raise a question of accuracy regarding of the number of people receiving potable water in this area. The communal standpipes might have been installed in the relevant areas but are not necessarily all functioning.

Table 4.2: Problems with supplied water in Percy, Ntlalontle and Hala1

Supplied water		
Percy	Ntlalontle	**Hala2**
○ Sometimes water does not come out of the taps ○ No water to build our houses ○ Sometimes we go for a week without water from the taps ○ Water restrictions	◘ *Sometimes water does not come out of the borehole* ◘ *There is no water for building* ◘ *We are not satisfied with only one borehole*	❋ Taps work on and off ❋ Taps leak ❋ Pipes are exposed to the scorching sun and are damaged over time ❋ Contractors do not involve women during the implementation stage

However, it is not all doom and gloom; the functioning water pipes in Percy have made a huge difference to the lives of the women in the domestic sphere. Both the officials and focus groups agree that, prior to the delivery of potable water, the biggest challenge the women had to deal with was the fact that they had to travel long distances in search of water. The women had to collect the water from distant rivers and streams. What frustrated them the most was that they had to travel these long distances in order to do small household chores such as washing clothes. According to the respondents, “they had to move mountains just to get water to wash their clothes and then they had to wait for the clothes to dry”.

Fortunately for women in Percy, the situation has changed dramatically. In an area with no natural water source nearby, government supplied communal standpipes are seen by the women as having a positive impact on their lives. The women have stated that they are now able to use fresh water for cooking in the morning without having to travel long distances to a source of water. Instead, the water supplied for them is clean and safe for consumption. Women in Percy had this to say about these taps:

- "We don't really have water problems anymore because we have taps."
- "We used to move mountains just to get water for consumption or to wash our clothes. When travelling these distances, we were subjected to risks (become ill or being assaulted)."
- "*OoMakoti* (brides) do not have to wake up too early anymore."

Ntlalontle residents receive their water from a government-supplied borehole. To them this borehole means that they can now have some form of formal infrastructure for their domestic water supply.

Some respondents, however, complain of the restrictions with regard to the water supplied by government. One participant said: "We do not have water projects because there is not enough water for anything other than consumption" According to Biggs, et al. (2004: 13), adequate water supply means that communities have water for domestic chores, for maintaining the environment and for economic development. In spite of this, water in the supplied areas is currently used for domestic purposes only. This means that the women do not have adequate water to meet all their responsibilities.

⊙ LACK OF INFRASTRUCTURE

Lastly, because of the water restriction women have to look for alternative water elsewhere in order for them to irrigate crops, build their houses and care for their livestock. One of these options is to use the reservoirs available in the community. The problem is that most of the dams in the communities have silted up, reducing the quality and quantity of water available to the women in Ndonga (see Table 4.3).

Table 4.3: The problem with reservoirs in Ndonga

Dams		
Percy	Ntlalontle	Hala2
○ Dams are silting up	◘ *The dam has dried up*	✱ Dams for irrigation are not available

Equally worrying is the realization that there is a lack of functioning infrastructure in Ndonga and that existing infrastructure has been left to deteriorate (see Illustration 4.1). The participants

are of the opinion that if these infrastructures were refurbished, there would be enough water for both human consumption and for livestock and crops.

According to Schreiner & Naidoo (2002: 7), it is common for service providers not to seek out local knowledge and understanding of water supply. In Hala2 and Ntlalontle this has resulted in service providers laying down new pipelines instead of using or extending the old traditional systems. The new systems are not only costly to install but have caused major damage in the area. The plastic pipes that were installed leak, because they have been vandalized, and the pipes burst as a result of the scorching sun. In the meantime, existing infrastructure is left to deteriorate. Considering that Ndonga shows signs of water scarcity, the women in Ndonga are vulnerable to water deprivation.

Illustration 4.1: A dam in need of repairs

4.3. NDONGA WOMEN'S VULNERABILITY TO WATER SCARCITY

Vulnerability can be defined as a threat to a group of people or their situation resulting from exposure to harmful threats because of environmental, social, economic and political exposure that influences their capacity to cope with or recover from the impact of the damage or hazard (Biggs, et al., 2004: 22; Pelser, 2001: 55). Women in Ndonga are constantly exposed to water scarcity. The women are vulnerable as a result of their social, economic and political exposure.

4.3.1. SOCIAL EXPOSURE

As may be anticipated in South Africa, a trend of rural-urban migration exists in Ndonga. This trend is largely attributed to the fact that men are often migrant workers, a trend which began under the former regime and which appears to continue. According to de la Harpe (1998: 3) apartheid polices facilitated the movement of able-bodied males into the urban environment in order to provide a readily available labour pool. This resulted in a disproportionate number of women and women-headed households in the Ndonga area. The Emalahleni Municipality population consists of significantly more female inhabitants (55 percent) than male (45 percent) (See Figure 4.3). The migration trend is further compounded when there is water scarcity, as men seek jobs elsewhere, leaving the women behind to cope with the situation.

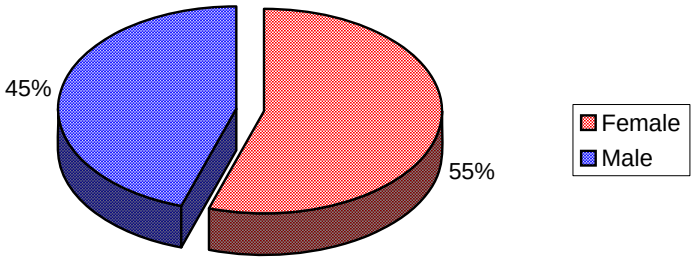

Figure 4.3: Gender breakdown in Emalahleni Municipality
Source: Emalahleni Municipality, 2003

Secondly, the social status of women can have a direct impact on women's vulnerability to water scarcity. Female-headed households are said to be at a disadvantage when compared to male-headed households. According to Schreiner & Naidoo (2002: 3), women, and women-headed households, are amongst the poorest of the poor.

These women also suffer when men are not available for traditional male tasks such as repairing water infrastructure in the community, which was previously taboo to women. Although there is progress in terms of training women in technical skills, women are still sidelined in some instances. For example, in Ntlalontle, women were not part of the implementation process when pipelines were installed, and therefore they missed out on technical training.

4.3.2. ECONOMIC EXPOSURE

The second reason for women's vulnerability in Ndonga is their economic status. According to Mehta & Ntshona (2004: 9), the Eastern Cape is one of the poorest of South Africa's nine provinces, with a predominantly rural population, high unemployment, and poor access to social

services. As already discussed above, female-headed households are amongst the poorest of the poor. In the Emalahleni Municipality the majority (51 percent) of the population is unemployed. This is mainly because of the nature of the district, namely communal land and rural settlement land. Secondly, there is the make-up of the population in terms of gender. At present the Emalahleni Municipality has relatively few economically significant resources to boost economic activities. The major economic sectors are the Government and social service sectors (with government grants as an important source of income). Whilst the agricultural sector has been identified as the sector with the greatest potential for future economic development, less than 3 percent of those employed are engaged in this sector (Emalahleni Municipality, 2003: 16).

Unemployment makes it easy for women to be vulnerable to water scarcity as it influences their capacity to cope. For example, when there is water scarcity, there is reduction in water for chores, other than domestic chores. In these instances, women usually hire a cart or car to transport water from distant rivers. However, a woman from Ntlalontle said that as a result of unemployment, they cannot afford transporting water or paying for repairs to existing infrastructure. They are also not able to use the government supplied water as they have to pay extra money in order to use water to irrigate, build, or water livestock.

Table 4.4: Women in Ndonga complain of unemployment

Employment/unemployment	
Percy	Ntlalontle
○ No money to pay for water because we are not employed ○ Unemployed and depend on livestock and vegetables/crops	◘ *Maintaining self-made boreholes is expensive.* ◘ *Unemployed and therefore cannot afford to pay for repairs and collecting water*

Table 4.4 demonstrates women's complaints in terms of unemployment. The respondents from Percy mentioned that what is worse is that rural communities "depend on livestock and vegetables/crops for a livelihood as they are unemployed". But they do not have enough water for these purposes, especially when there is water scarcity.

Drought that occurred in the past, which caused a decrease in the water resource, has had an effect on women's ability to cope. The drought resulted in crop failure and loss of livestock. More than 500 000 cattle died in the rural areas of the Eastern Cape during the first half of 1993 (Chapter 1). It is therefore clear that drought worsens the plight of those in rural areas, especially women, as the men migrate to urban areas and women have to take over their roles in an already difficult situation (Pelser, 2001: 36). In villages such as Hala2 and Ntlalontle, women still have to

spend a great deal of time in search for water. This reduces their time in housekeeping and results in women devoting less time to income generation.

4.3.3. POLITICAL EXPOSURE

One other factor that influences women's vulnerability to water scarcity is their level of political exposure. In most developing countries women are responsible for most water duties; however, they have not been taking part in the formulation of water policies. Instead, they have had to survive with whatever was available to them. The South African situation has not been different as water was managed by the state and those who owned land.

Women in Ndonga are still responsible for almost all the domestic related chores. When asked about their daily interactions, the participants (Percy, Hala2 and Ntlalontle) agreed that they start their day by fetching water for the day's household chores. Following this the women would then make tea and porridge for their family, prepare the children for school, clean the house, wash their clothes and irrigate their gardens. Some (Ntlalontle) even tend the livestock after completing their household chores.

In 1997, the South African National Water Act mandated the inclusion of water users in decision making with regard to water resources. Furthermore, the inclusion of women was highlighted (Hemson, 2002: 26). The women were therefore given an opportunity to be part of governance in their local community and to voice their opinions on issues pertaining to water resources.

This came at a time in which most governments have realized the importance of including communities in water issues, and more importantly the women. As discussed in Chapter 3, the exclusion of women in water management can result in inappropriate policies and unaccountability. It can also mean that women's specific needs are not met and that women's experiences are not recognized. Their inclusion, on the other hand, would mean the inclusion of the majority of the population in Ndonga and would mean the acknowledgement of the women as a knowledge base when it comes to local strategies to deal with water scarcity.

The South African government is therefore devising plans and strategies, such as the Integrated Development Process, to include women in all decision making concerning natural resources and is trying to make things easier for them by supplying free basic water for the poor. The Ndonga women are also currently given an opportunity to be part of governance in their local

communities. According to interviewees (Fudumele, Ndamane, Nonjuzana, Speelman & Ziduli)[12], government policies have made it possible for women to participate in decision making in water projects.

The officials all agree that they try and include at least 30% of all women in water projects and committees. The officials have stated that women form part of the community meetings and usually take part in the planning and implementation phases of all projects. According to one official, the women do not distance themselves from what is happening in their community. Together with the men, the women are "involved from the beginning and are able to identify water related priorities (Nonjuzana)". Nonjuzana mentions that these priorities are addressed through the Integrated Development Planning (IDP) process. The women are not just involved in committees and projects, but are sometimes taking centre stage in decision-making processes. Speelman has also shown the researcher evidence of committees that are chaired by women.

Women have reiterated what the officials said. All the groups (See Table 4.6) agree that they do form part of the local committees and they do make decisions. The women have stated that they not only attend the meetings but chair some of these meetings as well. This gives them a voice. However, women from Percy are the only group that fully agreed to being involved in all stages of decision making on local water projects. These women did not only identify their water priorities, but have been part of installing the communal taps in their village. They also form part of water committees and street committees and are the ones who monitor the already installed communal taps.

Some of the officials (Ndamane & Ziduli) are not satisfied with the level of participation by women in water committee meetings and other meetings in the community. According to these officials, they would like to see more women attending and participating in meetings. Ndamane maintained that a few of those women who do attend meeting do contribute to decision making. According to Ndamane: "there are more women attending water committee meetings than men. However, there are very few of them who contribute to decision making". So, although women attend these meetings, sometimes they do not participate. Another official (Ziduli) is of the opinion that there are few women who attend. According to this official, "women still think they have no right to men's business". The focus groups in Hala2 and Ntlalontle have also cited a number of problems they encounter concerning participation. These are discussed in Table 4.5

[12] Please note that the data from the interviews with key informants is presented together with the focus group findings.

Table 4.5**: Women's views on participation in water committees**

Participation		
Percy	Ntlalontle	Hala2
○ We have water committees to identify problems ○ We have street committees to monitor water usage ○ Women take part ○ Women were present during the installation of the taps ○ Women were included during design ○ We voice our needs but our agricultural and building needs have not been met	◘ *There is a water committee* ◘ *We are involved and work together with men* ◘ *Some women are not involved because they have not been elected* ◘ *Women are not elected because they do not attend meetings* ◘ *We are too busy doing other things and therefore do not have time to attend meetings* ◘ *Sometimes we are not aware that there is a meeting* ◘ *Women who attend the meetings do have a voice and they share ideas, however our water needs in this village have not been met yet.* ◘ *As women in committees, we do not get support from other women who often provoke and belittle us* ◘ *We get most support from men.* ◘ *During planning, only those in committees are involved*	❋ Women attend meeting and are involved in the water committee (4 of which 1 is the chairperson) ❋ We speak freely at these meetings ❋ We receive support from the community ❋ We receive little support from other women. Instead they belittle us and they call us names ❋ We would like to participate more but when we get back home, there is usually a lot of work still to do. This is even worse when there is water scarcity ❋ if you want to pass knowledge about water issues and water projects to other women, you do not get respect from them ❋ Jealously is rife among the women and other women see you as a nobody ❋ Some women believe that government should do everything

⊙ EXTRA WORK BURDEN

The majority of the women (Hala2 and Ntlalontle) have blamed their absence from committee meetings on their work burden. To them having to attend meetings and take part in community affairs reduces their time to complete domestic chores. This proves that little has changed with regards to sharing chores with others in the household. The women have said that, "we would like to participate more but when we return to our homes a lot of work still awaits us". Added to the responsibility of supplying water in their homes, and making decisions in the community, women are also involved in agricultural duties. These duties sustain the women financially and as a source of food.

⦿ WOMEN LACK SUPPORT FROM OTHER WOMEN AND STAKEHOLDERS

One other constraint is the lack of support from other stakeholders, including other women. *Local government* is playing a major role in ensuring that women take part in local water issues. As already mentioned in chapter 3, the South African government tries to involve women at all levels of water projects. As a result the women are willing to work hand in hand with government in conserving water resources. However, women in Ntlalontle are of the opinion that government is not addressing the water related problems in their village. The women claim that they have been asking for government's support for many years but have not been helped with their water related problems.

Although women take part in making decisions with regard to water issues, they still feel that their needs are not being met. According to the participants from Percy and Ntlalontle, even though they are involved in taking decisions about water issues, some of their needs have not been met, and especially their public needs (versus domestic needs).

Women have also stated that they receive most support from their *male counterparts*. According to the respondents, men realize the importance of involving women in decision making. They usually encourage the women to nominate themselves as leaders.

Contrary to the support the women receive from men, this study has also confirmed previous findings that women serving in water committees *do not get much support from other women*. Chapter 3 pointed out that most women usually criticize the few women that are currently involved in water committees. Participants also mentioned that, instead of getting support from other women who attend the meetings, they are ridiculed. One woman said that "women attended in numbers in order to ridicule those who have been elected. Even when women have been elected by other women into leadership positions, those they lead soon turn against them, calling them names". According to one of the focus group participants, who is in a leadership position, "women do not realize that putting women into leadership means women will finally be represented and have a voice". Whereas Lubisi (1997: 326) credited this behaviour to jealousy, the participants in Ndonga believed that women are not yet comfortable with the idea of women leaders. To them leadership is "male business". Instead of supporting each other women feel more comfortable with male leaders. "Women are usually the first ones to vote for men even if it has been made clear that they should vote for other women (Ntlalontle)". Women are thus more inclined to support men than other women.

This study confirms that women's participation in decision making is still at a minimum and that projects can fail if women are not involved. One can note that water projects in Percy (installation of communal taps) are thriving when compared to the project in Ntlalontle. Worthy of note is the fact that women in Percy were involved at all stages of the project whilst women in Ntlalontle were not included during the implementation stage. This shows the importance of including stakeholders at all stages of project execution as they are knowledgeable.

Considering women's vulnerability to water scarcity, one can realize that water scarcity in the area has an impact on these women.

4.4. THE IMPACT OF WATER SCARCITY ON WOMEN IN NDONGA

When there is a hazard such as water scarcity, societies are affected in different ways, but rural women have proven to bear the greatest burden as they are usually ill equipped for such a disaster. Ndonga is no exception. In Ndonga, the women's challenges, as in other rural areas, are associated with economic failure, health problems, time spent searching for water and their inability to afford to pay for water.

4.4.1. LOSS OF LIVESTOCK AND CROPS

Unexpectedly, the greatest worry for women in Ndonga is the loss of livestock and crops when there is not enough water, as opposed to the need to have water in their homes. This is due to two reasons. The first one is that some women already receive water for household consumption but do not have access to water for livestock or crops (see Table 4.6). When there is water scarcity owing to drought, the problem is usually intensified because agricultural activities usually become impossible. According to the women, when there is water scarcity humans find it difficult to survive and it is even worse for animals. "The livestock die because they cannot reach the decreasing levels of water in dongas or quarries". The livestock usually fall into these quarries while trying to get to water. The women have realized that cattle succumb easily when there is water scarcity and yet these animals are a prized possession in the community.

Table 4.6: Lack of water for agricultural purposes

Water for livestock and gardens		
Percy	Ntlalontle	Hala2
○ No water for gardens and livestock ○ We are not able to dip our cattle ○ There is not enough water for crops ○ We would like to plant crops because they can resist heat better than vegetables	◘ *Livestock die/there is not enough water for livestock* ◘ *Livestock should have protected camps, especially when there is water scarcity, and have not share it with animals from other camps.*	✱ We do not have enough water for irrigation

Secondly, as a result of high unemployment rates in this area, paragraph 4.3.2 shows that the Ndonga community depends on their livestock and crops for survival. The women depend especially on their vegetable gardens. When there is lack of water, women in Ndonga do not only find it difficult to give water to their livestock but are also unable to irrigate their gardens. According to the participants, they plant their seeds and only hope for a good harvest. "We wait for the rain but it never comes". This confirms that lack of water supply can have a negative impact on the women's economic activities. Illustration 4.2 shows a vegetable garden in Hala2.

To irrigate community gardens that are not close to the water source, the women have purchased drums in which to pour and store their water. However, these women have also noticed that their garden is not thriving.

Illustration 4.2: Masibambisane community garden in Hala2

4.4.2. HEALTH PROBLEMS

Together with the above-mentioned impact, when there is water scarcity Ndonga women have to deal with health problems. Out of the four health problems mentioned in chapter three as having a negative impact on women, only one was of great concern to the women in Ndonga. According to the women in Ntlalontle (as shown in Table 4.7), more problematic is the fact that

some of them still access their consumable water from unhygienic sources such as rivers. These women have all agreed that water from rivers is unhygienic as there are many other activities that are performed in rivers. The quality of the water drops with the level of water in the river. According to WHO (2002: 1), this results in infectious diseases such as diarrhoea.

Table 4.7: Impact as a result of unprotected infrastructure

Infrastructure	
Ntlalontle	Hala1
◘ *Unhygienic water* ◘ *Unprotected infrastructure* ◘ *Dam should be protected* ◘ *Water in the dam is muddy and not healthy*	❋ Sharing water with animals ❋ Unprotected water ❋ People do all sorts of unhygienic things in water

Women in Ndonga, like many rural women in South Africa, depend highly on springs. The women in Hala 2, for example, have improved their own spring. However, this spring is unhygienic and is not protected (see Illustration 4.3). The respondents also agreed that the situation is made worse by the fact that they have to share the water with animals.

Illustration 4.3: Spring in Hala2

The women have also noted that their children catch water related diseases very easily when there is lack of water.

4.4.3. WASTED TIME AND EXTRA BURDEN

Although some of the participants in the study have access to water close to their homes, other women in Ndonga claim to waste a great deal of their time in search for water when there is water scarcity. They wake up before dawn, walk long distances and wait in long queues for water.

Sometimes they have to wait for the springs to clear up before they can get water. This is a waste of time and an extra burden on these women as searching for water reduces time for other everyday chores. One of the women in Hala 2 says: “When you have walked far and waited for water for hours, you get back home and you find all the housework still waiting for you”.

This is a big problem, also experienced by other rural women throughout the world. In chapter 3 it was noted that the amount of time spent in search of water can dramatically increase when there is lack of water.

4.4.4. WATER BECOMES A LUXURY THEY CANNOT AFFORD

One problem that did not emerge clearly from the literature about the impact of water scarcity on rural women, is the issue of the expense of water. When there is lack of access to water, women in Ndonga are forced to dig boreholes (those who can afford to), buy equipment (tanks and drums) or pay someone to collect water from the river by car or cart. For example, an attempt was made by the community in Ntlalontle to drill boreholes in their area. This project turned out to be extremely expensive to maintain. This is a predicament for women who claim that they cannot afford to pay for water if they are unemployed. Free basic water provided by government is therefore appreciated but not enough. If women require more water than that provided, they need to pay for it but they cannot afford to pay the extra money. As a result, they are not able to give water to their animals or they have difficulty in building their mud houses. Illustration 4.4 is an illustration of a hired car collecting water from the river not too far from Ndonga.

Illustration 4.4: Hired car collects water from a river

Having experienced all these problems, women in Ndonga are conscious of their roles in rebuilding their area. As a result they have developed some coping mechanisms in order to try and recover from the impact of water scarcity.

4.5. NDONGA WOMEN'S STRATEGIES FOR MITIGATING WATER SCARCITY

As a result of their unique challenges with regard to water issues, women in Ndonga have learnt to deal with water scarcity using local strategies. Despite the fact that these women have received some form of assistance from government to mitigate water scarcity, they still have their own strategies to cope when there is water scarcity. This section serves to document the strategies used by rural women in Ndonga. According to Pelser (2001: 54), these strategies can be powerful measures for protecting and conserving water resources. These strategies can also help improve women's socio-economic conditions and their status or confidence in their own ability to influence development in their community.

Strategy 1: *Ubuntu* as a management strategy

The target population strongly believes that what is missing in their communities is the spirit of *ubuntu*[13]. According to one of the participants from Hala2: "People do not work together anymore but instead each person is pulling in his/her own direction". For many years ubuntu meant that neighbours could get together and invest their energies into a single project.

According to the participants, traditionally, communities used to share fields to plant crops. What this meant was that if one neighbour had seeds but did not have cattle for ploughing, or even a field, they would come together with each neighbour bringing whatever he/she had. This strategy had several positive impacts on these communities. Firstly, it meant that a group of households could use common land. Secondly, instead of irrigating three large fields, these families would instead irrigate one field, consequently saving water and energy and, lastly, they planted crops that could be stored and then used when there were water scarcity problems.

The ploughing, protection and harvesting of these fields enhanced community participation. The whole community came together during the ploughing season. The participants indicated that female labour contribution was usually directed at field preparation and ploughing, including sowing, weeding, harvesting, irrigation, crop protection, hauling to the threshing floor, threshing,

[13] Ubuntu is an African concept meaning "humanity to others". The word is derived from two South African languages, that is, isiZulu and isi Xhosa. Ubuntu also means "I am what I am because of who we are". The practice of Ubuntu is, therefore, fundamentally inclusive, involving respect and concern for one's family and one's neighbours (Wikipedia, 2006: 1)

cleaning and drying and storage. Harvesting (*Umthabatha*) was a social event. During these events women also cooked and prepared the traditional beer. The whole community was invited. Everyone who contributed to the process received a bag or two from the harvest. Households competed regarding the number of bags produced and this encouraged the community to work harder.

The women have noted that the community spirit that existed in the past is deteriorating. "People would rather buy their staple food from the shop". During an interview with one of the key informants, it was stated that the deterioration of the ubuntu culture has resulted in more poverty in rural communities (Ndamane). The women participants also claim that lack of respect for one another is causing a rift between community members.

Women in Hala2 are trying to rekindle the spirit of ubuntu by having community gardens. These gardens are on a micro-irrigation level, saving the community water. Their community garden is also situated close to water sources so that the women do not travel long distances in order to irrigate their gardens. Illustration 4.5 portrays one of the successful community gardens in Hala2 (Masiphakamisane vegetable garden). This garden is situated next to a spring.

Illustration 4.5: Women in Masiphakamisane vegetable garden in Hala2

Women in Hala2 and Ntlalontle have been trained in other water saving techniques such the use of "tower gardens". Tower gardens reuse domestic water. Considering the fact that government has only supplied the villagers with water for domestic consumption, reusing this water can be of good value. There is a group of women who are currently trying this technique with good results. The only problem the women claim to be slowing

this strategy's progress in the area, is that local women are sometimes not open to new techniques.

While men are able to migrate when there is water scarcity to look for a source of income elsewhere, women remain behind and have to survive with what they have. This is evident in Hala2 where women have community gardens. Women therefore use strategies such as the ones which are referred to by Pelser (2001: 59) as social networks of support. In this case, social networking implies working together to secure food.

Strategy 2: Storing crops for when there is water scarcity

Another system mentioned by the women (Ntlalontle) that helps to secure food in the community during drought is planting and storing crops. The community usually plant crops that can be stored and then used when there is a water scarcity problem. According to the women, crops such as maize, sorghum and wheat are more resistant to water scarcity than vegetables and therefore last longer, as they can be stored for future use. The crops are stored in a hole called *Isisele.* The hole is dug inside a kraal, in a round shape. The inside of the hole is then dried by making fire inside and the drying of the hole is called *ukugqwagqwa.* The stored crops typically survive for about six months. According to the participants, even if it rains, it is difficult for water to seep into this hole because cattle would compact the soil.

More resistant to water scarcity is sorghum, and this grain can be used for several dishes that can sustain a person. These dishes include porridge *(inconco)*, bread *(isonka samazimba),* the mixture of sorghum and beans *(iqhumatana/umbadavu)* and the famous *umqombothi* (traditional beer). According to the women the red type of sorghum is "the healthiest". Women are able to use other types of crops, like maize, for different dishes as well. The only problem with planting crops is that when there is drought, there is greater loss, as fields require large-scale irrigation.

Strategy 3: Using indigenous plants that are resistant to hot climate

Women in rural South Africa are not only responsible for collecting water. They are also the main collectors of fuel wood from forests for energy and cooking (See paragraph (3.3.2). These women have a large reservoir of knowledge about forest resources and what they can be used for, e.g., fuel wood, fodder, magic rituals, building, household utensils, baskets, mats and medicinal herbs, because they are the main collectors of these products. According to Prasad

(1998: 82), the knowledge of the habitat of wild vegetation could be seen as a cultural and natural heritage, one that is becoming endangered. By documenting this knowledge, women's livelihoods would be better and the environment protected.

Since the condition of forests has deteriorated over the past few decades, time is spent on fuel collection (Shrestha, 2001: 112). While out collecting firewood and looking after livestock, women in Ndonga spend long hours far from safe drinking water sources. Obviously, this situation is aggravated when there is water scarcity. One strategy these women use when there are no water resources in site is to use the Cape Aloe's flower *(Imvomvo)* to quench their thirst (see Illustration 4.6).

Illustration 4.6: Cape Aloe

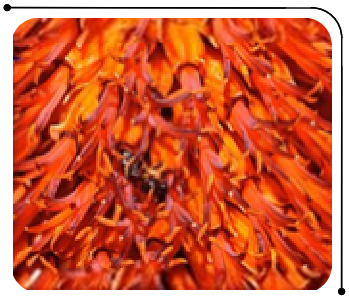

Illustration 4.7: Close-up of flowers of the aloe plant

Source: Aubrey (2001: 1) and Iziko Museum of Cape Town (2004: 1)

The Cape Aloe *(Ikhala) is* also known as Aloe Ferox, Bitter Aloe and Red Aloe. This plant is indigenous to South Africa (including Lesotho), and is found nowhere else on earth (De Jager, 2006: 1).[14]

[14] There are over 100 species of aloe in South Africa, but Aloe Ferox is the one that has been used by the indigenous people since long before the arrival of Europeans (De Jager, 2006: 1). It is a tall single stemmed aloe, which has a wide distribution, ranging over 1000km from the South-Western Cape through to southern Kwazulu-Natal. It is also found in the south-eastern corner of the Free State and southern

Although this plant is famous for its leaves and its healing powers, women in Ndonga have discovered that it has another important function. That is, the use of its flowers. These flowers are carried in a large candelabra-like flower-head. There are usually between five and eight branches, each carrying a spike-like head of many flowers. "*A. candelabrum*" has six to twelve branches and the flowers have their inner petals tipped with white. The women usually pick a branch and smash it against a bowl-shaped stone. They then drink the nectar that comes out of the flowers. The only precaution they take is not to drink too much of this nectar as this will result in what they call *Ukudola,* as their knees go weak. The nectar from the flowers quenches their thirst for a long period.

According to De Jager (2006: 1) the natural Cape Aloe from South Africa is building up its' name as one of the top natural remedies for a variety of skin conditions and various medical ailments. The products have helped them with a variety of complaints from arthritis, skin cancer, burns, eczema, psoriasis, digestive problems, blood pressure problems and many more. There is more than enough of this renewable resource to ensure that it does not need to be cultivated. Seven to eight leaves are harvested from the bottom of each plant without damaging the growth tip of this spiky, succulent plant.

Since the Aloe Ferox grows naturally and in large numbers without any need for water, it is an ideal plant to be used for commercial purposes. It can also be used sustainably, by extracting just enough to allow it to renew itself.

Strategy 4: Indigenous traditions and beliefs as mechanisms in mitigating water scarcity

- **Traditional beliefs**

In all focus groups, the worshipping of a supernatural being features highly as a strategy used by women. The women believe that water is a gift from the ancestors or from God. They believe that water comes from a supernatural power and that they are being punished when there are water problems such as drought or water scarcity. As a result of this belief the Ndonga community have for many years practiced what they call *ukungqungqa.* This is a dance performed by the whole community and the women consider it a very essential part of ensuring that they have water. They ceremoniously ask for forgiveness for all their transgressions and then

Lesotho. It is common on rocky hill slopes, often in very large numbers where it creates a stunning winter display. In the Eastern Cape it is found on the edges of the Karoo (Aubrey, 2001: 2).

ask the gods to send them rain. According to the women, they usually go to a dam to sing, dance and pray to the ancestors or God *(UQamata)* to ask for rain.

The women believe that their prayers are always answered. Sometimes on their way back to their villages, there would be clouds already visible. A recipe for their prayers to be answered is "to pray with one accord as they share common problems". They go to the dam or mountain with one goal or purpose in mind, namely, to get rain. What the women consider to be very important as well is that, after receiving the rain, they go back to the dam or mountain to thank these supernatural beings.

The women believe that they are being punished because of the degeneration of values in their society. They agree that people should try and remember their value systems. In this strategy the women again demonstrate the importance of working as a community with one goal in mind.

- **Myths**

Embedded in the culture of the Xhosas is the tendency to encourage women to wake up in the early hours of the morning (sometimes as early as 03:00 in the morning). According to the women this means two things: firstly, that they complete all their daily chores (domestic and agricultural); and secondly, it ensures that they can access clean and fresh water, before animals get to it, before the water subsides and before they have to stand in a long queue.

As part of their daily chores Oomakoti (brides) usually wake up before dawn to collect fresh water for their new families. The bride and her biological family are ridiculed if the new Makoti fails to do this. She is considered very lazy and said to be not worth the ***Iobola*** (bride wealth) that had been paid. The availability of water in some areas (communal taps) has made this practice less popular.

There are some myths that discouraged collecting or carrying water after sunset. According to Xhosa women, the Xhosa people believe that bringing water into the house after sunset is a bad omen. If you do this you bring evil spirits from the river with you and you then have to light a match and throw it into the bucket of water to chase away the evil spirits. This in turns ensures that there will always be water in the house.

4.6. Conclusion

Results from the study have proven that Ndonga is prone to water scarcity as a result of the arid climate, drought, desiccation, poor water supply and lack of infrastructure. Furthermore, the study shows that women are vulnerable to water scarcity as a result of their social, economic and political conditions.

Respondents have further pointed out that, as a result of their vulnerability, they are prone to the impact of water scarcity. These women are particularly prone to loss of livestock, health problems, wasted time and energy, and host are mostly unable to afford water services for non-domestic chores.

The study has, in addition, demonstrated that over the years women have developed coping strategies in order to deal with water scarcity. These strategies include Ubuntu, storing of crops, use of indigenous plants and traditional beliefs and myths.

The analyses in this chapter have shown the abundant knowledge the women have collected as a result of their daily use of water resources and the effects of the lack thereof. Furthermore, the findings in the study will be summarised in chapter 5 and then a number of recommendations will be proposed.

Chapter 5

SUMMARY AND RECOMMENDATIONS

5.1. INTRODUCTION

The main objective of this study was to document the experiences and strategies that have been used by rural women in Ndonga (Eastern Cape, South Africa) when faced with water scarcity. The study was conducted with the intention of sharing these experiences with local authorities as a set of recommendations to mitigate correlation water scarcity.

This was motivated by the fact that the literature study has shown that rural women are more vulnerable to water scarcity than men. There is also a gap with regards to the documentation of indigenous strategies to cope with water scarcity, especially from a female perspective. According to Pelser (2001: 53) and Biggs et al. (2004: 40), documenting these strategies is essential and can be effective in mitigating water scarcity, but the strategies are rare and not well reported. Women's perceptions are also very important as women's needs are usually not addressed or poorly addressed.

This chapter provides an overview of the main findings of the study as well as recommendations offered by the participants themselves and derived from the literature and data analysis.

5.2. SUMMARY OF THE MAIN FINDINGS OF THE RESEARCH

From the previous chapter the researcher has identified a number of findings and these are discussed below.

FINDING 1: THERE IS WATER SCARCITY IN NDONGA

Research has revealed that although there is abundant water in the Eastern Cape, focusing on specific areas will reveal different results. The research has therefore clearly demonstrated that, as a result of various causes, Ndonga is currently experiencing water scarcity. This is of great concern considering the fact that this phenomena is expected to become worse by 2025 (World Global Trends, 2005: 4).

The study has also proven that rural areas are more affected than urban areas as was highlighted in the UNFPA (2001: 24) report. Emalahleni, which is mostly a rural local municipality, is worse off in terms of accessibility to water when compared to its urban counterparts. Most of the respondents from Ndonga still access their water from natural resources whereas urban municipalities who source their water from taps within their dwellings. Even in villages where there are communal taps, these taps often do not function properly

Except for drought and the climate in the area, accessibility to potable water has proven to be the major cause of water scarcity to women in rural Ndonga, not only in the domestic sphere but especially in the agricultural sphere. Women in Ndonga are not only using land irrigation to maximize food supply for their households but are starting to pursue income generating projects. Lack of infrastructure to cater for agricultural use is therefore a cause for concern for the women. The fact that women need more water for agricultural purposes will also have an impact on the growing water consumption levels in agriculture that is already a concern in most African countries (UNFPA, 2001: 13).

According to the National Population Unit (2000: 33), the construction of dams results in silting and denial of water to downstream areas. Ndonga's existing water storage capacity has been reduced as a result of silting reservoirs. This has a major influence in terms of access to water.

Another typical problem with regard to the causes of water scarcity in Ndonga is that there is localized desertification that has resulted from unsuitable farming and animal husbandry. This concurs with what was highlighted by Winpenny (1999: 2) as a major cause of water scarcity. Ndonga's water situation is therefore a cause for concern as the causes of water scarcity are mostly human induced.

FINDING 2: NDONGA WOMEN ARE VULNERABLE TO WATER SCARCITY

The previous chapter has clearly shown that, because women remain home while men find jobs elsewhere, they are more vulnerable to water scarcity. When the men migrate, they take with them their expertise in technical skills. According to research, this sphere was considered a male domain. The researcher has therefore discovered that there is a need for capacity building amongst the women in Ndonga. The women have the knowledge about water resources but do not have the financial and technical capacity to maintain water infrastructure. Sometimes they are excluded when projects are implemented and therefore pass up the opportunity to gain the technical skills associated with equipment used. This has proven to be a problem in the past as men or technical help are usually not available in remote areas when needed the most. Their vulnerability is further influenced by the fact that they are poor as most of them are unemployed. As a result, they do not have the financial capacity to deal with water problems.

Another major concern influencing Ndonga women's vulnerability to water scarcity is their involvement and participation in decision making concerning water issues. The researcher therefore set out to assess their involvement in decision making.

FINDING 3: PARTICIPATION OF WOMEN IN DECISION-MAKING REGARDING WATER ISSUES IS STILL LIMITED

A great deal of research has been conducted to prove the importance of including women in decision making. Currently, in South Africa, women are encouraged to be involved in local, provincial and national governance as this is seen as a way forward regarding water management, especially in rural areas. When the South African government decided to transfer some of the decision making and management of water resources from the state to local communities and local user groups, it did not fail to mention the importance of considering gender differences with regard to their water needs. Because women and men's water roles are different their needs are also different. The S.A. government therefore mandated local government to include at least 30 percent of women in their water structures and projects. Nevertheless, the study population reported that there is still lack of participation in water structures by women and that even if women do join such structures, they do not contribute much to decision making. Some of the reasons mentioned by the women for their absence in water structures and the lack of contribution are as follows:

- Women's household work burden

- Lack of support from other women
- Women are often sidelined by project contractors
- Many women are not comfortable with what was previously a “man’s domain”.

FINDING 4: UNPROTECTED WATER SOURCES IMPACT ON NDONGA WOMEN’S HEALTH

According to the South African Constitution, every person has a right to an environment that is not harmful to his or her health or well-being. Nevertheless, water scarcity in Ndonga has a negative impact on women’s livelihoods. Because of water scarcity, women in this area are not able to maximize economic development. Instead, they usually lose stock and crops. They also do not have enough time and energy to engage in economic activities. This keeps women in poverty as they, in turn, are not able to afford water. If women cannot afford water, the municipalities suffer and are not able to recover costs.

The researcher also discovered that the springs in Ndonga are not protected. This has negative repercussions for community members, especially women and children. This means that the poor quality of water in Ndonga undermines the right of people in this village to have water that is not harmful to their health.

FINDING 5: WOMEN IN NDONGA ARE A KNOWLEDGE BASE

More significant to this study is the finding that confirms that the study population is a knowledge base concerning strategies that can be used to mitigate water scarcity. They are able to identify water resources, manage domestic water needs and identify methods that can best suit their environment, in order to conserve water and ensure food security when there are limited water resources.

Women’s knowledge is mainly based on their years of interaction with the environment (collecting water and fuel wood and community gardening) and from their needs and problems. For rural women in Ndonga, this is an advantage in that they are not only knowledgeable about water resources, but can also identify plants, crops and livestock that are drought resistant. Most of the strategies mentioned by the participants directly address some of the women’s needs. For example, the first and the second strategy addresses the women’ need to secure food for their households.

FINDING 6: ENSURING FOOD SECURITY

One finding that has confirmed the ability of Ndonga women to cope when they are faced with severe condition, such as when there is not enough water to supply demand, is the ability of rural women to secure food for their families.

Although this is not clear from the literature review, lack of water usually means lack of food security for rural people. This is evident from strategy 2 of the data analysis. Because women are the usual caregivers for family members, they spend long hours and energy trying to secure food from available resources. The target group has therefore pointed out a strategy to help secure food. This strategy involves storing of crops and using one crop for several dishes. This helps the women sustain themselves and their families during difficult times associated with water scarcity, or during prolonged droughts, without having to migrate.

FINDING 7: THERE IS POTENTIAL TO USE AGRICULTURE COUPLED WITH CONSERVATION TO IMPROVE THE LIVELIHOODS OF RURAL WOMEN

Although water has been identified as a resource that can eliminate poverty, this process is very slow in Ndonga. At the present moment, water is being supplied for consumption only. However, the women in this area have shown a potential for what is referred to by Schackleton and Schackleton (2004: 135) as formal community-based natural resource management. The women have been able to have organised or formal community-based gardens in order for them to have a source of income. In this way they have managed to sustain their families.

The women have also been able to identify natural resources that can be used even when there is not enough rain. The researcher has therefore found evidence that Ndonga has a potential to use indigenous natural resources to boost its economy and therefore improve their livelihoods.

FINDING 8: LESS TANGIBLE BUT ESSENTIAL COPING STRATEGIES

Chapter two has shown that community beliefs are an important tool in dealing with environmental problems. According to research, how we treat one another affects the way in which we treat the environment (Biggs et al., 2004: 37; Neuschler, 2001: 8). Women in Ndonga associate the availability of water with their value systems and their belief systems. The women

strongly believe that when they work together they are capable of achieving more for their community. Moreover, the women believe that their disrespect for their God, the ancestors and the community leaders, can result in reduced rainfall. This is why they often come together and pray.

To a large extent, all these findings show the ability of rural women to survive natural hazards. If decision makers are prepared to view practices at local scale level and properly consider women's water needs and experiences, they would be able to develop specific policies or coping strategies that are relevant and needs based.

5.3. Recommendations

From the findings discussed above, it is possible to point out a number of specific recommendations that can be implemented in order to move forward in ensuring that women and the community of Ndonga are better able to mitigate water scarcity in the future.

Recommendation 1: Creating awareness about water scarcity (preparedness) and the environment

Local authorities should develop programmes that create awareness of the looming water crisis and the impact it might have in a society that is already experiencing some water scarcity problems. This will enable the community to be prepared for hazards such as drought. The women in Ndonga are aware of alternative ways in which they can mitigate water scarcity; however, what will be more effective in dealing with this phenomenon is a pro-active instead of reactive response.

Recommendation 2: Address human induced causes of water scarcity

Causes of water scarcity that have been identified should be addressed in the following ways:

Authorities should be responsive to the fact that overgrazing does not only result in the loss of land (dongas) but that it also influences water infiltration and the water flow. Livestock should therefore be regulated and monitored. The community should also be encouraged to plant trees to regulate the water flow and therefore minimize soil erosion.

Government should accelerate the process of supplying potable water to all households. This process will help decrease the workload of local women, and at the same time it will give the

women an opportunity to participate in community meetings, income generating projects and other water projects.

Existing infrastructure, such as reservoirs, boreholes and communal taps, should be monitored, maintained and refurbished. Women should always be involved in these processes.

Recommendation 3: Reduce vulnerability to water scarcity

To reduce the vulnerability to water scarcity of Ndonga women, the following things are recommended:

In an area in which women make up the majority of the population, it is essential to ensure the continuation of the involvement of rural women in decision making about local water resources. Government should therefore strengthen the percentage of women in water related decision phases (design, implementation, management, monitoring and evaluation). The recommended percentage of women that are on water committees should also increase from 30 percent to at least 50 percent in those communities in which women are in the majority. Women's knowledge and experience of water management should therefore be acknowledged as a global resource to be developed, encouraged and used.

Local government should also monitor outside partners or contractors to ensure that they have included women in their projects. This will strengthen the involvement of women in the implementation of community water projects. Women should therefore be included at all levels of decision making.

To reduce poverty, government is already assisting poor communities with grants. To help curb unemployment even further, government should particularly support existing income generating projects financially and by encouraging communal efforts. Projects that should receive priority should be those using micro-irrigation schemes

Recommendation 4: Capacitate and empower rural women

To further reduce Ndonga women's vulnerability to water scarcity, the women need to be capacitated in a number of ways:

Firstly, they should be developed through capacity building and supported in their initiatives and management strategies. According to Reed & de Wit (2003: 103), this will be a key to

success and the sustainability of water resources. A platform must be created that will encourage women to voice their opinions and share their indigenous knowledge.

Secondly, women should be able to gain knowledge about how to maintain water infrastructure through involvement in the implementation phase of projects. They should also be trained to ensure that they are equipped with the necessary skills. This will help them when there are no technicians or men available when there is a problem.

Lastly, government should ensure land security and capacity building regarding economic growth, access to land and access to markets

RECOMMENDATION 5: REDUCE THE IMPACT OF WATER SCARCITY

There are two practical ways in which the impact of water scarcity can be reduced.

Firstly, open sources of water, such as the spring, should be protected to reduce health hazards. The Ndonga community have already initiated the protection of the spring in Hala2, but animals are still able to pollute the water source.

Secondly, water is essential for agricultural production and rural development in order to improve food security. According to Cain (2004: 200), water should therefore continuously contribute to economic growth. He highlights the importance of making an effort to reduce unsustainable water management by improving the efficiency of agricultural water use. However, women in Ndonga cannot afford water for non-domestic purposes.

For non-domestic purposes women should therefore use what is termed “grey water”. This means that water that was used for domestic purposes should be recycled and used for building and for vegetable gardens. This practice is very cost effective and is a sustainable way to use water. In addition to this, the availability of drought resistant natural resources, such as the aloe ferox in Ndonga, should be acknowledged as an efficient way in which water can be conserved while recognising these plants as a potential source to boost the economy in the area. Policy and practice should not continue to neglect this type of resource, but rather support it as a natural resource product that can boost the economy while creating jobs in the process, especially for women who typically remain at home even if there is water scarcity. It is important to ensure that they have an opportunity to use resources such as these that are easily available to them as a source of income.

RECOMMENDATION 6: DOCUMENT AND DISSEMINATE INDIGENOUS KNOWLEDGE FOR COMMUNITY UPLIFTMENT.

The last recommendation is for local government:

To align local women's indigenous knowledge systems with other strategies to mitigate water scarcity. This will ensure that women's needs are catered for and that water projects fully capitalise on the existing knowledge base of the women.

To encourage women to gather information about beliefs, perceptions and strategies and to formulate a database. In this way, local knowledge will not die with the old generation but will be carried forward to the next generations. Instead there will be an open process for making decisions and sharing information and a revival of traditional knowledge.

In considering the above recommendations, local authorities in Ndonga will be able to increase local women's ability to deal with water scarcity, through involvement and through the use of already existing strategies. Women's lives on the other hand, will significantly improve.

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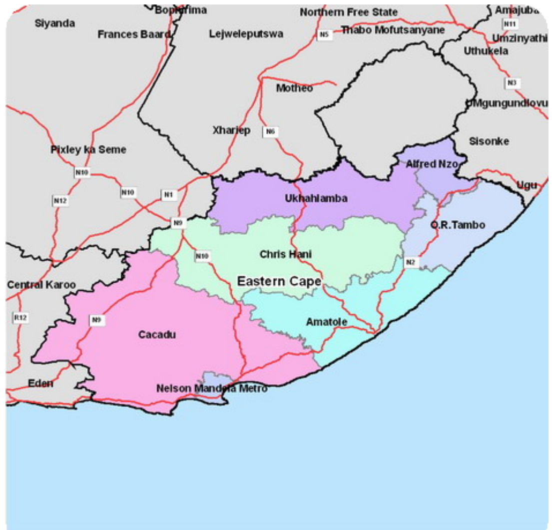
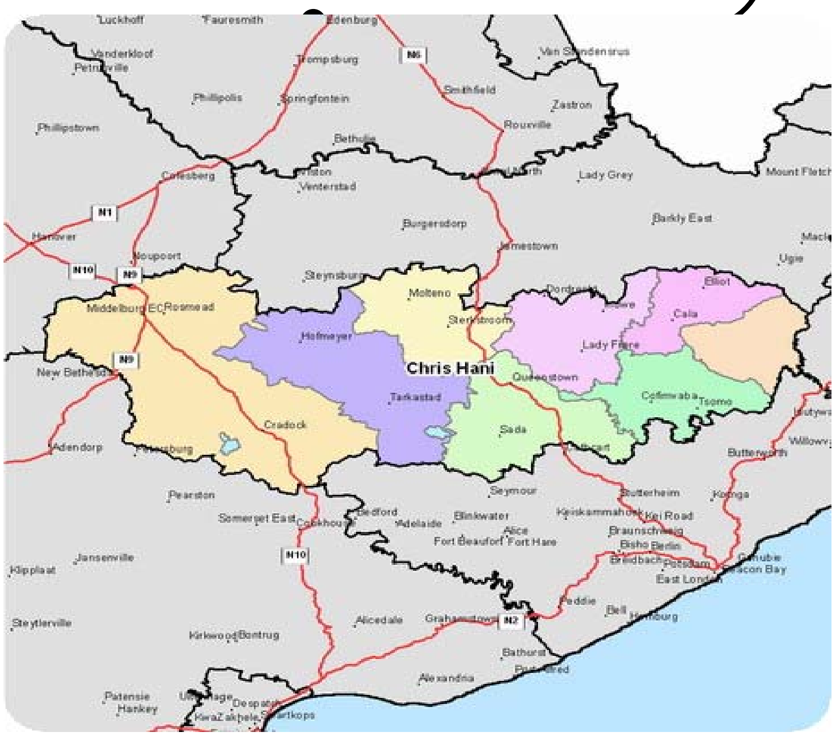
ANNEXURE A: RESEARCH SITE



Map of the Eastern Cape



Map of Chris Hani Municipality (Research Area (Lady Frere)

Source: Municipal Demarcation Board – South Africa, www.dermacation.org.za (2006)

ANNEXURE B:
INTERVIEW SCHEDULE

Aim: Document the extent of water scarcity in Ndonga and the impact it has on rural women with an intention of presenting a set of recommendations for improving the situation.

Objective 1: Background of the Ndonga area with regards to water issues.

- Get information of the years of drought and its impact in the Ndonga area.
- Data on future projections
- Water delivery statistics

Objective 2: To identify positive and negative impact of existing water infrastructure on women

- Where do they get their water supply?
- Would they continue to use this source if they had a choice?
- Why/why not?
- What would they change about the source(s)

Objective 3: To assess the extent to which women participate in decision-making concerning water resources in their area

- Do women take part in decision-making?
- Are meetings conducted in such a way that women are comfortable and understand?
- Do they support other women in decision-making positions?
- Are women encouraged and empowered about the importance of involvement?
- Do women participate?
- What can be done to encourage their participation?
- If they do participate, which positions do they hold?
- Do they make or suggest important decisions?

ANNEXURE C:
TIME SCHEDULE FOR INTERVIEWS

Respondent	Institution	Official position of respondent	Date	Duration
Cllr S.K. Fudumele	Emalahleni Local Municipality	Councillor	03 May 2005	13:30 – 14:30
Cllr Ndamane	Emalahleni Local Municipality	Councillor	20 May 2005	13:00 – 14:00
Cllr Ziduli	Emalahleni Local Municipality	Councillor	20 May 2005	11:00 – 12:00
Mr Nonjuzana	Emalahleni Local Municipality	Technical	03 May 2005	10:00 – 11:00
Mr Speelman	Amanz' Abantu Consortium	ISD	16 May 2005	10:00 – 11:00

ANNEXURE D:
LIST OF FOCUS GROUP PARTICIPANTS

PERCY	
1	Nolusindiso Nani
2	Debora Gunuza
3	Nongenile Mtwecu
4	Ntombomzi Kenqe
5	Nomisile Kose
6	Noncedo Majwede
7	Kuku Gunuza
8	Albertina May
9	Nokuphumla Ngavula
10	Lindelwa Godongwana
11	Fundile Makeleni
12	Nontsapho Sipapa

NTLALONTLE	
1	Nophumzile Gatyana
2	Nomthunzi Dayimane
3	Nolisine Nonzaba
4	Nowest Bizwaphi
5	Nothembile Dyantyi
6	Notaka Phakamisa
7	Nolitha Ndeleni
8	Nolist Toyise
9	Nowinana Rasmeni
10	Noteja Desemela
11	Nowanisi Jordane
12	Noluzile Desemela
13	Noluthando Tyityi

HALA2	
1	Nolinsethi Mtuyedwa
2	Nomsingathi Dlayedwa
3	Nokulunga Mangali
4	Noprivate Mutene
5	Nozukile Mthyobile
6	Nolindile Tyakiwe
7	Nowethu Tshona
8	Nowilitoni Gawulayo
9	Nothembile Qibi
10	Nomsingathi Dlayedwa

ANNEXURE E:
CHECKLIST FOR FOCUS GROUPS