

**WATER ISSUES IN LAND  
REDISTRIBUTION PROJECTS:  
A CASE STUDY OF THE PLATT ESTATE  
REDISTRIBUTION PROJECT IN  
KWAZULU-NATAL**

**BY:**

**MUHAMMAD RAZAK, ALI**

**REGISTRATION NUMBER: 8728661**

**SUBMITTED IN PART FULFILLMENT OF THE REQUIREMENTS FOR  
THE DEGREE, MASTERS OF ARTS IN THE DEPARTMENT OF  
GEOGRAPHY AND ENVIRONMENTAL STUDIES IN THE FACULTY OF  
HUMANITIES AT THE UNIVERSITY OF DURBAN-WESTVILLE.**

**SUPERVISOR: DR. U. BOB  
JANUARY 2002**

## ACKNOWLEDGEMENTS

### All praise is due to the Almighty God

To Almighty God for blessing me with Divine help and Guidance with which I successfully completed this dissertation.

To Baba Kassim Shah Faridi, for his guidance and direction, spiritually.

Completing a project of this nature was an enormous and arduous task. One of which I could not have achieved alone. I am therefore eternally grateful to a number of people for their assistance in various ways.

- My appreciation goes out to my family (my mother: Aisha, my wife: Farhana and my daughter: Zahra), for their patience and support during the compilation of this dissertation.
- My sincere thanks to my supervisor, Dr. Urmilla Bob, for her expert assistance, guidance, encouragement and patience, which has been invaluable.
- To my friend Lubna Nadvi, without whom this would not be possible. I thank you for your vision and drive.
- Sifiso from the Tapashiya CPA, for his assistance during the field trips and assisting in the questionnaire survey.
- Colin Pillay and Mdu Shabane from the Department of Land Affairs, Kwazulu-Natal office, for ensuring and granting access to the case study area (Platt Estate).
- To my departmental colleagues from the Kwazulu-Natal: Department of Agriculture and Environmental Affairs, for their continuous motivation and drive.
- To all in the Geography Department of the University of Durban-Westville, for your assistance.
- To my friends: Shaheen, Ismail, Tasneem, Mumtaaz and Sharmlin, for your support.

If I have left anyone out in my acknowledgements, a special thank you to you all.

## ABSTRACT

*Land and water are critical resources for rural livelihoods and lie at the heart of rural development. Granting rural people land under the land reform without sufficient water resources is indeed problematic. This dissertation explores rural development with the links between water and land reform, especially within the redistribution processes. The focus is on both accessibility and water quality within transferred land reform projects. The results of a nationally-based study focussing on land redistribution post transfer projects as well as an intensive pre-transfer case study research conducted in Kwazulu-Natal indicate that land redistribution is not effectively considering the water needs of the beneficiaries. In fact, in some instances, the newly resettled communities' access to water resources have worsened. This dissertation critically analyses and presents the relevant data, specifically highlighting whether land redistribution is addressing the water needs of rural communities. Furthermore, the role of the authorities in terms of providing water to land reform communities is critically appraised. Finally, alternatives, policy and implementation recommendations are forwarded to ensure that the availability and accessibility of water for both productive and reproductive purposes are sufficiently and rigorously considered within land redistribution projects.*

# TABLE OF CONTENTS

<b><u>CHAPTER ONE: INTRODUCTION</u></b>	<b>1</b>
1.1 INTRODUCTION	1
1.2 AIM	5
1.3 OBJECTIVES	6
1.4 CHAPTER SEQUENCE	6
1.4.1 Chapter 2 : Literature review	6
1.4.2 Chapter 3 : Methodology	6
1.4.3 Chapter 4 : Analysis	7
1.4.4 Chapter 5 : Recommendations and conclusion	7
<b><u>CHAPTER TWO: LITERATURE REVIEW</u></b>	<b>8</b>
2.1 INTRODUCTION	8
2.2 RURAL DEVELOPMENT	9
2.2.1 POLICY DEVELOPMENTS	10
2.2.1.1 The Reconstruction and Development Programme (RDP, 1994)	10
2.2.1.2 The Constitution of South Africa (1996)	12
2.2.1.3 Growth, Employment and Redistribution (GEAR)	12
2.2.1.4 The Rural Development Strategy (1995)	13
2.2.1.5 The Development Facilitation Act (1995)	13
2.2.1.6 The Rural Development Framework (1997)	13
2.2.1.7 Integrated Rural Development White Paper for KZN (1998)	14
2.2.1.8 Integrated Rural Development Framework : Operational Strategy (2000)	15
2.3 LAND REFORM IN SOUTH AFRICA	16
2.3.1 Restitution	19
2.3.2 Tenure Reform	20
2.3.3 Land Redistribution	22

2.4	APPROACHES TO WATER SUPPLY .....	28
2.4.1	Supply-driven Approach .....	28
2.4.2	Move towards peoples participation through Participatory Action Development (PAD) .....	29
2.4.3	Demand Responsive Approach (DRA) .....	30
2.4.4	The Free Water for all Debate or Debacle .....	32
2.5	DEVELOPMENTS IN THE SOUTH AFRICAN WATER AND SANITATION LAWS .....	34
2.5.1	DURING APARTHEID (PRE 1994) .....	34
2.5.2	POST APARTHEID (POST 1994) .....	36
2.5.2.1	NATIONAL POLICIES AND LEGISLATION .....	36
2.5.2.1.1	White Paper on Water Supply and Sanitation(1994) ..	36
2.5.2.1.2	The Constitution of South Africa (Act 108 of 1996) ..	37
2.5.2.1.3	The Water Services Act (Act 108 of 1997) .....	38
2.5.2.1.4	The National Water Act (Act 36 of 1998) .....	40
2.5.2.2	LOCAL GOVERNMENT LEGISLATION .....	41
2.5.2.2.1	The Local Government: Municipal Demarcation Act (Act 27 of 1998) .....	41
2.5.2.2.2	The Local Government: Municipal Structures Act (Act 117 of 1998) .....	42
2.5.2.2.3	The Local Government: Municipal Systems Bill .....	42
2.5.2.2.4	The Division of Revenue Act (Act 16 of 2000) .....	42
2.5.2.2.5	General .....	43
2.6	SANITATION .....	44
2.7	THE QUALITY OF WATER .....	48
2.8	IMPACT OF POLLUTED WATER ON QUALITY OF LIFE .....	54
2.9	WATER ACCESS AND AGRICULTURAL PRODUCTION .....	58
2.10	JOB CREATION AND WATER ACCESS .....	60

2.11	COMMUNITY PARTICIPATION .....	62
2.12	GENDER IMPLICATIONS .....	63
2.13	LAND REDISTRIBUTION AND AFFORESTATION .....	66
2.14	LAND REDISTRIBUTION AND CONSERVATION .....	67
2.15	RELATIONSHIPS BETWEEN THE DLA, THE DWAF AND OTHER ROLE PLAYERS .....	68
2.16	CONCLUSION .....	69
 <b><u>CHAPTER THREE: CASE STUDY AND METHODOLOGY</u></b> .....		71
3.1	CASE STUDY: PLATT ESTATE IN KZN .....	71
3.1.1	Location .....	71
3.1.2	Legal status .....	75
3.1.3	Development principles .....	75
3.1.4	Development proposal .....	77
3.1.4.1	Project 1: Boleni .....	79
3.1.4.2	Project 2: Ezitendeni .....	80
3.1.4.3	Project 3: Tapashiya .....	80
3.1.5	Physical Data .....	81
3.1.5.1	Physiography .....	81
3.1.5.2	Vegetation .....	82
3.1.5.3	Soils .....	82
3.1.5.4	Rainfall and Water .....	83
3.1.5.5	Infrastructure .....	83
3.2	METHODOLOGY .....	84
3.2.1	Secondary Methods .....	84

3.2.2	Primary Methods	85
3.2.3	Sampling	90
3.2.4	Qualitative and Quantitative Methods	90
3.2.5	Questionnaire	91
3.2.6	Mental Mapping	92
3.2.7	Fieldwork	93
3.3	CONCLUSION	94
<b><u>CHAPTER 4: DATA ANALYSIS</u></b>		95
4.1	INTRODUCTION	95
4.2	SECONDARY DATA ANALYSIS	95
4.2.1	Reviewing the Quality of Life Report (1998) : Water and Sanitation Issues (Access and Provision) for Kwazulu-Natal	96
4.2.1.1	Total redistribution projects transferred nationally	96
4.2.1.2	Primary sources of water for beneficiary projects	98
4.2.1.3	Land rights of water sources in Kwazulu-Natal	99
4.2.1.4	Sanitation systems	101
4.2.1.5	Summary of the Quality of Life Report (1998)	102
4.2.2	Reviewing the Annual Quality of Life of Land Reform Beneficiaries, 2000: Water and Sanitation Issues (Access and Provision) for Kwazulu-Natal	102
4.2.2.1.	DRINKING WATER	102
4.2.2.1.1	Roofing materials	102
4.2.2.1.2	Source of drinking water	104
4.2.2.1.3	Incidence of carrying water	105
4.2.2.2.	SANITATION SYSTEMS	106
4.2.2.2.1	Types of toilet facilities	106

4.2.2.3.	ENERGY .....	107
4.2.2.3.1	Electricity supply .....	107
4.2.2.4.	EXPECTATIONS VERSUS REALISATIONS .....	108
4.2.2.4.1	Community expectations versus actual realisations with respect to water services provision .....	108
4.2.2.5	SUMMARY OF THE ANNUAL QUALITY OF LIFE OF LAND REFORM BENEFICIARIES, 2000 .....	108
4.3	PRIMARY DATA ANALYSIS .....	109
4.3.1	QUESTIONNAIRE EVALUATION: WATER AND SANITATION ISSUES (ACCESS AND PROVISION) .....	110
4.3.1.1.	DRINKING WATER .....	110
4.3.1.1.1	Roofing types .....	110
4.3.1.1.2	Rainwater requirements .....	112
4.3.1.1.3	Primary sources of drinking water .....	113
4.3.1.1.4	Secondary sources of drinking water .....	114
4.3.1.1.5	The adequacy throughout the year, of the sources of drinking water .....	116
4.3.1.1.6	The frequency of the primary sources of drinking water being inadequate .....	116
4.3.1.1.7	The frequency of the primary sources of water becoming polluted .....	116
4.3.1.1.8	Pollution of secondary sources .....	118
4.3.1.1.9	The identified main water transportation system .....	119
4.3.1.1.10	Trips undertaken for water collection .....	120
4.3.1.1.11	Duration of round-trip to collect water .....	121
4.3.1.1.12	Distance traveled to collect water .....	123
4.3.1.1.13	Community Water Committee .....	123
4.3.1.1.14	Payment for Water .....	124
4.3.1.1.15	Animals frequenting the source/s of drinking water ..	124
4.3.1.1.16	Illness caused by drinking contaminated water .....	125



4.3.1.2.	BATHING WATER .....	126
4.3.1.2.1	Primary source of bathing water .....	126
4.3.1.2.2	Reliability of the primary source .....	127
4.3.1.3	WATER FOR WASHING CLOTHES .....	128
4.3.1.3.1	Primary source .....	128
4.3.1.3.2	Reliability of the primary source .....	129
4.3.1.4	WATER FOR LIVESTOCK .....	130
4.3.1.4.1	Primary source .....	130
4.3.1.4.2	Reliability of the primary source .....	131
4.3.1.5	WATER FOR IRRIGATION .....	132
4.3.1.5.1	Primary source for irrigating vegetable gardens .....	132
4.3.1.5.2	Reliability of the primary source for irrigating vegetable gardens .....	133
4.3.1.5.3	Primary source for irrigating other fields .....	134
4.3.1.5.4	Reliability throughout the year of the primary source for irrigating other fields .....	134
4.3.1.6	OBSERVATION .....	135
4.3.1.6.1.	Observation of the primary drinking water source ...	135
4.3.1.7	SANITATION AND WASTE DISPOSAL .....	136
4.3.1.7.1	Types of sanitation systems .....	136
4.3.1.7.2	Distance of sanitation system from the drinking water supply .....	137
4.3.1.7.3	Problems experienced .....	137
4.3.1.7.4	Household waste disposal methods .....	138
4.3.1.8	EXPECTATIONS VERSUS REALISATION .....	139
4.3.1.8.1	Expectations and realisations with respect to water services .....	139

4.3.1.9	PREFERRED NEEDS .....	140
4.3.1.9.1	Preferred primary water supply .....	140
4.3.1.9.2	Preferred secondary water supply .....	141
4.3.1.9.3	Preferred primary sanitation system .....	142
4.3.1.9.4	Preferred secondary sanitation system .....	142
4.3.2	SUSTAINABILITY OF WATER RESOURCES .....	143
4.3.3	MENTAL MAP .....	145
4.3.4	SUMMARY OF PRIMARY DATA ANALYSIS .....	148
<b><u>CHAPTER 5: RECOMMENDATIONS AND CONCLUSION</u></b> .....		149
5.1	SUMMARY OF DATA ANALYSIS .....	149
5.1.1	Secondary Data Analysis .....	149
5.1.1.1	Department of Land Affairs (1998a): Quality of Life Report .....	149
5.1.1.2	Department of Land Affairs (2000): Annual Quality of Life of Land Reform Beneficiaries .....	150
5.1.2	Primary Data Analysis .....	151
5.2	RECOMMENDATIONS .....	155
5.2.1	General .....	155
5.2.2	Alternative technologies for Rural Water Supply .....	158
5.2.3	Alternate Sanitation Systems .....	161
5.2.4	Information Dissemination and Education Strategies .....	163
5.3	CONCLUSION .....	165
<b>REFERENCES</b> .....		168

## LIST OF TABLES

Table 3.1	Platt Estate Entities .....	77
Table 4.1	Total number of transferred redistribution projects .....	97
Table 4.2	Percentage of primary/ main sources of water for beneficiary projects (KZN and National) .....	98
Table 4.3:	Percentage land rights of water sources in KwaZulu-Natal .....	99
Table 4.4:	Types of toilets used in land reform communities .....	101
Table 4.5:	Main Materials used for roof of main dwelling .....	103
Table 4.6:	Most often used source of drinking water .....	104
Table 4.7:	Incidence of carrying water .....	105
Table 4.8:	Type of toilet facility used .....	106
Table 4.9:	Connection to an electricity supply .....	107
Table 4.10:	Expectations versus actual realisations of water services provision .....	108
Table 4.11:	The predominant type of roof on buildings .....	110
Table 4.12:	The proportion of drinking water needs obtained from rainwater .....	112
Table 4.13:	The primary/ main sources of drinking water identified .....	113
Table 4.14:	The secondary/ alternate sources of drinking water identified .....	114
Table 4.15:	Pollution of the alternative or secondary drinking water source .....	118
Table 4.16:	Identified number of trips undertaken per day by the individual or a family member to collect water .....	120
Table 4.17:	Identified duration of each round-trip to collect water .....	121
Table 4.18:	Identified approximate distance that is traveled to collect water .....	123
Table 4.19:	Identified outcomes of illness of individuals and family members related to drinking contaminated water .....	125
Table 4.20:	Identified primary/ main source of water for bathing, washing and personal hygiene .....	126
Table 4.21:	Reliability throughout the year of the primary source of water identified for bathing/ washing/ personal hygiene .....	127
Table 4.22:	Identified primary/ main source of water for washing clothes .....	128
Table 4.23:	Reliability throughout the year of the main source of water identified for washing clothes .....	129

Table 4.24:	Identified primary/ main source of drinking water for livestock . . . . .	130
Table 4.25:	Reliability throughout the year of the primary/ main source of drinking water.identified for.livestock . . . . .	131
Table 4.26:	Identified primary/ main source of water for irrigating vegetable gardens . . . . .	132
Table 4.27:	Reliability throughout the year of the primary source of water identified for irrigating vegetable gardens . . . . .	133
Table 4.28:	Types of existing sanitation system . . . . .	136
Table 4.29:	Problems experienced with the sanitation system . . . . .	137
Table 4.30:	Main disposal method of household refuse/ rubbish/ waste . . . . .	138
Table 4.31:	Preferred primary/ main water supply requirement . . . . .	140
Table 4.32:	Preferred secondary/ alternate water supply requirement . . . . .	141
Table 4.33:	Preferred primary/ main sanitation/ toilet requirement . . . . .	142
Table 4.34:	Preferred secondary/ alternate sanitation/ toilet requirement . . . . .	142
Table 4.35:	Overall assessment of water sustainability for the Platt Estate Entities . . . . .	144

## LIST OF MAPS

Map 1:	Kwazulu-Natal: Ugu District Municipality in relation to the District and Local Council Boundaries .....	72
Map 2:	Location of the Platt Estate in the Vulamelo Municipality of the Ugu District Municipality .....	73
Map 3:	Farm locations making up the Platt Estate (Source: 1:50 000, 3030AB Nlavini) .....	74
Map 4:	Location of the Case Study Entities (Source: 1:50 000, 3030AB Nlavini) .....	78
Map 5:	Mental Map of Tapashiya .....	147

## LIST OF PLATES

Plate 1:	Timber plantations in Platt Estate .....	73
Plate 2:	Households at Boleni .....	79
Plate 3:	Densified settlement at Ezitendeni, with an individual carrying wood obtained from the scrub plantations .....	80
Plate 4:	Dispersed settlements at Tapashiya .....	81
Plate 5:	Rugged landscape with steep slopes and incised valleys at Platt Estate .....	82
Plate 6:	Examples of grassland and natural forests that is typical of the Platt Estate .....	82
Plate 7:	Examples of the roofing types (thatched, corrugated iron and corrugated iron with temporary guttering draining to removable containers) at the Platt Estates .....	111
Plate 8:	The photos above are examples of a typical spring (a), spring collection point (b) and river/ stream (c) systems that are found in the Platt Estate .....	113
Plate 9:	Secondary sources of water supply through borehole (a) and rainwater (b) .....	115
Plate 10:	Animal faeces near stream and spring (a and b) and non protection of spring (c) .....	117
Plate 11:	Open container with contaminated rainwater .....	118
Plate 12:	Women and children carrying water up steep slopes .....	120
Plate 13:	Women and children collection water from a spring runoff .....	121

Plate 14: Women collecting and carrying water up steep slopes which impacts on productive time lost .....	122
Plate 15: Cattle utilising the spring and pond for drinking water .....	124
Plate 16: Water collected from the spring or river/ stream used for washing clothes .....	129
Plate 17: Pond/ dam used as a water source for animals .....	130
Plate 18: Examples of pit latrines at Eboleni .....	136
Plate 19: Surface water runoff penetrating pit latrine .....	138
Plate 20: Waste being buried as a means of waste disposal .....	139
Plate 21: Water tank that can be used for water storage .....	140
Plate 22: Example of a Ventilated Pit Latrine situated at the Agricultural offices at the Platt Estate .....	143

## APPENDICES

Appendix A: Questionnaire: Water Resources and Sanitation Sustainability .....	180
--	-----

## ABBREVIATIONS

RDP	Reconstruction and Development Programme
GEAR	Growth, Employment and Redistribution
LDO	Land Development Objectives
RDS	Rural Development Strategy
DFA	Development Facilitation Act
RDF	Rural Development Framework
NGO	Non-Governmental Organisation
CBO	Community Based Organisation
DLA	Department of Land Affairs
DWAF	Department of Water Affairs and Forestry
CODESA	Congress for a Democratic South Africa

SLAG	Settlement and Land Acquisition Grant
WHO	World Health Organisation
WFWP	Working for Water Programme
SMME	Small, Medium, Micro Enterprises
SS	Sustainability Score
CSS	Composite Sustainable Score
WISA	Water Institute of South Africa
WRC	Water Research Commission

# CHAPTER ONE

## 1.1 INTRODUCTION

### *We are held hostage by the scarcity of water*

South Africa's history of apartheid had divided the country where approximately 87% of land was provided to the White minority, while Blacks - almost 75% of the population lived on 13% of the land, within the 10 Bantustans or homelands (Percival and Homer-Dixon, 1995). The White minority enjoyed a high standard of living, but the majority of the population were impoverished living in underdeveloped rural areas. Thus, the White dominant class harnessed the water resources as they were advantaged by their privileged access to land and economic power. Since transformation, the government of National Unity in 1994 stressed the need to develop the country. Therefore, the Constitution (1996) of South Africa, the supreme law of the land, was promulgated which guaranteed its people amongst others:

- the right to life and dignity;
- the right to gain access to land on an equitable basis;
- the right to access to sufficient food and water;
- the right to an environment that is not detrimental to their health and well being; and
- to have the environment protected for the benefit of present and future generations.

Development entails improving the quality of life for all and rural development ascribes to the development of rural areas by primarily improving the basic needs of the poor rural people in order to sustain and free them from rural poverty. The Reconstruction and Development Programme of 1994 (RDP) stressed the basic needs approach of developing the poorer disadvantaged rural communities to eradicate poverty. Land reform was a primary objective and access to land was a priority in a non-sexist, non-discriminative way, with a directive to transfer 30% of the land by the year 1999.

Contrary to popular perception, South Africa is a semi-arid country and has been identified as one of 17 water scarce countries in the world according to the Worldwide Financial Membership



Organisation (2001). The current situation therefore identifies and describes South Africa (being one of the listed African countries) as a water scarce country due to its high population growth rate and uneven distribution of water resources. It is estimated that in the near future, by 2025, most of the Third World countries will move from being water stressed to water scarce with water scarcity being regarded as the single greatest threat to human health, the environment and the global food supply (Worldwide Financial Membership Organisation, 2001). According to the Johns Hopkins University Center for Communication Programs (1998), water scarcity is defined as when a country's annual supply of renewable freshwater is less than 1 000m<sup>3</sup> per person, which hinders their development due to chronic and widespread shortages of water. Water stress on the other hand is defined as where a country's annual supply of renewable freshwater is between 1 000m<sup>3</sup> and 1 700m<sup>3</sup> per person, which experiences temporary or limited water shortages. Both water stress and scarcity is impacted negatively by increased population growth and is therefore regarded as an international problem (Johns Hopkins University, Center for Communication Programs, 1998).

Water access is a highly political and an economic issue in South Africa. Degradation and historically skewed allocation of water in rural areas presents mammoth challenges to government departments involved in development and redress concerns. These challenges are particularly acute in rural areas. Water in rural areas is used for irrigation, livestock and crop production, rural domestic purposes, wild life and conservation.

According to the Department of Water Affairs and Forestry (DWAF) (1997a), Kadar Asmal in his preface to Sustainable Forestry Development for South Africa (1997: 1), states the Government's resolve quite succinctly:

*Rural development poses an enormous challenge. 40 % of our population are extremely poor, in fact their daily nutritional needs are not met. The vast majority of these people are Black and live in rural areas. We are committed as a government to improving the lives of all South Africans so that they can live in a clean and healthy environment.*

At the time (1994) the DWAF identified 14 000 villages with between 12 and 15 million rural people who did not have access to clean water and around 21 million had no hygienic sanitation. By 1999, only 3.2 million people had received basic water supplies (Department of Water Affairs Review, 1999). A myriad of problems have presented themselves making water delivery difficult. The problem with distorted access to water relates directly to the laws that govern ownership, allocation, access to use and management of water embedded in historical colonial and apartheid practices. To a large extent, the National Water Act of 1998 does recast the policy and legislative frameworks related to ownership, access, use and control of water. The policies and legal instruments that were used to deny the majority of South Africans in rural areas access to tap as well as natural water bodies have been removed. However, the ability to transform the new policies and frameworks into practices that will result in the actual delivery and accessibility of water resources to the rural poor is far from being realized, especially in the land reform programme.

In most developing counties, especially in Africa, the majority of the population reside in rural areas. Primarily as a result of colonial processes, most of these areas do not have access to adequate resources and services. In South Africa specifically, the Whites harnessed the water resources as they were advantaged by the privileged access to land and economic power. The removal of the resource base and the unequal distribution of land resources as a result of colonial and apartheid practices in South Africa is viewed as one of the central contributory factors to the creation of widespread poverty in rural Black South Africa. Bromley (1995: 7 cited in Bob and Ali, 1999) argues:

*Discussions about property rights are helped along if we note that "property" is not really an object - land, water, trees - but is rather a stream of benefits arising from control over objects or ideas. Of course the magnitude of this stream of value will vary depending upon the range of managerial discretion over that stream.*

As de Klerk (1991: 25) states:

*Whoever owns land controls access to it, determines the use to which it is put, decides the economic, social and political beneficiaries of production on it, and how the wealth below it is to be exploited.*

Land is therefore a fundamental component of property relations in any society. Its distribution and control is vitally important to people and in many ways relations to land, especially in terms of access, ownership and control, influence power dynamics among and between individuals and groups.

Addressing the land question and ensuring access to land (and thereby land resources) to the previously marginalized groups in South Africa is envisaged as a vehicle to alleviate poverty in rural South Africa.

Since the demise of apartheid in South Africa, the Government of National Unity has stressed the importance of development which focuses on improving the quality of life of people in order to sustain them and free them from abject poverty. A critical aspect of this broad-based intention is to improve access to basic needs and services, such as water, electricity, housing, productive land, education and health care, in order to alleviate poverty. In this regard, the land reform programme was developed. A key objective pertaining to land reform was the transfer of 30% of the land to the previously disadvantaged by the year 1999. Inherent in this aspiration was the intention to redistribute access and control of natural resources existing on and in the land. Water resources and provision was viewed as being central to these endeavors. In terms of the goal of redistributing 30% of the land by the year 1999, there was little progress. This implies that both land and water relations had not changed significantly.

Water is a basic necessity and an essential ingredient for life. Access to safe drinking water is regarded as a fundamental human right and is enshrined in the South African Constitution of 1996. Everyone should have access to adequate and reliable sources of water for domestic or productive use. In the latter case, water for agricultural purposes is essential for subsistence

production in poor rural household and communities. For many rural communities and households their main source of income and food is through subsistence agricultural production. This essential survival strategy that is critical for food security in poor rural areas requires access to both productive land and adequate water supplies. Thus, land and water cannot be divorced since the ownership of both resources ensures survival in rural South Africa.

The Reconstruction and Development Programme (RDP) advocated the improvement of the living conditions of the poor to the level where water coupled with sanitation services of acceptable level would be available to all. The RDP plan was to supply 20/ 30 liters of clean water each day to every person within 2 years and 50/ 60 liters per day within 5 years (ANC, 1994). The most widely expressed concern is that every South African should have convenient access to an adequate and reliable source of clean drinking water. According to Southern Illinois University Public Policy Institute and the International Water Resources Association (1999: 1), the United Nations declared that:

*...all peoples, whatever their stage of development and their social and economic conditions, have the right to have access to drinking water in quantities and of a quality equal to their basic needs.*

When one looks at the DWAF's RDP plan, the affairs of the land reform programme does not fall under its mandate. One then questions the role of the department and its mandate as land reform projects especially redistribution, falls under rural development.

## **1.2 AIM**

This study intends to examine the problems that the land redistribution programme is experiencing in ensuring the beneficiaries have access to adequate and sustainable water sources, with the aim to evaluate the sustainability of the water resources in redistribution projects with the use of a case study from Kwazulu-Natal. Embedded in this concern are issues related to why rural people need water, what are the primary uses of water in these communities and the impact of water access on the quality of life.

### **1.3 OBJECTIVES**

- To review applicable legislation governing land reform, water resources management and rural development.
- Using case studies, to determine the appropriateness and sustainability of water resources in land redistribution projects.
- To examine the needs of beneficiary communities with reference to water resources.
- To review appropriate technologies for water and sanitation supply to land reform projects.
- To forward recommendations for improving sustainability of water services in land reform projects.

### **1.4 CHAPTER SEQUENCE**

#### **1.4.1 Chapter 2: Literature review**

In chapter 2, applicable literature, legislation and policies governing rural development, land reform and water and sanitation are critically evaluated. Insight into the problems facing rural communities with respect to water services provision and the associated impacts upon the quality of life are also reviewed.

#### **1.4.2 Chapter 3: Methodology**

This chapter attempts to give one insight as well as to provide a brief overview of the three case studies on the farm Platt Estates in terms of the projects location, legal status and development proposals. The baseline information of the case studies and the surrounding area are also presented. The adopted and adapted methodology proposed by Watson (1998) is also discussed and evaluated together with the primary and secondary methodology used to evaluate the water sustainability of land reform projects, with special reference to redistribution projects.

### **1.4.3 Chapter 4: Analysis**

Data through secondary and primary means are presented and evaluated. The secondary data evaluated is primarily from a desktop study of the reports by the Department of Land Affairs: Quality of Life Report for 1998 and the Annual Quality of Life of Land Reform Beneficiaries for 2000. The use of questionnaire interviews, field observations and mental mapping is the primary methodology used to gather information from the study area. This information is evaluated and analysed statistically through qualitative and quantitative methods. The secondary and primary data is presented in a tabular format which is evaluated and interpreted. Statistical sustainability scores are also presented. Field observation information, a mental map and photographs are also presented to strengthen total observations.

### **1.4.4 Chapter 5: Recommendations and conclusion**

This chapter provides a summary of the dissertation and offers general recommendations pertaining to what needs to be implemented in order to improve the quality of rural land reform programmes with special reference to land redistribution. This is needed to improve the quality of life for the beneficiaries and to move them away from the poverty cycle.

# CHAPTER TWO

## LITERATURE REVIEW

*The farmers told us that water and land go together. If we wanted some of their water we would have to buy the farm. The farmers wanted five million rands for their properties. They asked us, 'Have you got that sort of money?' I asked them, 'How do you feel as Christians, the fact that you are sitting on big farms with just your family, while next door there are about 13 000 people which are suffering for lack of water.' The farmers became sympathetic.*

Abraham Shabangu (cited in Department of Land Affairs, 1997: 10)

### 2.1 INTRODUCTION

According to the National Land Committee Press Statement (15 February 2001), rural areas is home to about 19 million of the nations people, most of whom continue to live under conditions that has not seen dramatic change as promised after the demise of apartheid in 1994. They comprise of 70% of the nations poor, including a disproportionate number of women, children and elderly. The absence of appropriate rural development strategies, speeded land reform, clean, safe and accessible water as well as other much needed basic amenities of life, drastically limit these communities economic opportunities and movement away from the poverty cycle. At the root of these stagnations, according to the National Land Committee Press Statement (15 February 2001) is the skewed property relations under which 70 000 white farmers control 86% of the land, whilst millions remain landless and subject to poor basic conditions. This is also compounded by the governments skewed macro economic policies (Growth, Economic and Redistribution) and budget constraints and lack of public/ beneficiary community consultation. This chapter reviews rural development in South Africa and the issues pertaining to the lack of appropriate and sustainable development for the rural poor with special reference to land reform that is administered by the Department of Land Affairs. Water resources management and sustainability is also reviewed.

## 2.2 RURAL DEVELOPMENT

Rural land redistribution in the post apartheid South Africa is seen as a critical premise for poverty alleviation in rural areas, as the history of forced removals and poor development strategies which clearly lacked focus on rural development have left behind a trail of poverty. The risk of being poor and impoverished is also greater for women than men and is larger for rural women because of their multiple workloads, traditional rules, limited options and limited resources available to them.

Poverty can be characterised by a state of being poor, with a lack of material means, resources and basic needs to sustain physical and social well-being acceptable as a minimum standard of living. According to Mngxitama (2001), rural poverty is rooted in landlessness, but is sharply worsened by the related lack of clean water, sanitation, healthcare and other basic services. In South Africa there are extremely high levels of poverty in rural areas and according to National Land Committee (2000a: 1):

*Recent estimates are that almost half of South Africa's total population can be classified poor, with most of the poor living in the rural areas of South Africa . The 'poverty rate' in rural areas is estimated at 72 % ( that is , the percentage of individual classified as poor), as compared with 29% in urban areas. African women living in rural areas constitute the bulk of the victims of poverty.*

According to McIntosh Xaba and Associates (1998), up until 1998 approximately 51 % of people in Kwazulu-Natal were living in poverty. This shows that our country's people are suffering. The people in rural areas are barely able to sustain themselves with special reference to women. This should not be new to us as from the demise of apartheid in 1994, the Government of National Unity has been putting rural development programmes, policies and strategies in place to reduce or eliminate poverty in South Africa, especially in light of the redistribution of resources, land reform being one of them. Implementation of these strategies have been problematic for various reasons .



The World Bank (1975 cited in Dixon, 1990: 56) states that:

*Rural Development is a strategy designed to improve the economic and social life of a group of people - the rural poor. It involves extending the benefits of development to the poorest amongst those seeking a livelihood in the rural areas. The group includes small scale farmers, tenants and the landless.*

This shows that rural development is concerned with economic growth, by raising the standards of the poor, with making use of natural resources. Both land and water are natural resources and are inextricably linked in order to foster economic livelihoods. However, it must be stressed that resources must be provided and utilised in a sustainable way by encouraging full participation of the beneficiaries (individuals and communities), thus ensuring sustainable development which is the utilisation and protection of resources for the present generation without hindering the needs of future generations. Rural development is not only about giving people land and services but ensuring that they can make a living off the land sustainably. If sustainability is not achieved, the mass exodus of people to urban areas in search of paid employment will continue thus weakening the rural base and further stressing the urban environment, with the result of povertising more people.

## **2.2.1 POLICY DEVELOPMENTS**

Since 1994, South Africa has undergone and is undergoing major policy development, placing major emphasis on rural development and poverty alleviation. The strategies and policies presented in this section sheds light on these developments.

### **2.2.1.1 The Reconstruction and Development Programme (RDP, 1994)**

The Reconstruction and Development Programme (RDP) was developed as a national programme for action. This approach was seen as a basic needs approach, people centred and the goals amongst others was to improve the living conditions of the people. This was to be done through better access to basic physical and social services and by creating opportunities (economic) for

the people to develop their potential. The RDP acknowledged the meeting of basic needs of the people. It also acknowledged that 17 million people lived below the poverty level of which 11 million was in rural areas, that 12 million people had no reasonable access to water and 21 million did not have adequate sanitation (ANC, 1994). Land reform was needed as a mechanism of rural development, where the RDP aimed at redistributing 30% of land within 5 years (1994 to 1999). However, this was not achieved as according to Mngxitama (2001: 2),

*nearly seven years later, these policies barely managed to redistribute 1% of land to black people despite the RDP promise to redistribute 30% of agricultural land by 1999.*

The RDP also advocated the supply of clean water, 20 to 30 litres per day within 2 years and 50 to 60 litres per day with 5 years, all within 200 metres from peoples dwelling. This also included adequate sanitation within 2 years. According to the Minister of Water Affairs and Forestry, Mr Ronnie Kasrils at the address to the Water Institute of South Africa (WISA) 2000 Conference in Sun City, as quoted in the SA Waterbulletin (May/ June 2000: 4) with respect to water services:

*Government is considering speeding up the delivery of minimum water and sanitation services to all South Africans by changing the RDP delivery standard of 25 litres of water per person a day within 200 metres of every household to 500 metres in difficult areas. Despite considerable progress, we have a long way to go before we can meet this undertaking. We have committed ourselves to finding ways to ensure that every household has access to clean, unpolluted water they need for their basic needs. However, as we have learnt, simply providing toilets and taps is not enough. Once it is installed, we need to make sure that it becomes a sustainable resource for that community.*

The supply of water services as promised by the RDP was not achieved. It can be argued that not enough thought was given to the formulation of that promise and that from the onset it was an unachievable goal. The goal was ridden with difficulties, which amongst others were: budget constraints, capacity constraints, poor planning and policy, lack of empowerment of local authorities, lack of knowledge of rural areas and rural communities, traditional roles and responsibilities, technical issues, education of the communities, monitoring and evaluating projects

and management and maintenance. However, the government has acknowledged that there are problems, but are committed to alleviating the backlog. According to the Minister, government will not meet its new deadline of 2007, unless delivery gains momentum (SA Waterbulletin, May/June 2000) .

The RDP also gave emphasis to the role of women and the removal of discrimination impeding women's access to land, whereby the National Reform Land Programme was seen as the central driving force of rural development (National Land Committee, 2000).

#### **2.2.1.2 The Constitution of South Africa (1996)**

The Constitution is the overall law of the land and the state has to implement its requirements. Thus, peoples rights through rural development is seen as a major focus of the Constitution. The Constitution of South Africa set out requirements for government action regarding land reform and tenure security by ensuring that:

- People dispossessed of land from 1913 received adequate redress.
- Security of tenure is provided to those who have insecure rights due to racially discriminating practices and laws.
- Efforts are made to give people opportunity to access land on equitable basis, but within the states available resources.
- The state must take legislative and other measures to achieve land, water and related reform.

#### **2.2.1.3 Growth, Employment and Redistribution (GEAR)**

In 1996, came a change of policy with the move towards Growth, Employment and Redistribution (GEAR) strategy where economic growth was prioritised over poverty alleviation. Thus, the RDP strategy was replaced by the macroeconomic policy of GEAR. It was perceived that economic growth will have a ripple effect onto the rural areas thus assisting poverty alleviation, through economic means and through the implementation of basic services. However, according to the National Land Committee (2000), GEAR imposed limitations on rural development strategy, including restriction of resources available for reform, protection of "production" sectors of the economy (especially the export farming sector). Thus, there was a perception that rural areas

outside the farming sectors were receiving little attention. GEAR's strategy was redistribution through growth (economic) and thus growth will benefit all. This did not bear fruition as there was no mechanism to compel those benefiting from economic growth to redistribute to the rural poor (Rural People's Charter, 1999). Thus, analysts believed that the stringent market-orientated, macro-economic policy of GEAR was increasing poverty, especially in rural areas as there were no ripple effects spilling unto them (McIntosh Xaba and Associates, 1998). According to McIntosh Xaba and Associates (1998), GEAR was not fulfilling job creation, redistribution of income in favour of the poor, distribution of facilities and services to all and securing a safe environment.

#### **2.2.1.4 The Rural Development Strategy (1995)**

The Rural Development Strategy (1995), was introduced and emphasised the need for coordination between the different tiers, as well as different departments of Government, in rural development and service delivery. But according to the National Land Committee (2000: 2) "the RDS said little on operational priorities and mechanisms."

#### **2.2.1.5 The Development Facilitation Act (1995)**

The Development Facilitation Act (1995), was developed for provinces to speed up the implementation of the RDP initiatives in relation to land, through Land Development Objectives (LDOs), whose key component amongst others was to ensure access to and the standard for land development including water, health and education facilities. Thus, the DFA (1995) ensured a mechanism for land development, regulations and uses.

#### **2.2.1.6 The Rural Development Framework (1997)**

The Rural Development Framework (1997), an operational plan for the RDS (1995), was developed after the demise of the RDP office in 1996. This function was taken over and was developed by the DLA (McIntosh Xaba and Associates, 1998 and the Rural Development Task Team (RDP) and Department of Land Affairs, 1997). The RDF focus was on poverty alleviation and proposed the government's intention to change the lives of the rural poor through a sustained reduction in absolute poverty (McIntosh Xaba and Associates, 1998). This was achievable through:

- public participation in local government;
- increasing employment and economic growth;
- providing affordable infrastructure and improved services;
- ensuring social sustainability; and
- enhancing capacities in rural local government to implement projects.

The focus of the RDF was primarily on governance for the provision of infrastructure and basic services through a demand and supply paradigm. However, according to the National Land Committee (2000) and McIntosh Xaba and Associates (1998), the RDF failed to develop detailed implementation plans and procedures as well as it failed to provide spatial planning initiatives which amongst others did not state the role of traditional authorities values in the development process. Another criticism according to the National Land Committee (2000) was that the DLA did not have a mandate to design a plan for implementation by the different organs of state, over whom it had no authority.

#### **2.2.1.7 Integrated Rural Development White Paper for KZN (1998)**

The Integrated Rural Development White Paper for KZN (1998) vision for rural development was tabled to achieve:

- integration by re-orienting the delivery system;
- to ensure an equitable rural development strategy over the urban biasness;
- complementing the civic and traditional system of governance;
- creating an inclusive rural economy;
- integrating the provision of services (with special reference to land and water) and development resources and
- the facilitation of participation in the development process.

By this time five NGOs began to respond to the declining political emphasis given to rural issues, especially reflected in budgetary allocations to rural development (Rural People's Charter, 1999). There was still an urban bias even though half of the population lived in rural areas and were impoverished. In 1999, the delegates of rural communities launched the Rural Development Initiative and adopted the Rural Peoples Charter which initiated a 12 point strategy. It aimed at government

and other roleplayers (NGOs, CBOs, communities) delivery to rural development which amongst others requested:

- rural economic development;
- clean water for all;
- land to the landless;
- sustainable environmental management for the future; and
- land and support for emerging farmers.

#### **2.2.1.8 Integrated Rural Development Framework: Operational Strategy (2000)**

According to the National Land Committee (2000), one could argue that the Rural Peoples Charter strategy led to the formulation of the Integrated Rural Development Framework : Operational Strategy (2000), which was undertaken under the auspices of the President's office. It outlined the need to integrate various departments programmes on rural development through a social fund, which would finance integrated development in the form of projects and the allocation of an adoption agency for delivery, thereby leading to the privatisation of rural development efforts. It also proposes the phasing in of this approach over three years with pilot projects focussed in the three poorest rural provinces: KZN, Eastern Cape and Northern Province.

There have been many policies developed to address rural development. All these policies merely provide an expression of intention unless there is major commitment from government with respect to: the building of capacity in the implementing institutions; financial aid, integrated planning, commitments from civil organisations and most important of all, commitment as expressed in the Rural People's Charter from individuals of communities, and communities themselves. This must not be seen as a "something for nothing" syndrome. Therefore, the beneficiaries need to work at it in order to sustain the projects and be at the forefront of the decision making processes. Women in particular need, consultation, economic empowerment, access to key resources (land, water, health care, etc) and sustainability thereof and security from all forms of violence. Their total dedication and input into decision making processes are critical for rural development, as women are key resource managers in rural areas. If this is not done properly, then the mass exodus of rural people to urban centres (rural urban migration) would continue, stressing the already fragile urban centres, creating massive peri-urban informal

settlements, thereby elevating the poverty cycle.

## **2.3 LAND REFORM IN SOUTH AFRICA**

Rural land reform and rural development cannot be separated, as they are inextricably linked. According to the ANC (1994: 20), “A national land reform programme is central and a driving force of the programme of rural development.” Rural land reform is but a tool for rural development and government is the instrument.

The history of South Africa shows a myriad of inequalities of which the land issue was undoubtedly the central issue. Blacks were faced with the increased pressures from landlessness, insecurity and poverty due to racial laws and apartheid. This was the final chapter in the history of land dispossession. Land in South Africa was central to conflicts, expropriation and relocation which resulted in the white minority owning 87% of the land. The Black majority were subjected to harsh conditions and were dumped into 13% of marginalised land (Percival and Homer-Dixon, 1995).

According to the Department of Land Affairs (2000), approximately half of the total South African population are categorised as being poor, of which 72% lives in rural areas/ households, taking into consideration that 50% of the total population live in rural areas.

With the demise of apartheid in 1994, the Government of National Unity with the new refined Department of Land Affairs (DLA) was tasked with implementing the Reconstruction and Development Programme (RDP) objectives (seen as the basic needs approach), which was seen as a means to alleviate poverty. The land reform programme was thus implemented to remedy the past injustices and bring about reconstruction and development by promoting sustainable growth and community development. The programme fell under the auspices of the Bill of Rights, which outlawed unfair discrimination and promoted women’s access to land and their active participation in the decision making process.

The Congress for a Democratic South Africa (CODESA) agreement, paved the way for land

reform in South Africa, but which had a no expropriation clause attached as a precondition. The Reconstruction and Development Programme (RDP) to alleviate poverty in rural areas was adopted by the DLA and a Land Reform Programme and appeared in the White Paper on South African Land Policy (1997), as the need to:

- transfer 30% of agricultural land from Whites to Blacks in five years;
- use natural resources (land, water, etc) optimally;
- generate economically viable agricultural holdings;
- recognition of the cultural value of land;
- prioritize historically marginalised groups in the provision of land;
- ensure that all South Africans have a place to live and secured tenure;
- increase the income and the quality of life for all South Africans;
- provide a potential for a variety of land uses;
- provide a link to broader rural development components (infrastructure); and
- provide a link to better local government organisations.

According to the ANC (1994), a national land reform programme “aims to address effectively the injustices of forced removals and the historical denial of access to land...and in implementing the national land reform programme and through the provision of support services, the democratic government, will increase incomes and eliminate overcrowding.” The objectives were seen as a basic needs approach to poverty alleviation and resolving the injustices of the past, which included redressing the injustices and marginalisation of women. However, under the CODESA agreement the expropriation of land from the White landowners was not an option. Only state land, donated land and purchased land from the white landowners, which fell under the “willing buyer willing seller principle” were options available. The willing seller principle advocated that land could only be purchased at market related prices, which made land acquisition very difficult. According to Bob (1999), the willing sellers were and are often White commercial farmers who would sell their land at inflated prices or were and are unwilling to sell good quality land at decent prices.

The Governments land reform policy therefore aims to:

- redress the injustices of the colonial and apartheid era;
- build national reconciliation;



- promote stability, economic growth and eliminate poverty; and
- improve household welfare.

In order to achieve this goal the programme must:

- compensate people for land lost due to racial laws;
- promote greater equality in the distribution of land ownership amongst its citizens;
- provide secure tenure for all people living on the land;
- ensure that the land is used sustainably so that it will be a productive resource for the future generations;
- provide land to meet the need for affordable housing and services;
- record and register all rights in property; and
- administer public land efficiently and effectively

The National Government is therefore responsible for land reform in the country, who must also liaise closely with the local, provincial and tribal authorities as they all have important roles to play in land reform. Not liaising with any one of the above authorities and facilitating buy-in, can lead to the programme failing. Apart from authorities participation the success of any project depends to a large scale on public participation in decision-making, gender equity (which remove laws that restrict women's access to land, promote women's active participation and register land assets in the names of the beneficiary household members and not only household heads), economic, social, and environmental sustainability.

Before embarking on explaining the land reform programme (restitution, redistribution and tenure reform) it is important to note who the land reform programme is for. According to the White Paper on South African Land Policy (1997) it is for the landless people especially women, farm workers and their families, who want to improve their tenure rights, labour tenants, who want to secure land rights, residents who want to secure or upgrade conditions of tenure under which they occupy land, people who get land through the land restitution programme, and people who lost land but are not covered by the restitution of Land Rights Act, 22 of 1994.

The approved households are given a Settlement/ Land Acquisition Grant of R16 000 (initially

R15000) per household. The main purpose of the grant is for settlement, production and/ or improving the tenure conditions. Successful applicants can use the grants for housing, water supply, sanitation, etc. It is also important to note that other departments like Housing, can be contacted for subsidies/ grants but only a combined maximum of R16 000 can be allocated per household from the two departments as a once off grant. This therefore entails that the entire development per household comes out from the allocated R16 000 grant. If the proposed development is greater than the allocated amount then that additional amount is costed to the applicant/ beneficiary.

The Settlement Planning Grant which is equal to 9% of the combined grant (number of houses x R16 000) is used for communities to plan their settlement needs by determining the feasibility of their desired development, by contracting external expertise (planners, surveyors, etc) (Department of Land Affairs, 1998a). This grant is allocated only for gaining legal approval for the project.

The three programmes under the land reform programme that was adopted based on market and demand driven processes are redistribution, restitution and tenure reform. This dissertation deals with the redistribution programme. Restitution and tenure reform will be briefly explained.

### **2.3.1 Restitution**

The Government of National Unity passed the Restitution of Land Rights Act 22 of 1994, to provide or compensate those people who were marginalised by racially prejudiced laws that removed/ evicted people since 19th June 1913. The former president Mr F. W. de Klerk in 1991 acknowledged that dispossession of land from the Black South Africans was the most decisive move in redistributing wealth and power to the White minority (Bob and Ali, 1999).

Restitution is therefore seen as a rights based programme, where the government must after reviewing applications, restore the land to people, provide alternate land or monetary compensation or alternate relief as agreed upon or negotiated by the applicant. The claimants for restitution rights are identified as the victims of forced removals, labour tenants, landless people, current occupants without title and people with historical claims based on occupation of land by

predecessors according to Levin (1997).

According to the Department of Land Affairs (1998b) Quality of Life Report, 28% of the total number of claims received was from Kwazulu-Natal. Also, 29% of the total rural claims was from Kwazulu-Natal, stressing that Kwazulu-Natal has the highest rural claimants. According to Bob (1998), in rural areas there are more community based claims lodged rather than individual land claims.

There are various issues and concerns that still need to be considered under the restitution process which include amongst others the following:

- the question of the state being the judge and the claimant;
- the validity of multiple claims and ratification thereof;
- the question of compensation for natural heritage or settlements;
- the question on the significance of the restitution process with regards to the cut off dates and the education of the public according to the significance of the final cut of date for laying claims;
- the question of women who were not seen as beneficiaries in the traditional systems due to traditional male biasness;
- the question of how the tribal authorities are going to see the restitution process; and
- the slow and expensive process of verification and restoration resulting in moves of claimants looking at redistribution as an alternative.

### **2.3.2 Tenure Reform**

Land tenure is envisaged as a secure way in which people own or occupy land or seen as a way in which to formalise informal rights of settlement and utilization. Until the fall of apartheid, it was very difficult for Black South Africans to get registered ownership rights to land which created a land shortage for Black people and led to people occupying land that they had no legal rights to. This led to evictions and threats thereof and severe conflicts. Thus, tenure reform aims to ensure that all people have security of tenure, irrespective of whether or not they own the occupied land, in order to eradicate exploitation, especially on farms and traditional land (where people lived in South African Development Trust Land, which could be confiscated at any time).

Amongst others, tenure reform was thus formulated to ensure that:

- problems of insecurity, inequalities and landlessness are resolved, including the protection of vulnerable people against arbitrary evictions, thus ensuring that all South Africans have land rights;
- systems of group or communal rights with individual rights are resolved ensuring appropriate land administration thereof; and
- all rights holders under communal ownership systems, especially women, have adequate representation in decision making processes.

The Department of Land Affairs (1998b) Quality of Life Report stipulated that there were 82 land tenure projects nationally, of which only 3 was from Kwazulu-Natal and only 1.6 % of the DLA's target to meet land demand of 600 000 households were realised.

The challenges faced by tenure reform, amongst others, are listed below:

- women are still marginalised by tenure reform due to customary practices experienced in rural areas;
- the acquisition of land is still market driven;
- the subsidies of R16 000 are still too small, and therefore pooling resources is prevalent;
- difficult to implement in the former homelands and in traditional land, where farmers and tribal authorities, chiefs, and especially the Zulu monarch (the King) are reluctant to release land; and
- poor education of the rural people that are waiting for government to do something without them applying, as land reform is demand driven.

However, a key criticism of the tenure programme, according to Mngxitama (2001: 2), is that laws and focus changed throughout the programme:

*with new laws drafted to protect the rights of farm dwellers (farm workers and labour tenants) bogged own in compromises made to White landowners roving unable to change the semi slavery conditions of farm dwellers, or to stop the arbitrary evictions which contribute to rural poverty and urban migration.*

### 2.3.3 Land Redistribution

The land redistribution programme is a needs-based component of the land reform programme and according to Bob (1999), it is envisaged to exceed the number of households it reaches as compared to the rights-based tenure reform and restitution programme. The purpose of the land redistribution programme administered by the Department of Land Affairs was to provide the poor with land for residential and productive purposes. According to the Department of Land Affairs (1998c: 26), the redistribution priorities was to provide for the following:

- the needs of the marginalised and women
- effective implementation of projects to areas that have institutional capacity
- projects that give attention to:
  - economic and social viability
  - fiscal sustainability by local authorities
  - environmental sustainability
  - access to markets and employment
  - availability of water and bulk infrastructure
- support for diversity of land redistribution projects, to address the multiplicity of needs

This was set up to improve the poor's livelihoods thus improving the quality of their lives and moving them away from poverty. Land redistribution was intended to assist the urban and rural poor, farm workers, women, labour tenants and emergent farmers. The land redistribution project is the most advanced of the three land reform programmes (Bob, 1999). According to the National Land Committee (2000b: 1), the initial policy platform as outlined in section 25 of the Constitution of South Africa, created "an imperative for government to respect and protect existing property rights and to ensure that no right could be arbitrarily removed." There was also the guarantee that government would assist the needy to purchase and develop land and provide services. It also enshrined that land redistribution should take place through the market with agreements for purchase of land being reached through the "willing-buyer" and "willing-seller" principle, with expropriation being an instrument of last resort if urgent land needs cannot be met through market transactions.

The process of redistribution involves the identification of land and the formation of a legal entity

by the beneficiaries, development of a plan for use of the land and evaluation, negotiation with the land owner and purchasing and transfer of the land with government assistance in the form of the Settlement and Land Acquisition Grant. The Provision of Certain Land for Settlement Act, 126 of 1993 was promulgated to provide for a Settlement and Land Acquisition Grant of the R16 000 grant (initially R15 000) per beneficiary household, which people could access individually or jointly through community resources pooling. The grant included supporting and financing the planning process as well as instituting the recommendations as outlined in the beneficiary communities business plan. However, the grant is not released to the approved beneficiary, rather it is released by the relevant department as its use is approved for agreed upon beneficiary plans (Bob, 1999). According to Levin (1990), one questions whether this process is really redistribution as this programme involves little redistribution, but rather, the transfer of ownership of one set of assets and endowments to another owner.

Stemming from the land needs by beneficiaries, the land redistribution strategy was implemented to respond to the variety of needs. However, the lessons that emerged from international experiences needed to be reviewed to ensure effectiveness of the redistribution programme. Christiansen (1996, cited in Kirsten et al, 2000) argues the following with respect to the international experiences:

- **The speed of the implementation of the programme.** One characteristic of a successful programme is rapid implementation. In the absence of fast paced programmes, a combination of excessive bureaucracy, over centralisation of the process and legal challenges is likely to render the programme ineffective. The importance of this lesson is again reflected by the recent farm invasions in Zimbabwe.
- **Economic viability of the options.** Before a reform programme is implemented, there must be a careful assessment of the models or livelihood options available to rural households. That is, the models should indicate whether the persons resettled on the land have sufficient land size and quality to provide at least the target income. Further, in computing the costs and benefits, other assistance and infrastructure necessary to generate the income should be planned.

- **Political acceptability and legitimacy of the programme.** There must be a consensus across the spectrum of political opinion that the programme is both necessary and the most acceptable way of achieving the stated goals. Land reform programmes are not irreversible, particularly where this consensus has not been achieved.
- **Clear definition of the role that the public sector can and will play.** The proposed programme must be evaluated in light of an understanding and acceptance of the roles that the public sector can and must play, and what should be best left to the non-governmental sector. Programmes that have relied entirely on the public sector in the belief that it is the only one capable of maintaining integrity, delivering services, determining needs, and managing the process have generally been unsuccessful.
- **Land reform is only one part of a comprehensive programme of economic reconstruction.** The redistribution of land is necessary, but not sufficient to guarantee the success of a development programme. There is the need for additional services, infrastructure, markets, incentives, health to be considered and access provided. These considerations are necessary both to sustain higher productivity and to include others who may not benefit from the direct provision of land.

Thus, the following options emerged to facilitate development:

- **Group settlement with production:** the primary need for this grouping is settlement with some land set aside for communal grazing, small gardens or grouped communal economic activities.
- **Group production:** the emphasis is on grouped production rather than settlement.
- **Individual production:** similar to group production but involves an individual or household that wishes to farm.
- **Commonage:** involves the release of land by a municipality or local authority to the poor, for grazing or garden allotments. The land is therefore set aside for the benefit of the poor residents of the area, whom will have land-use rights rather than ownership.
- **Share-equity schemes:** involves a partnership between farm workers and employers whereby the land and the farm business can be jointly owned. The Settlement Land Acquisition Grant can be used to buy a share in the enterprise.



However, according to Hlatwayo (2001), in seven years less than 2% of land has been transferred, thus leaving the apartheid landscape intact with the racial distribution of land still in the hands of the White minority (86%). After understanding the dynamics of international experiences, the one question arose: why did the process fail to deliver? There are no clear-cut answers to pinpoint the exact reasons. Notwithstanding this, there are a combination of issues which are examined briefly as follows:

- A key limitation is the protection of property rights of current landowners, and the guarantee of compensation for land transferred (National Land Committee, 2000b). This is due to financial constraints being placed on the extent of land transfer, by the effects of the "willing-buyer willing-seller" framework. This is further stressed by the requirement of "fair and just" compensation for the existing land owners (National Land Committee, 2000b). Therefore, according to the National Land Committee (2000b), the beneficiary communities were unable to meet the market-based terms of the redistribution programmes and saw no logic in paying most of their subsidies for the purchase of land from the White farmer. Furthermore, an important legislation impeding land reform within a market assisted framework, in particular the Subdivision of Agricultural Land Act, has not been effectively repealed (Kirsten et al, 2000).
- According to the National Land Committee, (2000b), the critical weakness of the redistribution programme has been the exclusion of the rural Black communities from real participation in the decision making processes of land reform. They argue that by applying to government to purchase land encapsulated them to being spectators in the process, which discouraged them from seeking creative ways of accessing land.
- Poor rural women also gained few benefits from through the land redistribution programme, as they face gender-specific barriers (National Land Committee, 2000b). These include, the skewed gender bias of favouring men as heads of households, land for women mediated through men, grants allocated to households rather than to individuals which does not allow women independent access to it, lack of women participation in the decision-making structures and process and a bias to agricultural production activities and male-dominated traditional activities such as grazing.



- The speed of implementation of the programme was slow due to excessive bureaucracy and over-centralisation of the process which rendered the programme ineffective (Kirsten et al, 2000). The length of time to get an application for land reform grant approved was astonishing and therefore, was largely responsible for the slow progress in land redistribution.
- The economic viability of farms indicate that households have insufficient land size and quality to provide for a reasonable livelihood or income. Assistance and infrastructure necessary to generate income was also not readily available to the beneficiaries (Kirsten et al, 2000).
- The need for additional services, infrastructure, markets, incentives and access thereof, had not received adequate attention (Kirsten et al, 2000). These services were necessary to ensure sustainability of the projects.
- There are no clear definitions of roles with respect to government and non-governmental sectors. Government became the major player and thus bureaucracy followed even though international evidence, where the public sector managed and maintained the process, were failures (Kirsten et al, 2000).
- The government was reluctant to use the expropriation clause as a legitimate mechanism for acquiring land (Hlathswayo, 2000b). Hlathswayo (2000b) therefore argues that this was another reason that the land reform programme did not meet expectations and hopes that the minister uses this mechanism on the premise that land is needed for the essential good of land reform.

Against this backdrop, the redistribution progress has not lived up to expectations, that is, to increase efficiency and equity, as well as increase growth and reduction of poverty to the rural poor. Notwithstanding this, the Minister of Agriculture and Land Affairs, Ms Thoko Didiza, in February 2000, announced new proposals to take land redistribution forward over the next five years (National Land Committee, 2000b). The new target is to transfer 30% of the countries

agricultural land over 15 years, through the integrated programme named Land Redistribution and Agricultural Development in South Africa (LRAD). This programme is directed to benefit the rural poor and to assist in the establishment of a class of commercial Black farmers with the ownership of agricultural land, thus improving their economic and social well-being (Kirsten et al, 2000). According to the National Land Committee (2000c), the key principles of the new programme will be that it is decentralized, it will remain demand driven and all beneficiaries will be able to access grants provided that they make a contribution to the project (in kind or cash) and that its implementation will be biased towards beneficiaries to ensure maximum participation. The system establishes a sliding scale with a range of grants, where R20 000 will be granted, provided the beneficiary makes a contribution of R5 000 in cash, labour or kind. A grant to the maximum of R100 000 can be provided on condition that the beneficiaries make a contribution of R400 000.

A range of projects, which include food safety net, commonage, equity schemes and commercial agricultural projects, are accommodated within the framework. Further to this, the programme provides for the communities holding land under communal and traditional tenure systems to utilise their grants to purchase land and upgrade their tenure, as well as to offer to the public agricultural state land free of land claims (Kirsten et al, 2000).

However, this new programme is not free of criticisms. The major concern is the limited access the poorest of the poor and especially women, the youth and other marginalised groups would have under the new programme (National Land Committee, 2000c and Mngxitama, 2001). According to Mngxitama (2001: 2), the new land reform policy (LRAD) promises to “virtually abandon the pro-poor focus of earlier policies in favour of the creation of a class of elite commercial African farmers, while excluding most landless blacks through the requirements of an ‘own contribution’ from people hoping to access state land reform subsidies.” According to the National Land Committee (2000c), the policy is a narrow and a piecemeal approach to land and agrarian reform which does not present a credible strategy to address the distribution of land or the root causes of poverty and inequality in the rural areas. The demand-led approach places excessive responsibility on the intended beneficiaries and “will privilege the rich and educated, who may have necessary networks, resources and knowledge.” (National Land Committee, 2000c). However valid these criticisms are, the government is steadfast in its implementation.

## **2.4 APPROACHES TO WATER SUPPLY**

There has been a dramatic paradigm shift in recent years throughout the world to move from a “top-down” to a “bottom-up” approach to rural development as the top-down approaches have generally failed. There was then a move internationally to consult with beneficiaries throughout the project cycle of water supply in order to ensure the projects sustainability. This section reviews the supply driven approach, the move towards public participation, the demand responsive approach and the free water for all debate (the return to supply-driven approach).

### **2.4.1 Supply-driven Approach**

The top down approach is deemed to be the supply-driven approach as adopted during the colonial and apartheid past, where the supply of water was deemed a priority, but it was supplied without or with poor consultation with the affected or targeted communities. Water was treated as a means of social good under the supply driven approach, with its justification that supplying water would improve the health of the people, including the environment (World Bank, 1998). According to the World Bank (1998), governments, NGOs and communities adopted the ideology that free water was a fundamental right of the people. Thus, governments and service providers devised schemes based on technical considerations such as the water source, its viability, the affected or projected population or communities. However this was done without consulting and seeking advice of those affected or targeted, especially women. This approach led to the failures of these water supply and sanitation projects, the reasons being various, but which include the following (World Bank, 1998):

- non acceptance of the projects by the affected communities (the “does not belong to us, why bother syndrome”);
- poor utilisation of services;
- non sustainability of projects, due to physical failures, poor repair and maintenance schedules;
- users failure to assist in maintaining, financing water services or paying for services
- inappropriate technologies;
- inappropriate consultation with tribal authorities, communities and the most affected - women; and

- return to traditional methods of obtaining water.

However on the other hand, according to Lammerink et al (2000a), common early difficulties were also encountered relating to the dependency culture instilled during decades of paternalistic relationships between rural communities and authorities. This caused difficulties in trying to sell the idea that communities needed to take responsibility for water management, as historically communities were used to the authorities providing the services, and the communities the passive recipients. Therefore it is not uncommon that communities do not accept the idea of community managed water supply schemes, and therefore capacity building and buy-in is needed for success otherwise communities will revert to traditional ways of water collection.

#### **2.4.2 Move towards peoples participation through Participatory Action Development (PAD)**

According to Lammerink et al (2000b), in the late 1970s a debate on development argued for public participation as a critical variable. The debate argued for peoples participation, especially women and community participation as “the emerging failures of the top-down expert-design developmental projects and programmes supported the promotion of participation as a central concept in development” (Lammerink et al, 2000b: 2). This led to an international acceptable “bottom-up” participatory approach being implemented, which is known as the Participatory Action Development (PAD) approach especially for water supply systems. This is a flexible approach to community-managed water supply systems that can be used by local authorities, aid support organisations for implementation in local/ rural areas. The key ideology stresses on community management and the PAD approach allows for methodology and tools to be developed to enhance “the capacity of rural communities to manage their own supply systems with appropriate backup support and guidance” (Lammerink et al, 2000a).

The PAD approach according to Lammerink et al (2000b) is therefore useful for:

- assessing social needs and problems and initiating structures to find solutions;
- identifying the needs for change and working out solutions holistically through improved technology requirements and actions to meet the needs of the people; and
- educating and training local people.

All of this is achievable through the three tier approach of the PAD system, which includes diagnosing the problem, experimenting and sustaining the proposed development project as well as through complete interaction with the community and/ or its representatives. The community determines its needs and the officers of the project facilitate and mediate, basically lending a “helping hand” according to Lammerink et al (2000b).

Adopting the PAD approach, the South African initiatives use the Demand Responsive Approach (DRA), which according to Mvula Trust (2000a), has gained considerable international and local support, due to the constraints of the supply-driven approaches used. The supply-driven approaches used in water services delivery projects have largely failed locally and internationally, as delivery of services to communities have been undertaken with little or no involvement of the affected communities in the decision-making and implementation process.

#### **2.4.3 Demand Responsive Approach (DRA)**

The DRA approach to water services delivery is based on the premise that communities must request or be in the forefront for initiating water service provision to their respective communities. This must be guided by the local community members and based on the demand for services by that community. It is also based on the premise that water services provision is conditional upon consumers or communities ability to pay, manage and sustain such a system. Even though water services is a basic need enshrined by the constitution it also has economic value as argued by the National Water Act (1998).

Thus, the DRA approach enshrines in its assumptions the following, as outlined by the Mvula Trust (2000a):

- Water and sanitation are not fundamental human rights and therefore conditional on the ability to pay, as they have economic implications.
- Government cannot fulfill its obligations to fully finance services, therefore consumers have to pay for the cost of the provision.
- Water is a commodity to be regulated by market forces and therefore payment for full economic cost determines sustainability.
- Governments role should be reduced, ensuring that private sector takes over functions,

but the private sector must be accountable to the government and the people.

- Elimination of subsidies by government to the community as it does not ensure sustainability.
- Communities must be self sufficient.

When one looks at these assumptions, one questions the adaptability of such an approach to the South African situation with regards to its viability. The Mvula Trust is adamant the DRA is appropriate in the context of South Africa, as it stipulates that the assumptions implied has its roots in the “capacity of government and particularly local government to finance and provide direct management support for basic services” (Mvula Trust, 2000a: 2 ). This ideology draws its evidence when one considers the constitutional inter-governmental financial transfers needed from national to local government, and as shown in the land reform process where monies are transferred to the local authority for the implementation of the business plan.

However, it must be warned that by comparing other developing countries where the DRA is implemented, does not necessarily mean that it will work and be accepted locally. South Africa has its own unique internal problems that it needs to solve, which includes the change of mindset of the communities as well as government officials with the power of changing and implementing policy. There is also the political need to combat poverty and redress the economic imbalances inherited from the past and until such time that this is addressed “DRA will not be embraced to the extent required to ensure sustainable services” (Mvula Trust, 2000a: 3 ).

Therefore, a refinement of the DRA approach is needed for South Africa, which needs to ensure the following, if any approach is to function:

- widespread education or workshops of the DRA approach to the masses;
- buy-in, into the DRA approach;
- political support;
- economic realisations for the community especially women, as they are fundamental to the projects success;
- greater levels of sustainability and cost recovery;
- continued acceptable operation and maintenance or repair of the installed system; and

- continued monitoring and technical support.

#### **2.4.4 The Free Water for all Debate or Debacle**

However, notwithstanding that South Africa has adopted the DRA approach on its land reform process and the water services implementation strategies, the government before the 2000 local elections, promoted that it would ensure that all citizens would have access to clean potable water and the right to free water, at least 6 000 litres per month of it. Some observers believed it to be a political ploy to secure the rural votes, but it seems that the government is intent on delivering on its promise, but of course only time will tell (Still, 2000 cited in Water Institute of South Africa, 2001). However, what is important to note is that the government with its macro-economic principles of GEAR, has had an about turn in its position, as free water is contrary to the government's water policy which enshrines the "user pay principle". According to Laurence (2001: 1), government's decision to provide free water "contradicts the internationally accepted conventional wisdom that even the poorest should contribute to the cost of their water consumption". According to Laurence (2001: 1), Minister Ronnie Kasrils argued that a change in tact was necessary and persuaded Cabinet to accept:

- the extension of piped water to South Africa's rural areas and the installation of water meters did not lead to increased water consumption;
- instead of flocking to the taps, rural people avoided the meters and sought to draw free water from streams, irrespective of how polluted the water was; and
- rather than spend money on metered water, rural women chose to search for alternative sources and to spend the money on something else.

It seems that the government has given water provision a high priority, thus recognising that providing access to basic clean water supply is probably a direct attack on poverty, necessitating a basic needs approach as enshrined by the defunct RDP.

Another important development has transpired and that is that government has had to revert to the supply-driven approach (during desperate circumstances), especially if one looks at the effort and drive taken to remedy the outbreak of cholera that developed in Kwazulu-Natal in August 2000. The 6 000 litres free water for all can be seen as a supply driven approach rather than a

demand responsive approach, which means that government has reconsidered its position and reverted to the traditional supply driven approach.

However good the intention may have been, it can be argued that this announcement of free water should only have been made after a clear policy or strategy was in place, which includes budgets and methodology (Still, 2000 cited in Water Institute of South Africa, 2001 the Water Institute of South Africa). This announcement could lead to existing communities requesting free water and therefore not paying for services which could threaten the sustainability of existing projects, as the infrastructure by local authorities to administer service projects is not yet in place. This is further argued by Still (2000 cited in Water Institute of South Africa, 2001: 24) which argues that the free water policy is:

*a bad idea, and is in fact (at least in the rural areas) a major disaster in the making. In fact the current disaster, that government is already losing R800 million on the upkeep of water schemes, is due to a de-facto free water policy in many parts of the country in our Apartheid past. Apartheid was not only about social engineering and repression of dissent. With it went a large measure of paternalism, and what can be more paternalistic than free water... The lucky few get free water, which they do not necessarily appreciate, and the millions still have nothing...Most of those who are unserved now will never be served.*

Also, in addressing the current DRA of projects, concerns can arise as to the guarantees that communities will now place, especially financial input for new projects, if they know that it is the local authorities mandate to provide water services and 6 000 litres per month of free water.

Another criticism according to Glover (2000 cited in Water Institute of South Africa, 2001), is that free water supply is urban biased, as well as that it effects the immediate interest of the “haves”(those with existing water and sanitation facilities), with long term impacts of the “have-nots”(those who do not have any services at all). According to Still (2000 cited in Water Institute of South Africa, 2001), what is needed to solve some of the problems is to provide a major campaign allocated with a big chunk of the budget to get water services to the under-served or



un-serviced poor. Irrespective of the doubts raised by many water service professionals regarding free water, DWAF remains resilient that the country must make it work, which is not all that reassuring, unless or until such time that a framework for implementation is workshopped.

## **2.5 DEVELOPMENTS IN THE SOUTH AFRICAN WATER AND SANITATION LAWS**

Water and Sanitation are inextricably linked. The Water and Sanitation laws in South Africa with the advent of democracy have had a dynamic paradigm shift. The Reconstruction and Development Programme (RDP) of 1994 identified that there was a lack of adequate and sustainable water and sanitation services, which required that government make these basic needs an important priority. It identified that water resources were unevenly distributed as well as that there was a void created with respect to the absence of a unified national institution charged with providing these services. This together with poor legislation was creating an obstacle to meeting the needs of the vast majority of South Africans. The democratic government was therefore tasked to speedily resolve this void and the responsibility fell on the shoulders of the national Department of Water Affairs and Forestry which was to develop new legislation and build competent local and provincial agencies that are capable of providing adequate water supply and sanitation services.

### **2.5.1 DURING APARTHEID (PRE-1994)**

According to the Department of Water Affairs and Forestry (1998), during apartheid, no national institution was responsible for ensuring that the people were provided with equitable and sustainable access to water supply and sanitation services. The Department of Water Affairs and Forestry (1998: 1), states that:

*Water supply and sanitation services were dealt with in a fragmented and inconsistent manner in Provincial Ordinances and rural water supply and sanitation was primarily left to the former homeland Governments to deal with.*

The commercialization, skewed utilization and storage of water resources primarily for large scale

agricultural production in rural South Africa, resulted in a decreased amount of water reaching natural water sources such as rivers and dams. Furthermore, a relatively small number of landowners controlled the bulk of water resources and it was conservatively estimated that over 65% of all water currently used in South Africa was and/or is privately owned (Department of Water Affairs and Forestry, 1998). Additionally, given the financial and technological capacities available to these landowners, it is possible that this percentage can be significantly increased by building dams to retain water on the property of the landowner.

In understanding the legal framework of Water Law it is important to understand the relationship between land ownership and access to water. Who has access to land invariably has access to water on and in the land. During apartheid, the white minority owned 87 % of the land and this has not changed substantially today.

According to the Water Act of 1956, and subject to vested rights, most of the water belonged to the state. One of the principles of the act was that owners of riparian properties were allowed water rights, that is, when such water which rose and fell on the land that belonged to that individual, the individual had exclusive use of the “private water”. Owners of riparian land could take as much surplus water as they could use beneficially as well as they could store surplus water by building a dam.

In the context of rural development, of which land reform is a major component, the following concepts need to be understood: private water, riparian rights and common law rights. Private water includes spring water, rain water, drainage water, soil water, underground water and water in private streams. It is deemed private so long as it does not form part of a public stream or interferes with two or more riparian owners. It, however, does not consider other users and the fact that all water is part of the hydrological cycle. Thus, if you own land and have the above water conditions, water belonged to you.

Riparian land owners enjoyed the rights to surface water, but did not own the water which ran past their farms. They only had rights to use the water for domestic purposes, stock watering and irrigation. The riparian owner could not sell water or use it for any other purpose. With the

immense pressure to control water resources riparian land owners were technically and legally capable of pumping many rivers dry especially in low flow periods. Water used for irrigation was extensive and pollution of water bodies, with excess nitrates and phosphates which enhance eutrophication as well as salination of the water bodies were not uncommon.

Common law rights enabled any member of the public who is situated next to a water body to make use of the water for domestic purposes, fishing and stock watering. Thus, if an informal or a rural settlement was officially recognized they could legally use the water. In event of low flow or drought, riparian owners upstream could not harness all the water without satisfying the common law rights of people downstream.

The focus on the old legislation was on water supply management where money was spent on transforming existing water infrastructure to innovative water schemes rather than the equitable allocation or optimal use of water. With the advent of democracy and the move towards understanding the environmental and social factors, a paradigm shift was noted, to move from a supply to a water demand management strategy in order to manage optimally the allocation of water services to the people.

## **2.5.2 POST-APARTHEID (POST 1994)**

Given that the Reconstruction and Development Programme (1994) identified that there was a lack of adequate and sustainable water and sanitation services, limited water resources in South Africa as well as the historical bias towards white land owners, the government began to establish a new legislation. The developments in legislation governing Water and Sanitation in South Africa has been phenomenal since 1994 and is continuously being revisited.

### **2.5.2.1 NATIONAL POLICIES AND LEGISLATION**

#### **2.5.2.1.1 White Paper on Water Supply and Sanitation (1994)**

This policy paper set out the strategy required for service delivery of basic water services, showing that water and sanitation were inextricably linked. The policy was tabled to provide a support to local government, involving communities and stakeholders. It was seen as a

participatory approach to service delivery of basic services, which also required inter-governmental involvement, especially recognising the role of the Department of Health in determining a sanitation policy. Community support was therefore instrumental in ensuring sustainability of service provision, as it was according to Mvula Trust (2001a: 4), “written at a time when the majority of South African poor lived in areas without any legitimate local government”. Mvula Trust (2001a: 4) also goes on to state that the policy remained “far sighted in its articulation of many issues” and therefore became difficult to implement without proper local government structures.

#### **2.5.2.1.2 The Constitution of South Africa (Act 108 of 1996)**

With the advent of apartheid and the democratic elections in 1994, the Constitution of the Republic of South Africa was prepared and promulgated in 1996 and therefore all its obligations must be fulfilled as it is the supreme law of the country. The Constitution (1996) guaranteed all of its citizens, amongst others, the right to:

- an environment that is not harmful to their health and well-being;
- to have the environment protected for the benefit of the present and future generations, through the establishment of reasonable legislative and other measures;
- access to sufficient water; and
- the state must take reasonable and other legislative measures, within its available resources, to achieve the progressive realisation of each of these rights above.

With the basic needs as a base, service delivery was the tool to ensure delivery, thus the Constitution (1996) stipulated the rights of individuals, outlining the obligations required by government to ensure the protection of the environment and responsible resource management, especially with regards to water services delivery.

The Constitution (1996) also outlined the divisions, functions and responsibilities of the three organs of state. The National Government’s function is to establish norms and standards for the provision of services, with support from the provincial and local government in the delivery of these functions and services (Mvula Trust, 2001a). The Constitution (1996) therefore enshrines the following :

- The National Government and Provincial Governments, by legislation and other measures, must support and strengthen the capacity of municipalities to manage their own affairs, to exercise their powers and to perform their functions.
- The provincial government must promote the development of local government capacity to enable each municipality to perform their functions and manage their own affairs.
- That the objective of the local government is to ensure the provision of services to communities in a sustainable manner. One such provision of services that is the function of the local government, is to provide water services that is limited to potable water supply systems and domestic waste-water and sewage disposal systems.

It can therefore be seen that ultimately it is the responsibility of local government for the actual service delivery of water services to its communities. However, support, co-operative governance and integrated development still falls under all spheres of government as the Constitution (1996) enshrines this to ensure that development programmes are co-ordinated to further the aim of efficient and effective service delivery to the people.

#### **2.5.2.1.3 The Water Services Act (Act 108 of 1997)**

This act was promulgated in December 1997 and its function was and is to fulfill the governments constitutional obligations. The Act enshrines that everyone has the right to basic water services. The Act defines both water supply and sanitation services as being Water Services, and aims at providing a developmental regulatory framework for the provision of water services by outlining the roles of the three spheres of government, in working together as “partners in planning, organising and delivering water services to communities” (Mvula Trust, 1999c: 1). This is in keeping with the constitution and the RDP goal (seen as a basic needs approach) of ensuring basic rights and services reaches all its citizens.

The Water Services Act (1997) thus ensures the following:

- It recognises the responsibility of local government to supply local communities with water services.
- It sets out the rights and duties of those who actually provide services (water service providers, who can be an authority, a water board, a voluntary water committee or a

private company), those who are responsible for providing services (a local government structure called the Water Service Authority, whose responsibility is to ensure that communities are provided with services that they can afford, are efficient, are economical and sustainable) as well as the roles and responsibilities of consumers (all those who are users of water in South Africa, whose prime responsibility is to pay for access to water services). However as a safety net, water services committees have also been accepted to serve as providers of water services to consumers in defined (rural) areas, only if the authority lacks capacity to undertake its functions. If the authority demonstrates its ability to fulfil its functions, then the water service committee can be de-established.

- It also outlines the supporting role of the national and provincial government to ensure the local governments responsibilities of water services provision are implemented.
- It also allows the Minister of the Department of Water Affairs and Forestry (DWAF) to set national standards to ensure future sustainable equitable water services provision which include:
  - water services provision;
  - water quality for use and discharge to receiving water courses;
  - sustainable usage;
  - economic viability of water services;
  - requirements for installation and operation of water service works; and
  - prescribes norms and standards for tariffs to ensure sustainability and conservation.
- Amongst the various limitations posed to protect the public interest, the following limits are critical, especially to the consumers/rural communities:
  - access to water services is subject to the availability of financial, human and natural sources;
  - consumers have a duty to pay reasonable charges for water services and the water services authority reserves the right to discontinue water services if the consumer negates to pay for service provision; and
  - consumers access to basic water services may not be limited or discontinued if that person proves the inability to pay for such services.

The objective of the Water Services Act of 1997 is to assist municipalities in their function of water services provision, thus ensuring the effective, efficient, affordable, equitable and sustainable access to water services to all consumers (Mvula Trust, 2001a). In keeping with rural strategies, the water committees are the prominent suppliers of water and according to the Mvula Trust (1999c: 3), “research has shown that this is the most effective and sustainable management option for rural areas”, as it is a community based provider which has the approval and blessing of the local community, the affected water services authority, the provincial administration and the consumers who are in agreement with the conditions set by the committee.

#### **2.5.2.1.4 The National Water Act (Act 36 of 1998)**

The Act recognises that water is a scarce resource and is an unevenly distributed national resource, which through the discriminatory laws and practices of the past had prevented its citizens equal access to water and use of water resources. The Act also recognises that water belongs to the people and the state is the custodian of such resources. It also recognises that through integrated management, the state has to ensure equitable allocation and redistribution to consumers, protection and sustainable use to ensure future sustainability (Department of Water Affairs and Forestry, 2001).

Of importance to this study, the Act ensures that the countries water resources are protected, used, developed, conserved, managed and controlled by taking into account the following:

- meeting the basic human needs of present and future generations;
- promoting equitable access to water;
- redressing the results of the past injustices, both racial and gender;
- promoting the efficient, sustainable and beneficial use of water;
- facilitating social and economic development;
- providing for the growing demand of water use; and
- reducing and preventing pollution and degradation of water resources.

Even though the Act, enshrines the user pay principle where water use is subject to charges if water services are networked (which is subject to the conditions applied to by the Water Services Act, 1997), it allows that anyone can use water from a water source for the purposes of domestic

use, domestic non-commercial gardening, animal watering (excluding feedlots) which graze on allocated land and store and use runoff from a roof, as expressed in Schedule 1 of the act, provided that all other regulatory requirements are adhered to. Schedule 1 users are deemed not to have a significant impact on water resources and therefore need not apply for a license to use, nor do they have to register their water use or pay for it (Department of Water Affairs and Forestry, 2000). Most rural areas fall under this category as the people use traditional methods of collecting water from rivers, streams, springs, etc. However, if water is networked and bought to standpipes or individual homes, or if irrigation is applied, or if water is used for agricultural production (commercial purposes) and not stipulated under schedule 1, then reasonable charges are placed on the consumers.

The Act also stresses pollution prevention and explains that an owner of land who causes, has caused and is likely to cause pollution or degradation of a water resource, must apply appropriate measures to prevent pollution, by ceasing or modifying the activity, by complying with waste management strategies, containing, eliminating and remedying pollution. Thus, rural communities are also responsible under this act, as no one is exempt irrespective of their social, economic and political status. It is, however, difficult to implement in impoverished rural areas for various social as well as economic reasons but it is still the law of the land.

#### **2.5.2.2 LOCAL GOVERNMENT LEGISLATION**

Over and above the national regulating acts, local government legislation has also been tabled in the White Paper on Local Government (Mvula Trust 2001a), which includes the vision to establish “efficient viable municipalities with the capacity to deliver basic services, as well as the inclusion of community participation in decision making” (Mvula Trust, 2001a: 2).

##### **2.5.2.2.1 The Local Government: Municipal Demarcation Act (Act 27 of 1998)**

This Act has a profound impact on rural areas, as it stresses the implementation of “wall to wall” municipal boundaries to ensure that disadvantaged areas are incorporated into the financially sustainable municipalities which can deliver sustainable services to the communities. However, there are complications as the tribal authorities are questioning their role, if the functions are given to the municipalities.



#### **2.5.2.2.2 The Local Government: Municipal Structures Act (Act 117 of 1998)**

This act focusses on mechanisms for service delivery, as it determines new municipal structures to include capacity requirements for its efficient functioning. According to the Mvula Trust, (2001a) and the Department of Water Affairs and Forestry, 2001, the Category A municipalities (Metros) which extends from cities to the rural periphery, will perform all service provision functions. Category B (Local Councils), have small towns or large villages with sufficient capacity to deliver services. Category C (District Councils), comprises of a group of Category B municipalities (Local Councils), which is responsible for service delivery which include the provision of water services to its communities.

#### **2.5.2.2.3 The Local Government: Municipal Systems Act (Act 32 of 2000)**

This looks at the internal systems and functioning of the municipalities. It regulates organisational change, public, community and women participation in decision making and most importantly allows municipalities to enter into partnerships with water boards, Non Governmental Organisations (NGOs), and is supportive of Community Based Organisations (CBOs) for water services delivery (Mvula Trust, 2001a and the Department of Water affairs and Forestry, 2001).

#### **2.5.2.2.4 The Division of Revenue Act (Act 16 of 2000)**

Financial management that is allocated to and controlled by National, Provincial and Local Governments are administered by this Act, whereby annually raised revenue is distributed to the authorities, and the local authorities portion of revenue raised nationally is called the "Equitable Share" (Mvula Trust, 2001a). With regard to services provision, the act allows for new projects being implemented with an agreement between DWAF and the Water Services Authority (Mvula Trust, 2001a and the Department of Water affairs and Forestry, 2001).

However, there still seems to be an urban bias to service provision of water, operating and monitoring costs of existing services, rather than the aim of providing some water to all of its communities. After maintaining the existing infrastructure, there is little or no money available for new service provision especially to the rural poor.

#### 2.5.2.2.5 General

Over and above the Acts and Regulations, Traditional Leaders are also important role-players in basic services provision, and policy is being developed according to the Mvula Trust (2001a), to define the roles and status of traditional leaders, with a vision that traditional leaders have an important role to play in the provision of services to communities.

Another important policy development is the institutionalisation of “6 000 litres of Free Water for All”. As discussed previously in “The Free Water for all Debate or Debacle”, there are many concerns to this debate as argued in Water Institute of South Africa (2001). Of concern here is that most rural municipalities do not have the resources to pay for free water and provide for other services and according to Holden (2001 cited in Water Institute of South Africa, 2001: 1), “until national Government comes up with a realistic strategy for funding free water it will not be implemented in rural areas, or free water will mean no water.” What is also unfortunate is that by promising free water with no corresponding budget it leaves the few water schemes for the poor in rural areas that are able to operate sustainably at a local scale vulnerable due to the committee that runs the scheme losing its only source of income. The argument is that the “Equitable Share” given to local authorities could be used to offset this dilemma. However, one questions the size of the equitable share given to the local government and whether the intended use which is for subsidisation of services to the poor will be implemented. Another important argument, according to Still (2000 cited in Water Institute of South Africa, 2001: 25), is that “national and provincial government have had very little control over how the councils have chosen to use that money” with respect to the equitable share and he therefore argues that at least this debate may force local government into leaning at least some of the equitable share for the support of rural water supply.

Irrespective of the debate, the national government have implemented this policy and it is up to all South Africans to make it work and according to Steele (2000 cited in Water Institute of South Africa, 2001: 10):

*It costs the country approximately R4 billion every year to treat and cope with the effects of diarrhoea and dysentery... if we can agree that a free lifeline supply should be considered an entitlement, then there should be no reason that national cross-*

*subsidisation and national tariff restructuring cannot form the basis of a viable alternative framework.*

## **2.6 SANITATION**

Water and sanitation in rural development is inextricably linked and therefore cannot be ignored. It is universally accepted that water services to rural communities are regarded as high priority, but adequate sanitation services seldom received attention in the social, economic and environmental development of rural communities.

The White Paper on Sanitation (1996) stated that 19 million South Africans and over 90% of schools and 50% of clinics lacked adequate sanitation facilities and had estimated that about 20.5 million people in South Africa had inadequate sanitation. Poor sanitation impacts negatively on the environment and on people's health, economic, social and psychological status (Mvula Trust, 2001b).

According to the South African Constitution (1996), the delivery of services (water and sanitation) is a local government competency. Adequate sanitation facilities for the poor, remains one of the greatest challenges facing developing countries and South Africa is no exception. The focus is on the word "adequate", which means providing comfort, privacy and effective barriers against the transmission of disease. However, many people generally interpret this meaning as the absence of any form of sanitation. Sanitation should be seen as the study and use of practical measures to preserve and maintain the health status of the people and therefore Sanitation is referred in the Draft National Sanitation White Paper (1996): 3.

*...to the principles and practices relating to the collection, removal or disposal of human excreta, refuse and wastewater, as they impact upon users, operators and the environment. Good sanitation requires health and hygiene education and acceptable affordable and sanitation services.*

Sanitation is therefore an all encompassing waste issue, rather than that what was traditionally seen as being toilet building, sewer systems, collection and maintenance.

The Draft National Sanitation White Paper (1996) for the first time in the history of South Africa addressed the needs of all South Africans as it took into account people's aspirations and of the growing constraints on economic and environmental constraints (Mvula Trust, 2001b). In order to ensure that all South Africans are provided with access to adequate sanitation within the constraints of limited national resources, consideration is given to on site sanitation as compared with no sanitation coverage.

There are various sanitation systems commonly used in rural areas. Sanitation systems and programmes are designed to improve the basic conditions of living with health, hygiene and safety being at the forefront. Unfortunately, a toilet or a place for human excreta by itself does not improve household health, hygiene and safety. A toilet system is therefore seen as a mechanism to remove human excreta from the immediate environment and thus the common systems used in rural areas by poor rural communities are excretion in the bush where foliage is dense, bucket system, pit latrines. These systems are problematic as most of the systems have their soak-aways onto land which reaches the surface and groundwater table, thus contaminating the valuable water sources. They pose a health, hygiene and safety problem to the users and the community at large.

Septic tanks, pour-flush and chemical toilets have also been used in rural areas according to Mvula Trust (1997). In general these technologies require secondary handling and treatment which makes it difficult to support with skills and backup in rural areas and it is also expensive rendering it uneconomical.

The most common rural sanitation system is the pit latrine where the urine and faeces are mixed and is slowly broken down where the pathogens (disease causing agents) are destroyed. The problem is emptying it out which is difficult and therefore second and third pit latrines are needed and built which requires contributions from households and which includes minimal costs. The pit latrines are also used by neighbours if they do not have one. What is generally problematic is the lack of any form of washing facilities for hands and toilet, the toilet smells (attracting flies) and

are poorly constructed. Pits generally last three to five years and often collapse.

The Ventilated Improved Pit Latrine (VIP) has therefore been specifically developed to overcome the problems of odour and flybreeding that generally occurs with other types of soak-away pit latrines (Mvula Trust, 1997). According to the Mvula Trust (1997), as a general rule a VIP latrine should not be sited too far from the house, should be located downwind from the house, at a minimum distance of 2 to 3 metres from the bottom of the pit to the groundwater table, it should be sheltered and have access for de-sludging if needed. VIPs have therefore been encouraged by the National Sanitation Programme in South Africa to be built as a minimum requirement for sanitation systems (Mvula Trust, 1999a). Although communities were supposed to be offered a choice of technologies, VIPs were the only options offered and these have led to problems being experienced, according to Holden and Austin (1999), especially in site specific areas where hard rocks strata are found, areas of high water tables and areas of collapsing sands renders the cost of a VIP an expensive option. This is further stressed by the Mvula Trust (1997: 9) that the widespread use of VIPs as in certain circumstances are not the most appropriate site specific option and therefore alternative sanitation options may be required if the following is experienced:

- high density settlements;
- steep or unstable slopes;
- high ground water table, especially if the groundwater is a source of supply;
- soil types that allow free-draining which could pollute surface and subsurface water;
- geology of hard rock types below the surface; and
- where VIPs are socially, economically, environmentally and politically unacceptable.

Added to the list above is the question of the life expectancies of the VIPs and collapsing sands. According to Holden and Austin (1999: 1), the question of emptying the pits are also problematic and as a result "In Zimbabwe the pits are full and there is no mechanism in place to empty them." This leads to new technologies being sought after.

Local government must therefore consider a demand responsive approach whereby communities are largely consulted. According to the Mvula Trust (2000b: 1), water and sanitation projects which are controlled by local community members, based on the demand approach (DRA) have

demonstrated:

- greater sustainability;
- elevated cost recovery;
- health improvements;
- economic viability for women especially; and
- understanding and adherence to maintenance and repair strategies

Sanitation and Health Promotion is one of the most important functions facing local governments in rural areas. Local authorities must therefore ensure the following is addressed according to the Mvula Trust (2000c: 2):

- community involvement in drawing priorities to address sanitation, health and hygiene;
- using participatory methods for educating community;
- ensuring demand driven projects;
- ensuring the understanding of costs involved in sanitation options; and
- understanding issues to improve their quality of life and immediate environment, by understanding amongst others the following:
  - hand washing;
  - safe handling and disposal of infant faeces; and
  - proper use and maintenance of water supply and sanitation systems.

Waterborne sewerage is possibly the best option for the safe disposal of human excreta, which provides flushed toilet services in homes, no contact with waste once flushed. Waterborne sewerage is only appropriate where there is sufficient supply of water, payments for services to recover service costs and the presence of institutional capacity. This is not the case in rural areas and therefore appropriate technologies need to be implemented to ensure health and hygiene improvements, sustainability and to ensure a safe environment.

According to the Mvula Trust (2000d: 2), sanitation appropriateness and sustainability is dependent on the following:

- what a household can afford to pay;
- what reliable and sustainable subsidies are available;

- what duties householders are prepared to take on;
- the availability of sufficient quantities of water if flush systems are envisaged; and
- financial and institutional capabilities of local government.

Therefore, appropriateness and sustainability of any sanitation system is only as good as the communities total involvement in the decision making of choosing an appropriate system, as much of the above is in the control of the members of the community.

Dehydration is an alternative system whereby the urine and faeces are separated and the dried faeces can be handled safely as a soil conditioner and the urine can be used as a fertilizer (Holden and Austin, 1999). The advantage is that the system can be built inside the house as there is no liquid in the pit, low maintenance and operational costs as the members of the household are required to regularly clean out the system and is only sustainable if the user is prepared to handle the dry faeces. According to Holden and Austin (1999), the CSIR and the Mvula Trust looked at the feasibility of urine diversion technology, which could provide an alternative to VIP. Of critical importance was to ensure cost effective solutions, overcoming social issues of handling dry faeces (use as night soil ), handling urine and education to men to sit during urination.

## **2.7 THE QUALITY OF WATER**

Where there is water, there is life. Where the quality of water is poor and scarce, life has to struggle. According to Abrams (1996), water is a scarce resource and is inequitably distributed in South Africa where 43% of all water falls on 13% of the land and with high annual variability and unpredictability. This distribution dynamic puts major pressure on government to protect its dwindling water resources and according to the Minister of Water Affairs and Forestry, Mr Ronnie Kasrils cited in the SA Waterbulletin (May/ June 2000: 4), government's commitment "to finding ways to ensure that every household has access to clean, unpolluted water they need for their basic needs."

Watson (1998) notes in her study on land reform projects in KwaZulu-Natal that eutrophication

of rivers caused by detergents, cattle defecating near the water, the building of latrines in percoline soils found near the rivers encourage seepage of bacteria from sewage into river systems. This undermines the sustainability of the newly acquired land. Her methodology suggests educating rural people on water conservation, water harvesting and the protection of rivers against pollutants. Thus, the need arises to determine the quality of water for use, especially in the rural areas and the need to educate communities on water resource management.

According to the Mvula Trust (1999a), surface water resources are dwindling due to South Africa being underlain by hard rock formations, only small quantities of water is obtained from underground sources, and in some areas due to salinity of the ground water over large areas it makes the water undrinkable. However, many rural people are still dependant on traditional, unprotected surface water sources such as ponds, rivers, dams and lakes and groundwater sources which includes all water that occurs underground, that which must be brought to the surface for use via boreholes and springs. The water is used for peoples domestic purposes (drinking and preparing food, washing and personal hygiene, and gardening or watering plants, etc.) and agricultural needs (crop production, irrigation, animal requirements, etc.). Rainwater harvesting is also an important source of water in communities but this depends on the amount of rainfall and the type of roofing that households can afford.

In rural areas, especially those that are remote, the principal collection of water is from groundwater which is collected through boreholes and wells. Ground water sources are becoming increasingly important as a source of supply to rural communities and South Africa, as they are often the only source and cost effective alternative available to isolated communities. According to the University of Durban Westville's Microbiology Department, groundwater was historically considered to be a safe and reliable source of water protected from surface contamination by a "living filter", an upper soil layer that removes pollutants (Water Research Commission, 1997b). This allows water to percolate downwards through the soil reaching the groundwater table. However, according to the Water Research Commission (1997b: 53), the University of Durban Westville's Microbiology Department recorded that "a number of well documented outbreaks of microbially related diseases traced to contaminated groundwater, as well as numerous reports of chemical contamination, have destroyed the widely-held misconception that groundwater is safe



from pollution". This challenges the commonly held contention that groundwater is pollution free. In poor rural communities this problem can be linked to the poor sanitation systems used or poor sanitary practices, poor waste management and allowing animals in close proximity to potable water sources.

The Mvula Trust (1995) reveals that there are approximately 20.1 million people without adequate domestic sanitation facilities in the rural areas of South Africa with ninety five percent (95 %) of rural people using either bush, bucket or pit latrine systems. This figure has not changed substantially in the last six years. The negative human health and natural environmental impacts of this is high. As population size and density increases, soils become saturated with pollutants (often fecal in nature), resulting in percolation of pollutants, especially bacteria and viruses into the groundwater table which are used by the local community.

In rural redistribution projects, in most instances the pooling of the R16 000 land settlement grants becomes the only mechanism to acquire land through the land reform programme. This implies that many families settle on an acquired piece of land where existing policies do not make the existence of adequate sanitation facilities a pre-requisite for beneficiary settlement. Sanitation and the provision of piped water are viewed as services that the community must develop on its own by either utilizing the balance of the land acquisition grant (if there are any remaining monies after the purchase of land) or by acquiring funds from other sources. For most communities the only source of funding becomes already financially strapped beneficiary households.

Development of piped water in rural areas is forging ahead very slowly and therefore rural people are still dependent on traditional systems for their daily water requirements. The provision of water services in land redistribution projects most often entails the construction of boreholes or standpipes. With increasing urbanization, mining, irrigation, human waste discharges and poor sanitation facilities; the quality of water in these natural water sources needs seriously to be looked at. The quality of water is determined by the purity of the water bodies or the pollution content of the water bodies.

Due to the importance placed on water resources in South Africa, there is a high priority placed on water quality control. The term Water Quality, according to a joint report by the Water

Research Commission, Department of Water Affairs and Forestry and the Department of Health (1999: 5): “is used to describe the microbiological, physical and chemical properties of water that determine its fitness for use.”

These properties are influenced by human activities, stemming from human domestic use, industrial and mining use, agricultural use and the disposal thereof to the receiving water bodies. This also includes problems that are related to inherent geological characteristics of the source area, such as mineral salts that leaches or dissolves into a water course.

It must be stressed that a clean or clear looking water does not necessarily mean that it is acceptable to drink, as it could contain dissolved substances and/ or pathogenic disease causing microorganisms which are detrimental to health. When a lay person asks about the quality of water, they probably would like to know if the water is suitable to use at home for domestic purposes and or for recreational use.

The principal categories of pollutants that can enter an aquatic system are through chemical, suspended matter and biological means. The quality of water is therefore determined scientifically by the following properties:

- **Physical Quality**

This refers to the measurements such as conductivity, pH and turbidity, that effects the aesthetic quality (taste, odour and overall appearance) of water. This is affected by suspended matter and dissolved matter like metals, oils, detergents, which reduces the oxygen transfer in the water and waste that encourages eutrophication (nutrient enrichment of water that encourages excessive microscopic growth of algae). This therefore transforms the physical quality, which effects aquatic life and human health negatively.

- **Microbiological Quality**

This refers to the pathogenic constituent of the water that is affected by viruses, bacteria, protozoa stemming from poor waste management both human and animal. These organisms are responsible for the transmission of infectious diseases such as cholera, viral

hepatitis and dysentery. A common mechanism used is coliform testing in water, especially *E.coli* (used as an indicator organism), which determines if the water is faecally contaminated. If there is presence of *E.coli* there is a strong possibility that there is a risk of infectious diseases carrying bacteria or viruses being present which is detrimental to health. Drinking or potable water should contain no coliforms.

- **Chemical Quality**

This refers to the concentration of dissolved organic and inorganic compounds (metals, acids, salts) which are in high concentrations. Most of these compounds originate from industries, mines, agricultural (with use of herbicides, pesticides), that inhibit and destroy bioactivity in water by removing oxygen, which makes water impalatable and if consumed can cause illness and or death if not treated.

The impacts of these pollutants pose major threats on rural water supplies if they are not adequately controlled and/ or, if there is no pre-treatment and disinfection of the polluted water prior to use. Thus, the treatment of water is needed prior to use, and in poor rural areas water treatment is almost non-existent and therefore rural communities are susceptible to disease and death. Therefore the determination of water is needed prior to use.

The classification of water is therefore important according to the Water Research Commission, Department of Water Affairs and Forestry and the Department of Health (1999), as one can establish how suitable the water is for domestic uses (drinking, food preparation, bathing and washing clothes) to allow for communication of water quality information to the communities and to aid in decision making regarding management for domestic supply. The classification of water is therefore important when one considers that according to van Veelan (undated), situations arise when poor quality water sources are accepted whilst good quality sources are rejected especially in rural areas. This is due to murky, discoloured and odorous water which may not necessarily be unhygienic being rejected whilst clear odourless water which may be harmful is accepted.

When water is classified, one can then determine whether the water can be used for domestic use or not, in relation to drinking, food preparation, bathing, laundry, etc. (Water Research

Commission, Department of Water Affairs and Forestry and the Department of Health, 1999). Thus, in a joint report, the Water Research Commission, Department of Water Affairs and Forestry and the Department of Health (1999) have classified water in terms of colour and class criteria, where:

Blue	=	Class 0	=	Ideal Water Quality
Green	=	Class 1	=	Good water Quality
Yellow	=	Class 2	=	Marginal Water Quality
Red	=	Class 3	=	Poor Water Quality
Purple	=	Class 4	=	Unacceptable Water Quality

These water quality assessments are analysed through strategic expensive laboratory means according to the properties of water quality discussed previously, in relation to microbiological, chemical and physical properties. In South Africa where water is in short supply, the ability to assess water quality accurately for its determined use is critical in protecting the health and well being of the people, with special reference to those in the rural areas that use water from unprotected systems. By using the above colour coded classification system the information can be used by communities to determine the quality of water and therefore its appropriate usage. However, time and money is of importance and this system requires expensive sampling procedures and transportation of the samples to the laboratories. There is therefore a need to determine early warning systems in the field to determine water quality which does not stop the normal sampling process being undertaken.

According to Genthe (1998), another means of determining the quality of water is through the use of a field kit for monitoring microbial water quality (the H<sub>2</sub>S Strip Test). This test method indicates the presence of total and faecal coliforms. Detecting its presence, the strip turns Black and therefore provides an effective visual mechanism for illustrating contaminated water. This allows to the evaluation of the microbial quality of water for small community water supplies and is used as an early warning system. This system has been supported by the Water Research Commission in 1998 and has been found to be 86 % accurate (Genthe, 1998). Its benefits include on field rather than expensive laboratory testing, no need for transportation of samples and awaiting a few days for results, anyone can carry out the test and it is a rapid method resulting in

the reduction of time loss during analysis. However this must not be used as a alternate system for analysis rather it should be used as a early warning system supported by laboratory analysis.

## **2.8 IMPACT OF POLLUTED WATER ON QUALITY OF LIFE**

Water is the source of life and water pollution, according to a joint report submitted by the Water Research Commission, Department of Water Affairs and Forestry and the Department of Health (1999: 6) , "occurs when water is rendered less fit for use as a result of human activities." Thus, one can see that the activities by humans are responsible for pollution of our natural water resources, which among others include poor waste management by mining activities, industries, human settlement with poor sanitation facilities and means, solid waste disposal, wastewater treatment plants discharge to waterbodies as well as animals defecating near water resources. All impact severely on the properties of water, rendering it poor especially for domestic use.

According to the White Paper on National Water Policy (1997), water is required to meet basic human needs and maintenance of healthy aquatic ecosystems. Adequate water supply and proper sanitation facilities are a critical basic need that affects both man and the environment. According to the Water Engineering and Development Center (1997: xix), Mr Mike Muller (Director General of Department of Water Affairs and Forestry) in his keynote address in 1997 to Water Engineering and Development Center (WEDC) Conference, stated that:

*There is a long way to go, and with regards to affordable sanitation for all, we are still in the learning stage.*

Sanitation affects the quality of life. Poor sanitation systems and practices, poor waste management and poor animal husbandry practices are an integral part (but not limited to) of water resources degradation in rural areas. Research shown by the Mvula Trust (1995) reveals that there are approximately 20.1 million without adequate domestic sanitation facilities in the rural areas of South Africa of which 95% of rural people use the following facilities of none/ bush sanitation, bucket or pit latrine systems. There is concern that with the increase in population

densities, that the use of these systems will cause subsurface migration of contaminants which have adverse impacts on human health and on the natural environments. It is important to note that in order to ensure that all South Africans are provided with access to adequate sanitation within the constraints of limited national resources, consideration must be given to onsite sanitation, especially water borne sanitation as being the first prize. It has been shown that in developing countries, where waterborne sanitation is used, there has been substantial improvements in health and environmental quality. However, this does have its limitations especially with respect to rural development policy, site specifications, cost and handling.

Water is critical for a healthy community and health is measured in terms of mortality rates. According to the Department of Water Affairs and Forestry (1997c: 1), Professor Kader Asmal reported that:

*...every day infants die from the diseases bred of the unavailability of clean and potable water. Among the historically privileged population, infant mortality rates are about 20 per 1000 births. In some water-deprived rural areas we lose 370 infants per 1000 births.*

Such a situation thus cannot be allowed to exist when one considers human basic needs which is entrenched in the present Constitution and Bill of Rights which acknowledges that all citizens be equitably treated.

According to Water Research Commission (1997 cited in the SA Waterbulletin, 1997b: 9), the overall mortality rates are found for the following diseases:

- |  |   |                      |
|--|---|----------------------|
| • Intestinal infections                        | – | 2.87% of all deaths  |
| • Intestinal Infectious diseases (0 - 6 years) | – | 16.91% of all deaths |
| • Viral Hepatitis                              | – | 0.09% of all deaths  |
| • Malaria                                      | – | 0.03% of all deaths  |

Thus, water related diseases and deaths associated can be curbed with adequate, sustainable and good water quality supply and adequate sanitation facilities and practices. Water related diseases can be associated with the following:

- **Waterborne diseases:** gastroenteritis, dysentery, cholera. Spread by contamination of water by urine and faeces.
- **Water washed:** transmission of diseases results from lack of adequate water, or inadequate hygiene, such as Shingellosis.
- **Water mediated:** where water plays a role in life cycle of the pathogen or one of its hosts such as Schistosomiasis or Malaria.

With reference to epidemics, Kwazulu-Natal was inflicted with the Cholera Epidemic in August 2000. According to Haffajee (2001: 1):

*Occasionally, SA's image of itself as Africa's tiger is torn apart to expose its weak rural flank. The Cholera epidemic is one such occasion.*

The above statement with reference to South Africa's weak rural flank is very apt when one considers that within five months (from August 2000) of the epidemic being detected in Kwazulu-Natal, 66 people were killed and more than 18 200 people were infected (Haffajee, 2001) and within six months, infecting 72 739 people with 147 deaths (The Citizen, 2001 as cited by Mngxitama, 2001). According to Khan (1997: 1):

*...(diarrhoea) thrives in the absence of hygienic conditions and is tied with pneumonia as the biggest child-killer on earth, taking the lives of 2.2 million children each year. Diarrhoeal episodes leave millions more children underweight, mentally and physically stunted, easy prey for deadly diseases and so drained of energy that they are ill equipped for the primary task of childhood learning.*

According to the World Health Organisation, a fatality rate of less than 0.5% is deemed world best practice (Haffajee, 2001). Even if the cholera epidemic is eradicated, it will still not stop the estimated 50 000 annual deaths, mainly of poor rural children, from diarrhoea and other waterborne diseases (Mngxitama, 2001). Therefore, any death or associated illness that is related to waterborne and related diseases, is not acceptable and should be eradicated and or easily prevented through the provision of adequate health care, sanitation and clean safe water supplies,

all of which falls under the auspices and control of government.

According to Haffajee (2001), the Director General of the Department of Water Affairs and Forestry, Mr. Mike Muller, stated that if government allocated R1 billion per year to the clean water programme nationally, the backlog of clean sustainable water to all could be wiped out in six years. This is not far fetched or a high price to pay when one considers that the government provided R100 million to fight cholera in Kwazulu-Natal alone (Rivett-Carnac, 2001) and according to Steele (2000, cited in Water Institute of South Africa, 2001: 10): “It costs the country approximately R4 billion every year to treat and cope with the effects of diarrhoea and dysentery.”

One also questions the applicability and sustainability of water projects when one considers that according to the Rural Development Services Network (an NGO), the network found during field visits to the affected areas in Kwazulu-Natal, that many of the people who had access to water projects had reverted to traditional sources of water collection because they were too poor to pay for the water, which was subsequently cut off (Haffajee, 2001). Therefore, what is needed to prevent such a situation from arising again is for a mass education drive on educating the community on water and sanitation practices and an effective, sustainable and implementable water and sanitation policy coupled with all costs. Far fetched... maybe, but not when lives are at stake.

Another threat to rural livelihoods comes from a new threat to the safety of water supplies, namely protozoal pathogens which have emerged over the last two decades, according to the SA Waterbulletin (2000). The protozoan parasites *Giardia* and *Cryptosporidium*, according to the SA Waterbulletin (2000), have become recognised causes of gastroenteritis in healthy individuals and has been implicated as the main cause of waterborne parasitic diseases which has reached epidemic proportions worldwide. The presence of these parasites have been detected in South African rural communities according to the CSIR (SA Waterbulletin, 2000). Contamination of the water sources have been contributed to, amongst others by:

- Infected Humans through sewage discharge, seepage from septic tanks pit latrines, accidental or deliberate defaecation near water resource and runoff from night-soil.



- Infected animals which includes livestock and domestic animals.
- Human activities through the disposal of contaminated faeces.

Therefore, better protection and control against this disease, data information, better treatment methods, educational awareness programmes and political will are needed to eradicate this new threat to sustainable rural livelihoods and poverty eradication.

According to the Department of Water Affairs and Forestry (1991), apart from human life, aquatic and other life is also affected as the following indicates:

- Severe pollution causes decrease in oxygen level in water, thus fish and aquatic flora and fauna die which then rot and pollute the river further.
- Animals and cattle that drink from it also tend to become sick and die.
- Salination whereby high salt concentrations are found affect the suitability of water for irrigation purposes.
- Excessive nitrates and phosphates from human and animal wastes also increase the effect of Eutrophication, where unwanted algae and water plants grow, reducing water availability and causes undesirable tastes and odors, and possible production of carcinogenic products in water.

Thus, it can be seen that the quality of our water resources invariably affect the quality of all life, that are the users of the natural water-bodies for survival, and the rural population is thus invariably negatively affected by poor quality and polluted water bodies. It is therefore necessary that the water resources be safeguarded and that no form of untreated waste water enter the water bodies, through the insurances of political will, funding and educational awareness drives.

## **2.9 WATER ACCESS AND AGRICULTURAL PRODUCTION**

In addition to being essential for human existence water is also required for agricultural production which includes crop cultivation and animal husbandry. Agricultural production can be divided in commercial (large scale and small scale) and subsistence. Commercial agriculture

includes amongst others, the use of large tracts of land, mechanised equipment, improved technology and high operating costs and high profit margins. Subsistence agriculture on the other hand looks at the provision of food crops for household consumption and not resale. However, this notion of subsistence agriculture is fictional as, according to Redding (2001: 1),

*there really isn't anything called subsistence agriculture in Africa today, except on a very small scale and in very limited regions....but there really hasn't been anything that one could call subsistence agriculture for at least 100 years. Almost all farmers, whether male or female, are engaged at some level in production for the market....(men) often farm principally for the market...(women) farm principally for household consumption and then either market the surplus or grow a specific crop on the side to be marketed. However, the notion of the subsistence farmer who produces only what his or her family needs, and all that the family needs, is largely a fiction.*

Historically irrigation had been subsidized by the government for White farmers (Foster 1994). Forster (1994) argues that these subsidies which were created to ensure the price of agricultural products, provided the farmer with higher profit margins and also reduced the value of water to the farmer to a level where there was little incentive to consider conservation measures. Irrigation exclusively in the hands of a particular group and at such a large scale also impacts negatively on the subsistence farmers downstream. Private tenure and riparian rights enabled White farmers to dam water and use it for irrigation purposes. Drying up of waterways, salinization and extreme low flows downstream of commercial farms were not uncommon, thereby creating poor water (and land) quality and insufficient water availability to rural communities.

Economic progress and increasing demand for water because of population growth, urbanization and industrialization puts pressure on the amount of water currently available for agricultural purposes. Complicating factors include climatic variability, skewed regional distribution and deteriorating water quality. In 1965 agricultural water utilization comprising water used for irrigation purposes and stock watering accounted for 70% of total water consumption according to the Water Research Commission (1997a). Also, in 1980 there was a decrease to 53.8% (52.2% and 1.6 % respectively for crop and animal agriculture). The DWAF, estimates this to be 45.8%

and 1.4% respectively by the year 2010 (Water Research Commission, 1997a: 41).

With the demise of apartheid in 1994, the existing scenarios still existed until 1998 when the inception of the new National Water Act (1998), came into promulgation. However, what is important to note is that all water according to the Act belongs to the people and the state is the custodian thereof. There are no provisions for private water. However, it allows that anyone can use water from a water source for the purposes of domestic use, domestic non-commercial gardening, animal watering (excluding feedlots) which graze on allocated land and store and use runoff from a roof, as expressed in Schedule 1 of the Act, provided that all other regulatory requirements are adhered to. Schedule 1 users are deemed not to have a significant impact on water resources and therefore need not apply for a license to use, nor do they have to register their water use or pay for it (DWAF, 2000). Most rural areas fall under this category as the people use traditional methods of collecting water from rivers, streams, springs, etc. However, if water is networked and bought to standpipes or individual homes, or if irrigation is applied, or if water is used for agricultural production (commercial purposes) and not stipulated under schedule 1, then reasonable charges are placed on the consumers.

## **2.10 JOB CREATION AND WATER ACCESS**

The government's inability to actually redistribute water access to all as well as implementing appropriate technology associated with harnessing water, treatment and storage, places the government in a position where providing taps and standpipes in communities becomes the government's key strategy for providing households with water. This strategy is supported by most households because it ensures the supply of clean water. However, the provision of taps in poor rural communities where the majority of households have no access to secure jobs raises the critical issue of affordability. Households are unable to afford to pay for water services. However, this may soon change with the advent of the 6 000 litres free water provision, promulgated by government. This may take time to be implementable in rural areas as it is still urban and "haves" biased. This may even lead to the dismantling of the Water Committees in the rural areas. Thus, water concerns in rural areas must be addressed within a broad-based rural development process

that focuses on job creation and security, as according to the Hlatswayo (2000a), statistics showed a 21% drop in household incomes for the poorest 40% of South Africans, the rural poor. This aspect of job creation is important if redistribution projects are to thrive, thus sustaining land and water projects.

Employment opportunities with respect to water services management are three fold, temporary during the construction of water schemes, semi-permanent with respect to maintenance of the scheme and permanent with the creation of Small, Medium, Micro Enterprises (SMMEs) which can be used in other rural development projects.

According to the Department of Water Affairs and Forestry (1999a), billions of rand is lost every year in South Africa to damage done by alien plants. They are problematic because they waste 7% of our water resources, cause erosion, siltation of water sources, extinction of indigenous plantations, increase fire risk and reduce our ability to farm indigenous plants (Department of Water Affairs and Forestry, 1999a). Therefore, the Working for Water Programme was launched in 1995, in an effort to tackle the problem and create jobs especially for the rural poor. Over and above the clearing of the alien vegetation, secondary industries are created to make saleable items from wood that is cleared such as crafts and furniture, mulch, charcoal or smoke chips or secondary initiatives such as eco-tourism around the clearing project area (Department of Water Affairs and Forestry, 1999b). According to the Department of Water Affairs and Forestry (1999c), the programme is aimed at social development through job creation in order to help alleviate poverty. It can be alluded to being a state initiative. Therefore the Working for Water Programme (WFWP) of the DWAF need to be viewed as options for land redistribution beneficiaries. The WFWP was launched as a national water conservation campaign, which focuses on the removal of water consuming alien vegetation (Umgeni Water, 2000). According to Umgeni Water (2000), the primary benefit of the scheme is to increase the availability of water resources and through this have created secondary benefits which include:

- Job creation in an impoverished rural context, with a total of 800 to 1000 temporary jobs sustainable for 3 to 5 years of which over half would be taken up by women.
- Skills transfer through training and development, and the promotion of Small, Medium, Micro Enterprises (SMMEs) in the context of declining formal employment opportunities.

- Increase in tourism potential as a result of improvements in the area through improved ecosystem functioning, minimisation of biodiversity loss, reduction in bank erosion, reduction in intensity of fires and improvement in aesthetics.

Thus, government will have to create much more jobs for the rural poor, if rural projects are to become sustainable, and as it stands the governments GEAR ripple effect has yet not been felt by the rural communities. Government must therefore create a society of independent people rather than a “dependant society” and job creation is the means.

## **2.11 COMMUNITY PARTICIPATION**

Power relations around water sources between Whites and Blacks are well understood in the South African context. However, understanding intra-community and household dynamics remains to be adequately examined.

The level of community participation greatly influences the evolution and impacts of water projects. A comparative study of two redistribution projects in Kwazulu-Natal reveals the importance of participation in development processes (Bob and Ali , 1999). Whilst one project had assistance from an NGO and full community participation, especially from women, the other contained no community participation. The differences in terms of expressed community satisfaction and the real benefits in terms of actual project implementation in the two redistribution projects are startling. In the latter case where participation and planning were non-existent, the community after two years of trying to build boreholes and stand-pipes have failed to even come to an agreement on the location of these water facilities. The existing boreholes were defective and there were no capacity within the community to repair these boreholes. In the former project where no water facilities existed prior to settlement, the community in the last two years had effectively drilled boreholes, developed a rudimentary irrigation system to transport water from the river to the fields, maintained water facilities and had built adequate sanitation facilities in the community. This has had a dramatic positive effect on health levels, agricultural production and general well-being within the community. Community members stated that they felt that they could achieve things together and despite that fact that they lived previously in different locations,

they were developing a sense of community (Bob and Ali, 1999). On the other hand, the latter project appeared to be dealing constantly with conflicts that may also have mitigated against the community coming together to address basic and fundamental needs related to water issues in the community (Bob and Ali, 1999).

Protected springs and boreholes provide the cheapest source of clean water for rural communities. The technical skills required to maintain and repair springs are relatively simple. However, studies show that the problems experienced in relation to springs are around management issues. Obtaining contributions from households who use the spring is generally difficult, especially in fragmented communities such as many of the bigger land redistribution projects where people from different areas have settled on the land. Water committees are rarely functional and where they exist, gaining widespread support from households are difficult.

Furthermore, according to the Mvula Trust (2000e), South Africa is facing municipal service delivery challenges and an effective way is to enter into partnerships with communities. A municipal-community partnership involving traditional leaders, non-governmental organisations and community-based organisations, in the water and sanitation sector can be instituted and according to the Mvula Trust (2000e), it is one of the most effective ways to deliver services to small, isolated rural communities. However, the municipality takes overall responsibility for the service (Mvula Trust, 2000e).

Therefore, communities need to play an active role in deciding on and implementing policies that govern their lives. The need is to ensure participation as well as for the community to take effect of their lives, to ensure the future sustainability of their services.

## **2.12 GENDER IMPLICATIONS**

In rural areas women play a vital role as both water suppliers and as water managers as well as primary providers of health care to the family. Women and children are generally the transporters of water to their homes and fields. Women are also primarily responsible for managing and

conserving water at the household level. According to Mvula Trust (1999d), women “have the best information on availability, reliability and purity of water sources.” Therefore, as illustrated above, it is the women who have the knowledge of the location, reliability and quality of the local water resources and are responsible for collecting water, controlling its use and overseeing sanitary arrangements. Despite this, women rarely participate in policy and decision-making processes pertaining to water issues at government and community levels. Erskine (1996) states that women need to be involved in the process of promoting and establishing water and sanitation systems.

Data collected from fieldwork conducted in land redistribution projects in Kwazulu-Natal illustrates that women’s access to communal resources such as forests, wood and water are critical to household survival (Bob, 1999). Furthermore, the distance of these resources impinges greatly on women’s workloads. Variations in land use and location of these resources can dramatically impact demand for labour.

Water is the source of all life and securing a safe and adequate supply is a major task for women as well as for many governments. Water is needed for domestic purposes, personal hygiene and sanitation, child care as well as for uses on the farm and processes involved in food production and craft work. Water is also needed for their animals and pets. The provision for adequate water is essential if women are to become more effective income earners if required. Time saved in water collection directly influences their ability to be successful in providing themselves with a better chance of feeding themselves and their families and so improve their health and productivity. Collecting water is an arduous task, and sometimes it is undertaken several times a day, travelling great distances over treacherous terrain, walking/ wading in deep mud to reach clean water. Women carry heavy loads in containers, balanced on their heads or strapped on their backs.

The following issues are still prevalent in rural water supply and need to be addressed according to Bob (1999):

- In areas where water can be pumped women have not been taken into account in the design or location of the pumps.



- Women are not trained to repair or maintain them and sometimes the quality of the water is poor.
- Cultural traditions also ensure that women in many societies are not permitted to intervene in decision making. Male heads decide where to build the houses without considering the distance of water resources; as water collection is not their concern.
- Inappropriate technologies and credit facilities, limits the access that women have to a water source of allow them to make improvements themselves.

According to Denkelman and Davidson (1988), women as managers of water resources have to decide where to collect water, how to draw, transport and store it. They also have to determine how many water sources (determined on its quality) can be used and for their various purposes, washing, gardens, food and how to purify drinking water using simple techniques (such as filtration) or materials available from the environment. This shows that women's experiences in collecting, storing, using and purifying water is critical for health reasons and their survival.

The importance of water quality for health is clear as most human diseases are transmitted by water (cholera, typhoid) or water related (bilharzia). According to Sijbesma (1985 cited in Rodda, 1994), women organise the disposal and re-use of the waste water as they take great interest in health care, where women in Yemen use the best quality water, preferably from a spring for drinking; personal washing, cooking and cleansing drinking vessels, food and flour grinding stones. Grey water is saved and used for washing clothes and watering plants, feeding poultry, cattle and cleaning floors.

Women's knowledge of local water conditions is generally passed on to successive generations and includes, location and availability of water sources, social aspects such as separate arrangements of water sources and sanitary facilities and of community needs and customs. Therefore any effort to improve local water supplies must take into account women's needs and project planners must consult with women, before embarking on any project. Women need water sources close at hand to save them valuable time in collection as well as water points must continue to play their part as informal meeting places where women exchange information and learn from each other. According to Rodda (1994), an organisation called "Water Aid" has a



philosophy to involve village communities (especially women) right from the start of a project, making sure that women have their say about what they actually want, as well as ensure that women take part in the design, using appropriate technology, to ensure sustainable development.

### **2.13 LAND REDISTRIBUTION AND AFFORESTATION**

In Kwazulu-Natal, as in other parts of South Africa, many redistribution projects have been encouraged to participate in forestry programmes. Afforestation makes a claim on natural resources, principally land and water, which has a number of environmental and social consequences (Department of Water Affairs and Forestry, 1997b). According to Forestry South Africa (1999), Rural Development Forestry is initiated as it involves local people in a forestry initiative and is used in small scale farming systems. However, commercial forestry such as gum trees consume large amounts of water which results in the drying up of streams during winter while the soils are poisoned over the maturation period which is over seven years. The long term affects of land reform projects that have opted to participate in forestry programmes can be devastating.

Forests dramatically reduce run-off because most forests are found in the upper reaches of the catchment - consequently little water reaches rivers and other natural water bodies in the lower catchment areas. Calculations on the run-off rate must inform levies. Forestry companies must be made to pay for the use of water, albeit as indirect and direct users of water. These monies can be used to subsidize water projects in poor communities.

Notwithstanding this, in commercial forestry or rural development forestry, partnerships are being entered into with large industries who promote afforestation. However, this is governed by the Department of Water Affairs and Forestry, through the Catchment Management Agencies who determine the carrying capacity and water use in a catchment. Timber plantations (such as gum and wattle) generally consume large quantities of water and is regarded as a stream flow reduction activity. It is therefore governed by the National Water Act (1998). Once a threshold is reached, new timber plantations are not permitted.

## **2.14 LAND REDISTRIBUTION AND CONSERVATION**

Conservation according to Jordan (1995), "is the philosophy of managing the environment in a way that it does not despoil, exhaust or extinguish , " our resources. Therefore, conservation is seen a means of protection and use of our resources, but in a sustainable way. However, an area of contention has emerged between conservation areas/ game parks and redistribution projects that are located in close proximity to these nature reserves. Nature reserves are not major users of water but they occupy prime land to sustain/ conserve their ecosystems for conservation and ecotourist purposes. The communities located adjacent to these reserves are often poverty-stricken and competition for the scarce water reserves that are "protected" in the parks exists. Conservationists see natural water sources such as rivers as the "lifeblood" of a nature reserve but rural communities see it as their "lifeblood" for agricultural production and other domestic uses.

South Africa is a signatory to the Ramsar Convention, a convention on the management and conservation of wetlands (Department of Environmental Affairs and Tourism, 1998). Wetlands plays an important part in water polishing and acts as a water attenuator. Its importance is therefore highlighted and indiscriminate use is prohibited. This further impacts on possible use of wetlands in rural areas which further impacts upon land redistribution projects.

Conservation of biodiversity is another area that needs explanation. A local example that can be used to highlight the issue, is the Nonoti Land Redistribution project which came under scrutiny by the KZN Wildlife, as the potential presence of the Black-headed Dwarf Chameleon and the Pickersgill Reed Frog in the area needed investigation. If present it was subject to specific management plans, drawn up by KZN Wildlife in consultation with the beneficiary community and KwaDukuza Municipality (Scott Wilson, 2000). This illustrates how important conservation is in reviewing land redistribution projects, as it could stall a project indefinitely.

## **2.15 RELATIONSHIPS BETWEEN THE DLA, THE DWAF AND OTHER ROLE PLAYERS**

Given the concerns raised in this paper, a key question is whose responsibility is it to ensure that land reform beneficiaries gain access to land, gain access to clean and sustainable water resources. The DLA has vociferously argued that their key function is the delivery of land and land rights. According to the DLA, the provision of services is beyond their constitution and budgetary mandate. The provision of basic services, water being one of them, is primarily the function of other line government departments such as the DWAF and as per the Constitution (1996), the local authority is responsible for water services delivery. It is important to realize that whilst water issues are the prerogative of the DWAF, government departments are not isolated units. It is problematic to view land, housing, water provision, environmental affairs, etc. as separate, independent sectors. In reality a great deal of interdependence and overlap exists between the various government departments. The fragmentation of the different line function departments results in the lack of co-ordination at the local level. The absence of mechanisms to provide support for integrated development in land redistribution projects results in the inability for people to acquire adequate services and facilities with the land. As such, dialogue with clear roles and responsibilities between the various departments with reference to the DLA, the Local Authorities and the DWAF and to a lesser extent, the Provincial Departments of Environmental Affairs whose responsibility is to review water and sanitation schemes in terms of the Environment Conservation Act (1989), is important to meet the challenges of rural development.

However, according to Mvula Trust (2001d: 1), "South Africa is facing daunting municipal service delivery challenges." The Water Services Act (Act 108 of 1997) sets out the institutional framework for the provision of water services and the roles and responsibilities of the local authority as a water services authority is outlined, especially in terms of ensuring the effective and efficient provision of water services. Certainly also, government cannot do everything and must therefore enter into partnerships with other public authorities (eg. another municipality or a water board), stakeholders such as NGOs, CBOs, commercial farmers, industries, etc. are acceptable and therefore needs to be encouraged. Each of these organisations have certain advantages over the other with respect to technical expertise and assistance, financial and social, but holistically,

all need to pool their resources and ensure social responsibility to the government and moreover to the impoverished people of South Africa. Notwithstanding this, private sectors are profit driven, but due to governments poor track record in the last seven years on service delivery, government should ensure/concentrate on determining policy, norms and standards to ensure the active participation of the private sector in the provision, operation, maintenance, management and monitoring of the water and sanitation services.

## **2.16 CONCLUSION**

This chapter reviewed the broad framework of rural development which included the legislative framework supporting rural development since the demise of apartheid. It also showed that land reform is but an integral part of rural development and therefore the inextricable link. However, land and water are also inextricably linked as a productive means, to ensure survival and sustainability. Notwithstanding that land redistribution is an integral part of the reform of the country since the demise of apartheid, the Government has only managed to redistribute less than 2% of land in seven years to the landless (Hlatwayo, 2001), well below the 30% target within five years promise. Over and above the redistribution of land, water access has also been problematic even though the Constitution of South Africa (1996), guaranteed its citizens the right to sufficient water access and the RDP programme, through the Department of Water Affairs and Forestry promised to deliver 20 to 30 litres of clean potable water to within 200 meters of every household. However, the local authorities are not exempt from scrutiny, as constitutionally they are also responsible for service delivery. Thus, this chapter also reviewed the legislative framework of the national and local governments for water services provision. The emphasis has also been on the approach of government in the supply of water. Significantly, there has been a shift in the mindset of government, as there is a clear move away from a demand to a supply approach, especially in light of the Cholera epidemic in Kwazulu -Natal. The government therefore mindfully instituted the "6 000 litres per household free water for all programme". However, there is still concern that it benefits the "haves" rather than the "have-nots". The quality of water was also reviewed in light of the impact of polluted water on the quality of life. The significance of sanitation issues and its impact on the quality of water and health was appraised, together with the need for better public

involvement and consultation especially with women whom are the managers of water in rural areas. Therefore, land and water are critical resources for rural livelihoods and lie at the heart of rural development. After all development does ague for the improvement of the quality of life.

# **CHAPTER THREE**

## **CASE STUDY AND METHODOLOGY**

According to Leedy (1993: 137), methodology is “merely the study of a particular method, or methods, for reaching a desired end” where the method is the way in which one solves the problem, reaches an objective or gets the job done. Therefore, the methodology used to meet the aims and objectives of this study is in the form of secondary and primary methods. The secondary information is in the form of desktop studies whereas the primary method used has adopted and adapted the methodology or the methodological approach used by Watson (1998). Further to this, a mental map and field observations were also employed.

Case studies are an important facet of research as it gives one direction. The study under review is the Platt Estate in Kwazulu-Natal. The information provided gives a description of the *status quo* of the project, the development proposal and the physical characteristics of the area.

### **3.1 CASE STUDY: PLATT ESTATE IN KZN**

The background information for the study is drawn from the Business Plan for Platt Estate that was developed by Lima Rural Development Foundation (1998; 1999).

#### **3.1.1 Location**

The Platt Estates is located in the Ugu Regional Council Area of Kwazulu-Natal (refer to Map 1) and is situated 20 km north of Highflats and 60 km west of Umzinto (refer to Map 2). The estate comprises of a number of farms which were controlled by the state and managed by the Kwazulu-Natal Department of Agriculture. The Department was responsible for the management of the estate, including the maintenance of the timber plantations (black wattle and gum), fencing, infrastructure and agricultural extension.



Map 1: KwaZulu-Natal: Ugu District Municipality in relation to the District and Local Council Boundari





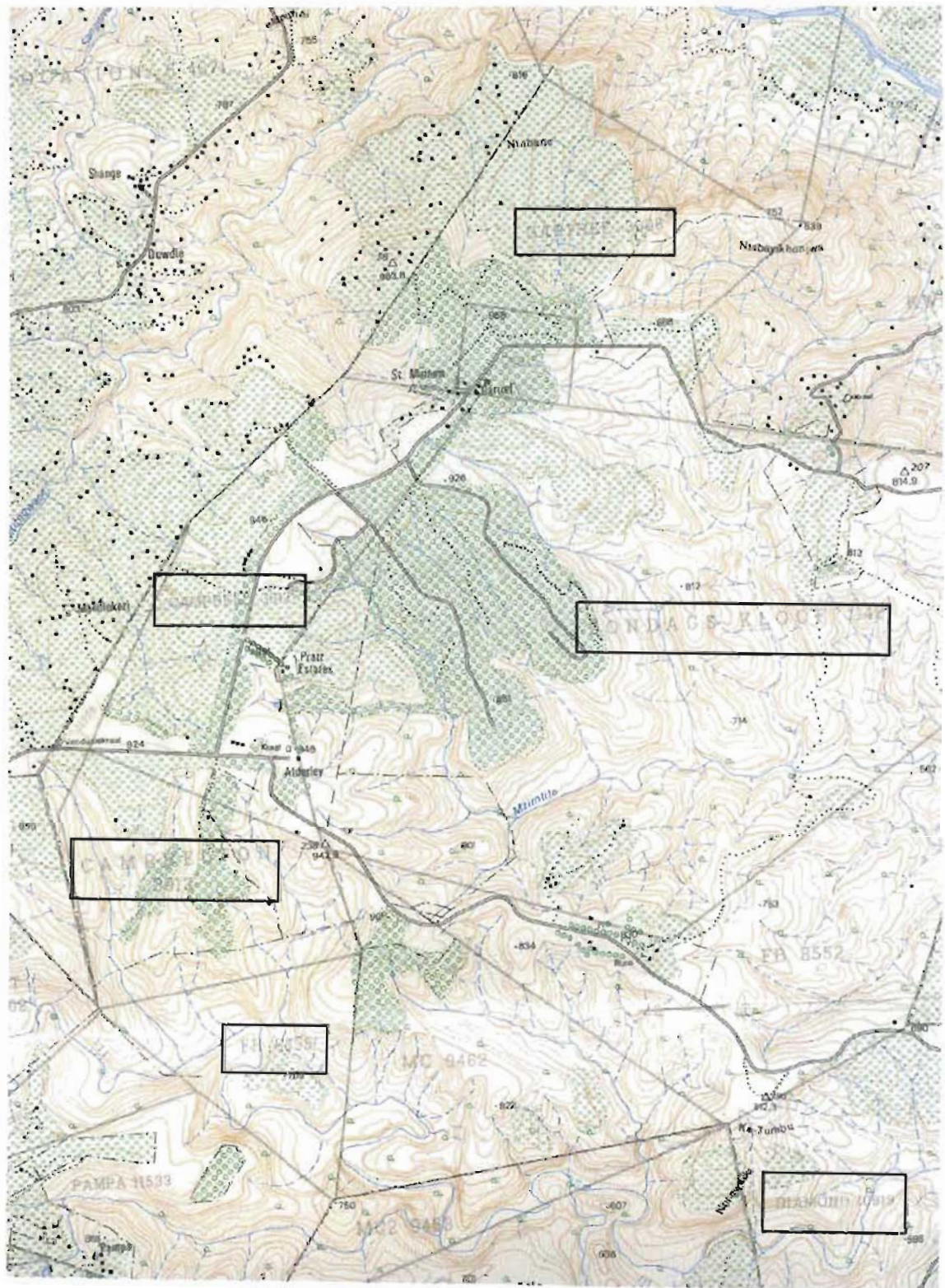
Map 2: Location of the Platt Estate in the Vulamelo Municipality of the Ugu District Municipality



Plate 1: Timber plantations in Platt Estate

The Platte Estate consists of the farms: Zondags Kloof, Gartref, Diamond, Campbelton, Campbell and Alderley. This is illustrated in Map 3.





Map 3: Farm locations making up the Platt Estate (Source: 1:50 000, 3030AB Nlavini)

### **3.1.2 Legal status**

According to the Lima Rural Development Foundation (1998), a survey of the residents residing on the properties of Platt Estate, indicated that 104 families lived on the property since birth or for longer than 20 years, 102 families moved in within the last 10 years and 8 families moved in within the last 12 months prior to the survey being undertaken. The residents had utilized the resources on the farms with the full knowledge of the Kwazulu-Natal Department of Agriculture and the Department of Land Affairs, without paying rent.

Therefore, the families living on the land had rights to the land. The legal rights within which the families had claims were in terms of the Extension of Security of Tenure Act, Act 62 of 1997 (ESTA) and the redistribution programme (Lima Rural Development Foundation, 1998). The ESTA gives the occupiers who lived on someone else's land on or before the 4<sup>th</sup> February 1997, with the permission or knowledge of the owner, a secure legal right to live on and use the land. With respect to this case, as the land is state land, the state acknowledged to provide financial aid to ensure that the occupiers become owners of the land.

According to the redistribution programme, financial aid can be sourced under the Provision of Certain Land for Settlement Act, Act 126 of 1993 (Act 126), which according to the Lima Rural Development Foundation (1999: 20) aims to:

*provide for the designation of land; to regulate the subdivision of such land and the settlement of persons thereon; and to provide for matters connected therewith.*

Therefore, Act 126 can be utilised in conjunction with the State Land Disposal Act, Act 48 of 1967, to transfer state land to the families.

### **3.1.3 Development principles**

According to the Lima Rural Development Foundation (1999), the Platt Estate is located within the Vulumelo Standing Committee Area of the Ugu Regional Council and it was noted that access to services was generally poor and that the land was generally used for vegetable gardens and crop production. Thus, the vision amongst others, was for:

- water and sanitation development;
- primary health care;
- co-ordinated supply and maintenance of infrastructure and services (roads and water);
- housing development, land acquisition and government support and training;
- environmental management (including water and sanitation).

Thus, the vision for Platt Estates, according to the Lima Rural Development Foundation (1998: 29), was to:

*create a total living environment for its inhabitants which provides for their basic needs, which allows residents to lead a realistically prosperous and safe life and within which they can fulfil their aspirations and expectations.*

Therefore, the principles of the development need to incorporate the following:

- **Social development:** through developing the needs of the community with respect to access to basic levels of infrastructure and social services (such as education and health care facilities) which impact directly upon their living conditions.
- **Sustainable development:** through providing basic needs, the provision of access to basic necessities and services (such as water, sanitation, employment and transport links). There is also the need to ensure that the development is environmentally sustainable as well as socially, economically and institutionally sustainable, through ensuring buy-in from all stakeholders and organs of the state.
- **Settlement principles:** through the need to accommodate existing residents by formalising their land rights as well as formalising rights to those families that are detached from the Platt Estate but whom belong to the community.

### 3.1.4 Development proposal

The present settlement pattern is scattered with some agglomeration along the main roads through the Estate and therefore the settlement plan is not to relocate the people but to encourage new settlements to occur in zones of existing settlement adjacent to existing roads.

The Estate has been divided into areas for settlement and vegetable gardens and areas for agriculture (timber plantations and grazing lands). The Estate division proposed, is for five (5) separate and autonomous geographic and legal entities that would purchase land they are residing on. The five (5) legal entities proposed are tabled below.

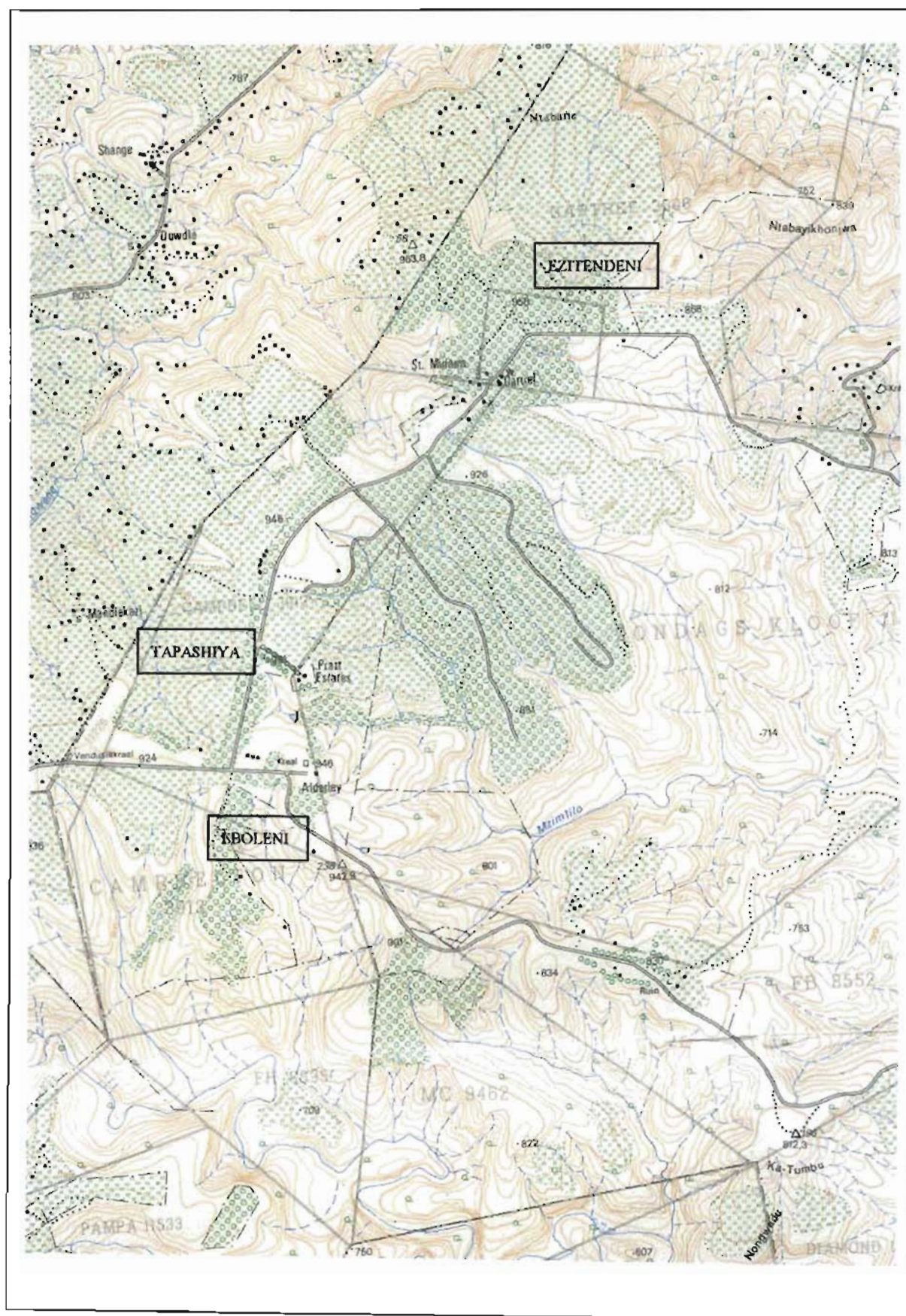
Table: 3.1 The Platt Estate entities.

Settlement	No. of families	Hectares
Boleni	57	843
Ezitendeni	34	540
Tapashiya	31	321
Nyanyabuzi	58	1147
Mkhunya	55	773

Table: 3.1 above provides insight into the project entities, the legal family households and the land availability in hectares for each entity. What is shown is the legal claimants or beneficiary list. There has also been a number of families that have moved unto the land after the legal register was compiled.

Notwithstanding the commercial afforestation potential, the development proposes for the settlement of the beneficiaries with vegetable gardens. For the purpose of this study, the three entities (Boleni, Ezitendeni and Tapashiya) were investigated and analysed (refer to layout Map 4). Therefore, only these three entities will be reviewed. The areas demarcated are as follows:





#### 3.1.4.1

#### Project 1: Boleni

Farm: Campbelton 3913 and FH 8895

Area: 843 Ha

Beneficiaries: 57

Value: R317 000.00



Plate 2: Households at Boleni

Fifty-seven (57) families are located on the property which is 843 hectares in extent. The property includes approximately 63 hectares of scrub wattle which is being utilised by the community for their domestic purposes. The land under occupation is regarded as high quality agricultural land. The settlement is dispersed resulting in the inefficient use of the land. However, there are options to densify this settlement and utilize it for the expansion of the Platt Estate or to provide agricultural support by developing it into small scale farms (as a local economic development strategy) which could provide income by the sale of the crops to local residents.

Property FH 8895 lies to the south of the above property and is unoccupied, as it has steep slopes which fall away down to the Mpambanyoni River. There is only approximately 20 hectares suitable for timber production. The rest of the property is suitable for livestock grazing. Refer to Plate 2 for an example of a household at Boleni.



#### 3.1.4.2

#### **Project 2: Ezitendeni**

Farm: Gartref 3606

Area: 540 Ha

Beneficiaries: 34

Value: R159 000.00



Plate 3: Densified settlement at Ezitendeni, with an individual carrying wood obtained from the scrub plantations

The property Gartref is 540 hectares in extent with thirty four (34) families situated in a formal settlement area. The settlement are fairly densified (refer to Plate 3). They also have access to the wattle plantation which adjoins them that they use for firewood and building structures. The proposal is to dispose the property to the resident families with the exception of the wattle plantation which will be used as a commercial entity.

#### 3.1.4.3

#### **Project 3: Tapashiya**

Farm: Campbell 3912 (west of the district road)

Area: 321 Ha

Beneficiaries: 31

Value: R230 452.00

Thirty one (31) families reside on the western portion of the Farm Campbell 3912, whom are scattered along the length of the property mainly along the access road. The property

is approximately 321 hectares in extent with 13.9 hectares of wattle in good condition along the district road. There is also 32.9 hectares of scrub wattle on the property which is mainly being used for domestic purposes. The settlements are dispersed (refer Plate 4). The remainder of the property has good quality grazing land and the property is situated in the highest rainfall area and approximately 70% of the area is either arable or has timber potential.

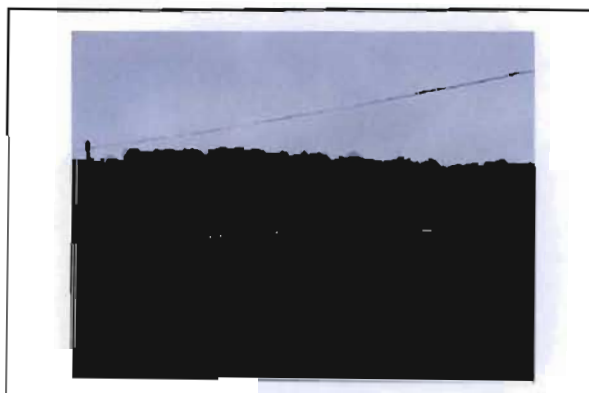


Plate 4: Dispersed settlements at Tapashiya

### **3.1.5 Physical Data**

#### **3.1.5.1 Physiography**

The area is dominated by the valley of the Mkomazi River, approximately 700 meters from the plateau, with smaller but deep incised valleys of the Mzimlilo River in the centre of the Estate and the Mpambanyoni River south of the Estate. This has resulted in a rugged landscape of steep-sided ridges where slopes of over 25% and often over 60% which makes the land agriculturally unsuitable or suitable for only very limited extensive agricultural use (refer to Plate 5).





Plate 5: Rugged landscape with steep slopes and incised valleys at Platt Estate

#### 3.1.5.2 Vegetation

The vegetation is mixed open Ngogoni veld (*Aristida junciformis*), the density of which varies with slope and aspect. The river valleys has a much drier and hotter climate with predominantly valley Bushveld in the middle altitudes with Coastal Forest especially in valleys and moist sites (refer to Plate 6).



Plate 6: Examples of grassland and natural forests that is typical of the Platt Estate

#### 3.1.5.3 Soils

The soils of Platt Estate are mostly shallow Lithosols as is expected with the very steep topography. There are also good Hutton soils on the main watershed ridge near the Gartreiff Store and further west at Nkolostsheni with smaller areas of Griffin soil. The remaining soils are mainly from TMS and are both shallow and of lower inherent fertility.

Nevertheless, the Glenrosa (*Trevanian*) and Clovelly soils which occur at the northern end of the watershed are reasonably deep, medium-textured soils with generally good physical characteristics. It is only in the extreme west and south-west that the sandier soils of the Platt series (Glenrosa form) predominate in association with small patches of poorly-drained soils of the Cartref form. These soils are of reasonable depth and favourable topography so that they too, have a modest cropping potential despite their erodibility and low inherent cropping fertility. Platt Estates as a whole has a significant cropping potential but one which is unevenly distributed.

#### **3.1.5.4 Rainfall and Water**

The rainfall in the area ranges from 860mm to 910mm according to the Centre for Water Research of the Faculty of Engineering, University of Natal as cited in the Lima Rural Development Foundation (1999). This is ideal for timber growing.

The water resources of the area are unevenly distributed with useful water sources provided by the perennial Mzimlilo and Mpambanyoni rivers. Both these rivers are deeply incised making it prohibitively expensive to pump water up onto the intervening ridges. The result is that the ridges are rather poorly supplied with water, a condition which is aggravated by the lack of groundwater normally associated with TMS sub-strata. However, it should not be difficult or excessively costly to build a number of small farm dams to rectify this problem. The Mkhunya entity is bounded by the Mkomzazi River which lies at the bottom of the escarpment. There are a number of springs in the area, but, which dries up during the dry seasons. The only borehole within the case studies is found in-between Tapashiya and Ezitendeni, which for the majority it is a great distance to travel to collect water.

#### **3.1.5.5 Infrastructure**

The area is poorly served with infrastructure with the conditions of the roads of poor quality, with a lack of well-distributed internal water supplies and proper sanitation facilities and a lack of adequate fencing. The fencing could be used for proper veld management as well as the protection of the springs from animals.

## **3.2 METHODOLOGY**

The research methods employed in this study is guided by the questions and methodologies presented that focuses on water resources sustainability in rural land reform programmes with special attention on the redistribution programme. The intention of this study is to evaluate the transferred project's water resources sustainability and the impacts of sanitation on the water resources, by utilising the secondary sources of information gathered from the Department of Land Affairs: Monitoring and Evaluation, Quality of life Reports for 1998 and 2000. The Kwazulu-Natal averages are compared with that of the combined national averages.

Further to this, the assessment of the water resources sustainability including the reference to the impacts of sanitation on the water resources are critically analysed for projects that are in the implementation phases, but not transferred as is the case of the case studies undertaken in this study. This information serves as a guideline or a baseline that precede implementation, which over time can be re-evaluated using the same or similar methodology. The re-evaluation will determine whether or not the projects are being sustainable, with respect to water resources sustainability. The re-evaluation can also be used to determine if the beneficiaries needs and expectations are being met or realised which indicates success or failure of a project.

The information analysed in this study is based on various secondary and primary sources as explained hereunder.

### **3.2.1 Secondary Methods**

The secondary sources of information is sourced from various forms of research on land reform in South Africa as indicated in chapter two, the literature review of this study. The collection and analysis of the secondary data was primarily a desk-top study which provided insight into, the water resources sustainability, which draws information from the national land reform programme, issues pertaining to sanitation and the national legislation. Therefore, the following desktop studies were undertaken:

- Reviewing the Quality of Life Reports for 1998 and 2000, with special reference to water and sanitation issues and the case studies from Kwazulu-Natal. The case studies in

Kwazulu-Natal is compared with national trends.

- Reviewing relevant literature on rural water and sanitation issues, rural development, national legislation and the national land reform programme.
- Review of the business plans for the Platt Estates that was formulated in November 1998 and revised in November 1999.
- Adopting and adapting the methodology used for Assessing the Environmental Impact of the Land Reform Programme by Watson (1998) for the Department of Land Affairs: Monitoring and Evaluation Directorate. Notwithstanding this being a secondary source of information, the method and questionnaire was adopted and adapted for the primary methodological approach.

### **3.2.2 Primary Methods**

The questionnaire instrument was developed and implemented in accordance with the approach suggested by Watson (1998). This section briefly provides an overview of Watson's (1998) methodology.

The Department of Land Affairs Monitoring and Evaluation unit, in consultation with Professor Watson of the University of Durban-Westville in 1998, developed a methodology for assessing the environmental impact of the land reform programme. The report according to Watson (1998: *i*), was intended to serve as a user manual of the Environmental Impact Assessment (EIA) format. The EIA is an integral part of the process to obtain environmental approval from the provincial and national departments, namely The Department of Agriculture and Environmental Affairs in Kwazulu-Natal and the National Department of Environmental Affairs and Tourism. These departments are responsible for development approval with respect to environmental management approval as legislated under the Environment Conservation Act, Act 73 of 1989 and the National Environmental Management Act, Act 107 of 1998. The national and provincial departments determine approval of projects where land use change is required, as is the case for some land reform projects. The approval is based on the needs and desirability of the project as well as the sustainability of the project. According to Watson (1998), sustainability is achieved when natural resources is used such that it does not lead to its decline in productivity which ensures the potential to meet the needs of the present generation without impacting negatively on the ability

of future generations to meet their own needs. Failure to integrate environmental considerations in the land reform process will lead to beneficiaries not escaping the poverty trap (Watson, 1998).

According to Watson (1998), there is a need to determine the environmental status of the projects through the identification of Key Criteria and Indicators (KC&I). The KC&I therefore reduces the number of measurements by aggregating information comprehensively to determine the projects sustainability. Values are therefore assigned to the KC&I and baseline values for the KC&I should be obtained prior to transfer of the land to the beneficiaries or as soon as possible after transfer (Watson, 1998). This serves as a tracking system which provides an early warning system of environmental deterioration which determines the level of remedial measures to be undertaken. It also ascertains the impact of the land use change over time.

Watson (1998), determined the potential influence on the sustainability of the various natural resource systems through the use of the KC&I. For the purpose of this study, the KC&I for assessing the sustainability of water resources was adopted and adapted. The KC&I were rated and scored according to Watson (1998), as follows:

<b>Rating</b>	<b>Score</b>
Very bad	1
Bad	2
Moderate	3
Good	4
Very Good	5

NB: A copy of the scoring is contained in the questionnaire, Appendix A.

In the study area, questionnaires were used to gather information about the project entities together with field observations. Six (6) indicators were used to determine the overall sustainability of the water resources for the case studies. The indicators determined are as follows:

- Drinking water
- Bathing water

- Water for washing clothes
- Water for livestock
- Water for irrigation
- Field observations

The indicators were rated in terms of their potential influence on water resources sustainability and a composite measure representing the overall sustainability of the water resources was derived. According to Watson (2001), the indicators provide a reliable assessment which is simple, quick and cheap to use. The rationale of assigning values to each of the indicators is that changes in the overall assessment over time can be monitored if tested again thus providing “an early warning system of deterioration enabling remedial measures to be implemented” (Watson, 2001: 156). Thus, the baseline for the proposed project can be obtained and collated before transfer or early in transfer and thereafter tested over time. This determines in time as to whether or not the sustainability of the water resources are improving or deteriorating. If it deteriorates then remedial measures can and must be undertaken.

According to Watson (1998: 36), for a project to be sustainable in terms of water resources, the project beneficiaries need a water supply that is:

- reliable        surface water sources may disappear during the dry season or during droughts.
- adequate        each individual household needs water for drinking, watering livestock and vegetable gardens, and washing bodies and clothes.
- clean            water contaminated with pathogens can have a serious detrimental effect on the health of the community.

Thus, the sustainability indicators according to Watson (1998) should encompass the following:

- mechanism of water extraction, community expertise and financial resources;
- water channeling to reservoirs;
- protection of the sources and storage;
- supplementary sources especially rainwater capture from roofs;

- construction of dams; and
- eradication of alien plants in riparian areas.

Unsustainable indicators should encompass the following:

- measured sedimentation into surface water sources;
- increased eutrophication;
- defecating on the floor of the drainage channels connected to the rivers and on the banks of and in rivers, streams and springs;
- pit latrines in percoline areas and in close proximity to water sources;
- washing clothes in stagnant water; and
- livestock grazing in wetlands.

According to Watson (1998: 13), laboratory analysis that involved considerable expertise in the use of equipment, procedures and expenses did not provide a “finer assessment of water quality than obtained by observing whether certain attributes (as detailed in the methodology) were present or not.” Therefore, for the purpose of this study, laboratory analysis of the water were not undertaken as according to Watson (2001), the indicators provide a reliable measure of the overall sustainability despite the high degree of subjectivity involved in the selection, quantification, weighting and integration. Watson (2001: 165) therefore concludes that the study “should be viewed as having the basis for a methodological approach rather than a methodology *per se*.”

Further to the adapted methodological approach used by Watson (1998), additional assessments were appraised (although not scored on the sustainability methodology) which include the following:

- Sanitation and waste disposal
- Expectations versus realisations
- Preferred needs

The sanitation and waste disposal indicators provides information on their impact upon water sources. The expectations versus realisations indicates the communities perceived expectations of the land reform programme with respect to water and sanitation expectations. The preferred

need highlights the communities actual requirements based on their primary and secondary options for the provision of water supply and sanitation systems. This moves beyond the top-down approach of implementation to the bottom-up approach of requesting from them their needs and requirements.

According to Green (1993), the importance of choosing context-specific methods when conducting research is stressed. This study takes into consideration the following specific primary research methods or techniques:

- Gender : Four (4) men and eight (8) women participants.
- Location : Rural area in Kwazulu-Natal.
- Project : Non-transferred but occupied land redistribution and tenure reform project at the Platt Estates in Kwazulu-Natal. The Estate was divided into five entities: Boleni, Ezitendeni, Tapashiya, Nyanyabuzi and Mkhunya. Three of the five entities at the Platt Estate were involved in this study: Boleni, Ezitendeni and Tapashiya. The projects are all involved in settlement and agriculture.
- Field workers : The research team comprised of four (4) members, the fieldworkers, one male (a community committee member who is a former technikon student ) and one female (a Phd student from the University of Durban-Westville whose field of study is on gender and rural development) both of whom are Zulu speaking, my supervisor, a lecturer from the University of Durban-Westville and I, who were the facilitators and observers.
- Language : Since the participants were Zulu speaking, the interviews for the questionnaire were conducted in Zulu by the fieldworkers.



### **3.2.3 Sampling**

According to Bob (1999: 129), sampling refers to “the set of procedures by which individuals, households or communities are selected from a total population group.” Not all individuals or households can be sampled as it has time, logistic and financial implications. Therefore, for the purpose of this study four (4) households from each entity (Boleni, Ezitendeni and Tapashiya) were systematically sampled. This was to ensure that a geographical spread of respondents are interviewed. Distance and topography can evolve as key aspects of differences between households when dealing with access to natural resources such as water. According to Leedy (1993), this sampling technique is the least sophisticated and the data level extracted is generally in the form of personal observations, interview and questionnaires. This study applied the systematic sampling technique with the use of questionnaire interviews and field observations.

### **3.2.4 Qualitative and Quantitative Methods**

According to Leedy (1993: 139), “all data, all factual information, all human knowledge must ultimately reach the researcher either as words or numbers.” This ensures that all information can be analysed. The issues are as to the way in which the data is gathered and this information analysed. According to Leedy (1993), if the data is verbal, then the methodology is qualitative and if the data is numerical, then the methodology is quantitative. Linked to this, is the focus of objective data that is expressed in the form of numbers and is expressed as quantitative data. However, the data that is reported through language which exists within the minds of individuals are argued to be qualitative (Leedy, 1993). Notwithstanding this, researchers both qualitative and quantitative need reliable and valid results, whereby the quantitative researcher requires data to be reliable, that is, replicated over time whereas the qualitative researcher concentrates on the validity of data, that is, representative of the full picture of what is being investigated (Leedy, 1993). Information and data is sometimes not that clear-cut and therefore qualitative and quantitative methods need not be replacements for each other but be alternatives that can be used to complement and clarify information (Mattingly and Falconer-Al-Hindi, 1995; McLafferty, 1995; Rose, 1993), which Leedy (1993) terms “triangulation”. Bob (1999) argues that diversity in terms of methods and approaches employed in conducting research should therefore be encouraged and applauded.

This study therefore utilizes both qualitative and quantitative methods through the use of open-ended and closed-ended questions (discussed under questionnaire), whereby qualitative information are easily quantified and statistically analysed.

### **3.2.5 Questionnaire**

According to Bob (1999), questionnaire based surveys are the most common methodology used to gather information which is directed to specific individuals, whilst Leedy (1993: 187) argues that “a common place instrument for observing data beyond the physical reach of the observer is the questionnaire”. Both agree that the questionnaire is the simplest and most widely used instrument to gather information. The questionnaire comprises a set of carefully structured questions, designed to obtain the needed information without any ambiguity or bias as every respondent answers the same question, that is worded in the same way and in the same sequence (Johnston et al, 1986). For this study, the questionnaire was designed to collect information from four (4) households per community entity. Thus a total of twelve (12) households were interviewed of which eight (8) were women. The questionnaire was prepared in both English and Zulu, a copy of which is attached as Appendix A.

Bob (1999) indicates that using the questionnaire methodology is useful in gathering a wide range of information that can be easily quantified and used for statistical analysis, as is the case of this study. The questionnaire was designed with closed-ended and open-ended questions. The closed-ended questions required specific information from a range of choices and were designed to collect data that could be qualified and quantified statistically. The open-ended questions however specific with respect to the answers requested, needed verification of the answers given. The open-ended questions were therefore used to clarify positions as well as to use this information qualitatively, quantitatively and statistically.

The research questions as contained in the questionnaire attempts to provide information as to the issues impacting upon the communities of the three entities with respect to water resources sustainability. The questions aim to address the objectives outlined in this study as contained in chapter one. The questions attempts to analyse the communities drinking water supplies, bathing

water, water for washing clothes, water for livestock and water for irrigation. This allows for the analyses of the dominant sources of water with respect to its adequacy, reliability and impact on overall sustainability. This information is also collated statistically to determine the overall assessment of sustainability of the water sources according to the methodology adapted from Watson (1998).

Furthermore, questions regarding sanitation and waste disposal were designed to determine the status quo as well as its impact upon the water sources, the receiving environment and the health of individuals. The communities expectations and realisations of water and sanitation requirements were also sought after together with their preferred primary and secondary needs. This ensures that a bottom-up approach of consultation with the community is entrenched, which could mean sustainability of the project if their needs are met.

### **3.2.6 Mental Mapping**

According to Bob (1999), mental maps are crucial to geography as it provides a basis for knowing different aspects of a community as well as show the different natural resources and micro-environments. The mental map (Map 5, not drawn to scale) provides insight as to the layout of the community households and its relation to their primary water sources. The mental map of Tapashiya was compiled in consultation with and verified by the committee member of the Tapashiya community. According to Kate (1970 cited in Jooste and Liebenberg, 1997), by analysing the structure of mental maps, one can gain an idea of how people orientate themselves in relation to the environment. Thus, with the use of mental maps the water related issues can be highlighted as well as it can be used for future reference and as a basis for future development for the realisation of people's needs, especially with reference to water and sanitation service provision. Therefore, mental maps are useful in planning from a government level, since it gathers information which can be used in detail planning ensuring an integrated approach to development.

### 3.2.7 Fieldwork

The primary fieldwork conducted in this study used both qualitative and quantitative methods. According to Bob (1999), both qualitative and quantitative methods are useful as each method reflects different ways of getting different types of information.

The following sequence of events were undertaken to gather information:

- **Introductory meeting: (27 November 2001)**

An introductory meeting was held with the community committee members at the agricultural offices at Platt Estates. This meeting was arranged in consultation with the Department of Land Affairs, chief planner for the Monitoring and Evaluation section as well as with the permission of the Director of the Department of Land Affairs in Kwazulu-Natal and the project manager of Platt Estates. The community committee members were informed about the purpose of the study.

- **Interviews through the use of questionnaires: (27 November 2001)**

The community committee members at the introductory meeting agreed to participate in the questionnaire survey on the same day. The questionnaires were completed for those present at the agricultural offices and thereafter the research team was taken to the individual communities to complete the allotted questionnaires. Four (4) men and eight (8) women were interviewed by the fieldworkers, with the remaining research team being observers and facilitators as well as being responsible to clarify any issues. The questionnaires were written in both English and Zulu with the questions being asked in Zulu by the fieldworkers. Any clarifications were referred to myself or my supervisor.

- **Field observations and mental mapping: (30 November and 10 December 2001)**

Further meetings were arranged with the committee members. The purpose was to observe the status of the water resources and sanitation facilities on the three entities and to record and report upon it. Field observations are important tools as one makes a careful record of what is observed such that, as according to Leedy (1993: 186), “the researchers can then return to the record to study the observations that have been described there.” Therefore, field observations of all the researched entities were recorded and a detailed

mental map of Tapashiya was prepared. The mental map incorporated the major plantations, the springs, rivers and streams in relation to the residential settlements, with a view of providing a mental picture of the surrounding environment.

### **3.3 CONCLUSION**

This chapter attempts to give one insight and provide a brief overview of the three case studies in the farm Platt Estates in terms of the project's location, legal status, development proposals and the baseline information of the case studies and the surrounding area. The adopted and adapted methodology proposed by Watson (1998) was also discussed and evaluated, together with the primary and secondary methodology used in this dissertation to evaluate the water sustainability of land reform projects with special reference to redistribution projects. The use of questionnaire interviews, field observations and mental mapping is used to gather information which is statistically analysed in the next chapter.

# CHAPTER FOUR

## DATA ANALYSIS

### 4.1 INTRODUCTION

According to Conyers and Hill (1994), the collection and analysis of data play an important role in planning. Planning is a process of decision making and decisions cannot be made without at least minimum information. Therefore, interpreted or analysed data reveals certain information that is required for planning purposes or to determine the *status quo*.

This section attempts to review the progress of the land redistribution programme from its inception and compare this with the current situation with special reference to water services (water and sanitation) provision. The secondary data which consists of the Quality of Life Reports prepared by the Department of Land Affairs in 1998 and 2000, will be analysed. Furthermore, primary data that was collected via questionnaires in three communities of the Platt Estates in Kwazulu-Natal (as described in chapter three) is presented and analysed in this chapter. Field observations and a mental map of the Tapashiya entity are also interpreted. Finally, an overall assessment of the sustainability of the water resources for the identified Platt Estate Entities (Boleni, Ezitendeni and Tapashiya) is determined.

### 4.2 SECONDARY DATA ANALYSIS

The secondary data analysis through the form of a desktop study, reviews the Quality of Life Reports of the Department of Land Affairs, Monitoring and Evaluation Directorate for 1998 and 2000. The secondary data analysed, forms a backdrop of baseline information that can be utilised for future comparative analysis.

#### **4.2.1 REVIEWING THE QUALITY OF LIFE REPORT OF 1998 (DEPARTMENT OF LAND AFFAIRS, 1998A): WATER AND SANITATION ISSUES (ACCESS AND PROVISION) FOR KWAZULU-NATAL**

The sampling undertaken by the 1998 Quality of Life Report indicates that a total of 62 projects were selected throughout the country. The findings as expressed hereunder in the tables indicate the national total as being 62 projects and the Kwazulu-Natal total being 14 projects. The relevant aspects of the Quality of Life Report of 1998 pertaining specifically to Kwazulu-Natal in comparison the national averages are analysed.

##### **4.2.1.1 Total redistribution projects transferred nationally**

After three years of operation, the DLA had only transferred about 200 000 hectares of land to about 20 000 households (Department of Land Affairs, 1998a). This represented 0.2% of the households demanding land and 0.6% of the 30% target.

According to the Department of Land Affairs (1998a), there was a total of 893 redistribution project cases, including farm equity schemes and commonages. Of these, 457 were in the registration phase, 185 had been approved, 55 were in the feasibility/ designation phase and 108 had been transferred. Table 4.1 below reflects the number of transferred projects per province, the total hectares of land transferred and the total number of households who had received land. Special reference is made to Kwazulu-Natal, which had only 35 projects transferred, 6237 households receiving 58 185.11 hectares of land. This represented only 0.5% of households that had received land in Kwazulu-Natal.

Table 4.1 Total number of transferred redistribution projects

PROVINCE	NO. OF HECTARES	NO. OF PROJECTS	NO. OF HOUSEHOLDS
Eastern Cape	9 675.37	11	3 586
Free State	13 741.44	22	1 220
Gauteng	83.54	5	665
<b>KwaZulu-Natal</b>	<b>58 185.11</b>	<b>35</b>	<b>6 237</b>
Mpumalanga	17 782.15	14	3 978
Northern Cape	72 943.11	8	1 683
Northern Province	3 913.09	4	784
North West	4 552.11	6	1 750
Western Cape	659.85	3	356
<b>Total</b>	<b>186 183.39</b>	<b>108</b>	<b>20 049</b>

Source: Department of Land Affairs (1998a)

The Land Reform Pilot Programme and the results from the National Impact Assessment Study conducted by the Department of Land Affairs: Monitoring and Evaluation Directorate (1998) indicated that there was inadequate delivery on support services for land reform projects. Furthermore, there were serious environmental limitations associated with land reform projects. It would seem that in the long term the land reform programme will experience difficulties in realizing its stated objectives of improving the quality of life of poor rural communities.

In most instances, rural communities that had settled on the land under the land redistribution programme in South Africa had done so without adequate provision of services, including water (Department of Land Affairs, 1998a). Despite the relatively few years that the land redistribution processes have been in place, inadequate access to and inappropriate management of water resources had led to increased or exacerbated existing ecological, human health and workloads (especially for rural women) crises in redistribution projects.



#### 4.2.1.2 Primary sources of water for beneficiary projects

In terms of water provision, the table below illustrates in percentages what the primary sources of water are for beneficiary households, with respect to Kwazulu-Natal in comparison to the national averages.

Table 4.2 Percentage of primary/ main sources of water for beneficiary projects (KZN and National)

MAIN WATER SOURCES	NATIONAL (n = 62)	KZN (n = 14)
Tap in house	15	-
Standpipe	45	14
Mechanical Pump	7	7
Well/Spring	5	7
River Spring	23	64
Tank	2	-
No water Source in community	5	7

Source : Adapted from Department of Land Affairs (1998a)

Only 15% of the projects nationally had access to tap water in a house. In Kwazulu-Natal there were none reported with the vast majority of the projects dependent on unconventional, natural water sources, with 64% utilizing rivers and streams. This is of concern in relation to disease transmission. The World Health Organization defines access to safe drinking water as water available in the home or within 15 minutes walking distance (Hedman et al, 1996). More than half of the respondents interviewed nationally stated that their primary water source was more than 2 km (more than 15 minutes) away from their houses. This is inappropriate when one considers the Reconstruction and Development Plan of 1994 and the Department of Water Affairs and Forestry's (DWAF's) promise to provide an adequate supply of water (20/30 litres per day) to every household within 200 metres from their dwelling. Detailed discussions with the respondents exposed the fact that households had better access to water (and electricity) when they lived in

the location prior to settling on the redistribution land. In one community during a mental resource mapping exercise, respondents were asked where they intended to get water from after they moved onto the land. It was noticed that the planned residential area was located away from the dams and the river, the only available natural water sources on the farm. The respondents promptly answered that the government will be providing them with taps. In Kwazulu-Natal, most projects after more than two years of families settling on the land had not gained access to water. In very few instances community boreholes were installed. It is unlikely that this community will be an exception to the regional trend. What is clear is that communities are planning on largely false expectations. In this instance, women who are generally responsible for collecting water, are likely to bear the brunt of this type of misinformed planning in their communities.

#### 4.2.1.3 Land rights of water sources in Kwazulu-Natal

Water rights discussed hereunder is predominantly concerned with the Water Act, Act 54 of 1956. This is prior to the promulgation of the National Water Act, Act 36 of 1998 which argues that all water is under the custodianship of the State and is controlled by the Department of Water Affairs and Forestry (DWAF).

Intensive fieldwork conducted in 14 of the land reform projects in Kwazulu-Natal show that although land redistribution grants beneficiary households ownership rights to land, these were rarely accompanied with water rights. Table 4.3 illustrates in percentages the land rights of water sources in the sampled projects in Kwazulu-Natal.

Table 4.3 Percentage land rights of water sources in KwaZulu-Natal

LAND RIGHT OF WATER SOURCE	HOUSEHOLDS (n = 56)
Ownership (title)	-
Communal ownership	31
Usufruct	14
No rights	55

The results from the table above show that the majority of the households (55%) had no

ownership rights to critical water resources. None of the respondents indicated that they had ownership rights to their water source. In some households access to water was dependent on the permission of someone else. In fact, respondents indicated that they stole wood and water from neighbouring farms. On a number of occasions, members of one community were arrested because of this.

Rural land redistribution beneficiaries need water for a variety of reasons. Water is essential to meet basic human needs such as drinking, washing, cooking and sanitation. Also, rural people need water for productive purposes to meet both dietary and income needs. For the rural poor in South Africa water is scarce and/ or of a poor quality. Poor quality of water threatens the health of rural people who succumb to even easily treatable diseases as a result of the compounded effect of inaccessibility to health care facilities. Thus, the amount and the quality of water available to land redistribution communities creates the conditions that frame whether these projects will be sustainable or not. Land redistribution projects that are further away from urban centres are significantly worse off in terms of service provision than those that are located near small towns.

During interactions with beneficiaries in various land redistribution projects, especially in Kwazulu-Natal, it was clearly evident that there were high levels of dissatisfaction around inaccessibility to water (Bob, 1999). Many beneficiaries stated that they were promised water (this is also often supported by information in the business plans). They also stated that areas that they had moved from (in some cases where they were closer to towns) had better access to services, especially water and electricity.

T020082

The Department of Land Affairs has set up an elaborate and costly process associated with land redistribution. The development of legal entities and business plans are often lengthy processes aimed at ensuring the sustainability and viability of redistribution projects. Planning agencies or consultants are often paid exorbitant fees to develop project business plans. They often do so without the consistent and meaningful participation of the beneficiaries (Bob and Moodley, 1999). A major critique of the business planning process is the lack of integration of environmental and resource concerns. A perusal of some of the business plans in some of the projects indicate that in terms of water provision, the business plans reflect adequate water sources within the



community (Bob and Moodley, 1999). However, discussions with community members suggest that communities have insufficient water supply for domestic purposes as well as for the productive ventures articulated in the business plans (Bob and Moodley, 1999).

#### 4.2.1.4 Sanitation systems

Toilet types used forms an integral part in personal hygiene and practices. Poor sanitation practices impacts negatively on health and water resources. Viruses and bacteria can be transported via the water medium, thus causing waterborne diseases as runoff from poor sanitation systems and practices enters waterbodies, through surface and groundwater migration.

Table 4.4 Types of toilets used in land reform communities (expressed as a percentage)

TYPE OF TOILET	NATIONAL (N = 62)	KZN (N = 14)
Flush Toilet	15	-
Pit Latrine	48	36
Bucket	10	-
No Toilet	27	64

Source: Adapted from Department of Land Affairs (1998a)

The predominant sanitation system in Kwazulu-Natal was the pit latrine which constitutes 36%. However, this seems to be the only system, as no other system such as flush toilet, ventilated pit latrine or even the bucket system was being used or even being provided, as compared to the national average of 15% for flush toilet and 10% for the bucket system. Pit latrines are also of concern as they also contaminate groundwater sources if not properly constructed and managed. Of major concern was that 64% of the respondents in Kwazulu-Natal reported not having any toilet system, which means that the bush or streams may be a sanitation system that was being used. This is alarming when one considers that waterborne diseases such as cholera, dysentery and diarrhoea are transmitted through faecal contamination of the water sources.

#### **4.2.1.5 Summary of the Quality of Life Report of 1998**

With respect to problems limiting farming performance of land reform communities, 37 of the 92 households interviewed (40.2%), stated that lack of water was the priority problem with insufficient land the second highest of 21 households (22.8%) (Department of Land Affairs, 1998a). Of the 14 projects reviewed for Kwazulu-Natal, 12 rated water issues as a major challenge (Department of Land Affairs, 1998a). The projects include Lonsdale, Rockydrift, Mandlazini, Labuschagneskraal, Ncunjane, Misgunst, Nomoya, Ganahoek, Kwa-Xamu Community Property Association, Amantungwa, Cornfields and Mgazini Trust. It is evident from the analysis above that water and sanitation issues nationally are problematic and that Kwazulu-Natal is worse-off than the other provinces. Therefore, these projects need to be revisited to determine if the water and sanitation related issues have been addressed.

#### **4.2.2 REVIEWING THE ANNUAL QUALITY OF LIFE OF LAND REFORM BENEFICIARIES: 1998/ 1999 (DEPARTMENT OF LAND AFFAIRS, 2000): WATER AND SANITATION ISSUES (ACCESS AND PROVISION) FOR KWAZULU-NATAL**

The sampling undertaken by the Department of Land Affairs (2000) report indicates that a total of 101 projects were selected with a sample size of 1145 households. The findings as expressed in the tables hereunder indicate the national total as being 101 projects and the Kwazulu-Natal total as being 13 projects.

##### **4.2.2.1. DRINKING WATER**

###### **4.2.2.1.1 Roofing materials**

There is always a need for utilizing rain as a source of drinking water as rain water is perceived to be clean and pure. The collection systems of rain water is important and therefore roofing systems are an indication of households ability to collect rain water.

Table 4.5 Main Materials used for roof of main dwelling (expressed as a percentage)

<b>MATERIAL CODES</b>	<b>NATIONAL (n = 101)</b>	<b>KZN (n = 13)</b>
Traditional Materials (Thatch)	10	34.1
Temporary Shack (Plastic, cardboard, plywood)	11.8	1.7
Permanent without guttering (corrugated iron)	45	40.8
Permanent with guttering (corrugated iron)	30.1	21.8
Other (specify)	3.1	1.7

Source: Adapted from Department of Land Affairs (2000)

Kwazulu-Natal has a higher incidence, that is 76.6% as compared to 66.8% nationally, of roofing systems (traditional thatched, temporary shack and permanent corrugated iron roofing without guttering) that is used which do not collect rain water. It is noteworthy, that 40.8% in Kwazulu-Natal and 45.0% nationally do have permanent corrugated iron roofing which could be utilised for the collection of rainwater, if guttering were installed. This, coupled with those houses that have permanent corrugated iron roofing with guttering (21.8% in Kwazulu-Natal and 30.1% nationally) will ensure that 62.6% (40.8% and 21.8%) in Kwazulu-Natal and 75.1% (45.0% and 30.1%) nationally would have access to rainwater for their drinking water supplies if they are installed with proper rain tanks,. The roofing together with the rain collection tanks is therefore important for collecting clean drinking water. It is a simple but effective system.

#### 4.2.2.1.2 Source of drinking water

Table 4.6 Most often used source of drinking water (expressed as a percentage)

<b>SOURCE OF DRINKING WATER</b>	<b>NATIONAL (n = 101)</b>	<b>KZN (n = 13)</b>
Piped - internal	13.6	8.9
Piped - yard tap	31.8	2.8
Water carrier/tanker	2.9	0.6
Piped - public tap/kiosk (free)	16.1	2.8
Piped - public tap/kiosk (paid for)	4.9	1.1
Borehole	9.7	21.2
Rainwater tank	0.4	-
Flowing river/stream	8.5	25.1
Dam - stagnant water	4.2	3.9
Well (non-borehole)	4	12.3
Protected spring	0.2	0.6
Other	3.6	20.7

Source: Adapted from Department of Land Affairs (2000)

In Kwazulu-Natal there is a high incidence (83.2%) of non protected systems of water source being utilised which include boreholes, rivers or streams, dams and wells. The “other” as a response (20.7%) is of concern as it has not been specified as to what this is. It can be assumed then that the respondents did not want to answer the question, were unsure of the source list or that the water source was unprotected for example from unprotected springs. However, this cannot be verified. Irrespective of this, there is a contrast when one considers that the national average is 69.5% for protected water sources, which include, piped internal and external, water carrier or tanker, piped public tap and protected spring. The utilisation of water from rain water tanks (0.4% nationally and none in Kwazulu-Natal) is of concern as this is a simple system that can be erected and that which needs to be looked at. According to the Department of Land Affairs

(2000) only Eastern Cape had reported using rain tanks.

#### **4.2.2.1.3 Incidence of carrying water**

Table 4.7 Incidence of carrying water (expressed as a percentage)

<b>COLLECTION OF WATER</b>	<b>NATIONAL (n = 101)</b>	<b>KZN (n = 13)</b>
Fetch Water	75.3	91.9
Do not fetch water	24.7	8.1

Source: Adapted from Department of Land Affairs (2000)

The majority of respondents (91.9%) in Kwazulu-Natal fetch water as compared with the high national average of 75.3%. This high incidence of fetching water is directly related to the source of water when one considers, with reference to Table 4.5 that 88.3% in Kwazulu-Natal do not have piped water systems. What is even more alarming is that according to the Department of Land Affairs (2000), the majority of households make up to four trips per day. The shortfall of the report is that it does not stipulate the distance that water is fetched from or the time taken to collect water. With this information the productive time lost could have been calculated. The high incidence of fetching water and the trips undertaken, although not stipulated in the report, are done mainly by women and children. This relates to the general gender bias that is experienced in traditional rural communities which results in a waste of productive time, especially for the women.



#### 4.2.2.2. SANITATION SYSTEMS

##### 4.2.2.2.1 Types of toilet facilities

Table 4.8 Type of toilet facility used (expressed as a percentage)

TYPE OF FACILITY	NATIONAL (n = 101)	KZN (n = 13)
Flush toilet	24	10.6
Improved Pit Latrine with ventilation (VIP)	9.1	1.1
Other Pit Latrine	40.7	46.1
Bucket toilet	5.9	1.1
Chemical toilet	0.4	-
None	12.9	2.8
Other	7	38.3

Source: Adapted from Department of Land Affairs (2000)

Although there is an improvement in the supply of flush toilets (10.6%) in Kwazulu-Natal from the none in the 1998 report, the incidence of traditional basic systems in Kwazulu-Natal such as pit latrines, bucket systems, none and other is alarmingly high at 88.3%. What is of concern is that 38.3% in Kwazulu-Natal is stipulated as “other” and is not specified. It can be concluded that the “other” systems are informal as it does not fall under the formalised systems indicated above. This is alarming when one considers that waterborne diseases such as cholera, dysentery, gastroenteritis and diarrhoea are transmitted through faecal contamination of the water sources by traditional informal systems.

### 4.2.2.3. ENERGY

#### 4.2.2.3.1 Electricity supply

Table 4.9 Connection to an electricity supply (expressed as a percentage)

<b>ELECTRICITY CONNECTION</b>	<b>NATIONAL (n = 101)</b>	<b>KZN (n = 13)</b>
Connected	42.2	8.9
Not Connected	57.8	91.1

Source: Adapted from Department of Land Affairs (2000)

In order to have formal water supply to individual households there is a need to pump water from water sources to holding tanks. Systems such as solar energy, diesel pumps and windmills could be used but water supply is also dependant on electricity supply for pumping systems. With the high incidence of 91.1% in Kwazulu-Natal not having electricity supply, it makes it difficult for having such systems. Although difficult, there is a need to connect the rural communities to the main electricity supply lines.

#### **4.2.2.4. EXPECTATIONS VERSUS REALISATIONS**

##### **4.2.2.4.1 Community expectations versus actual realisations with respect to water services provision**

Table 4.10 Expectations versus actual realisations of water services provision (expressed as a percentage)

<b>SERVICES</b>	<b>NATIONAL (n = 101)</b>		<b>KZN (n = 13)</b>	
	<b>Expectations</b>	<b>Realised</b>	<b>Expectations</b>	<b>Realised</b>
Reticulated Water	65.1	16.5	73.5	8
Sanitation	65	12.4	72.2	4.9

Source: Statistics adapted from Department of Land Affairs (2000)

Communities have expressed that they had reasonably high expectations of receiving reticulated water (65.1% nationally and 73.5% in Kwazulu-Natal) and sanitation (65.0% nationally and 72.2% in Kwazulu-Natal). However, there has been a very low realisation rate, especially in Kwazulu-Natal with 8.0% for reticulated water and 4.9% for sanitation. What makes realisations of expectations of water and sanitation difficult is that the Department of Land Affairs's constitutional role is that of originator of land reform as it does not have the mandate nor the resources to provide for basic infrastructure and services beyond that of land transfers (Department of Land Affairs, 1998a).

##### **4.2.2.5 SUMMARY OF THE ANNUAL QUALITY OF LIFE OF LAND REFORM BENEFICIARIES, 2000**

Nationally, a total of 101 projects were selected, with 13 from Kwazulu-Natal. It is evident from the analysis above that water and sanitation issues nationally have had marginal improvements when compared to the analysis from the 1998 Quality of Life survey. In Kwazulu-Natal the services provision for piped water to properties increased from none in 1998 to 11.7% in 2000

and flush toilets from nil in 1998 to 10.6% in 2000. The averages compare as piped water to properties lead to the installation of flush toilets. However, the incidence of people using unprotected water is still alarmingly high in Kwazulu-Natal at 83.2% and 91.9% still collecting or fetching water. Also of concern is the fact that only 1.1% in Kwazulu-Natal and 9.1% nationally use VIPs as a standard system, whereas 88.3% in Kwazulu-Natal use informal systems which is made up of pit latrine, bucket, none and other. Surely, VIPs should be regarded as standard practice as recommended by the National Sanitation Programme in South Africa (Mvula Trust, 1999a) and persistence with any lesser system is unacceptable. Therefore, however marginal the improvements are, more needs to be done to rectify the *status quo*.

### 4.3 PRIMARY DATA ANALYSIS

Analysis of the data collected from the case studies as detailed in chapter 3 is presented and analysed hereunder. Primary data analysis through fieldwork was undertaken with the use of questionnaires, field observations and a mental map of the Tapashiya entity. According to Bob (1999), questionnaire-based surveys are the most common methodology used to gather a wide range information as it is directed to individuals. Field observations were undertaken to describe the physical status of the water resources as well to reinforce the information presented by the respondents. The information was easily quantified, as is the case in this study through the use of sustainability scores. Sustainability scores were assigned to 22 of the 36 attributes and an individual entity assessment and an overall assessment of the combined entities of the water sustainability was calculated. A mental map for the Tapashiya entity draws attention to the location of the settlement in comparison to the water resources, the road infrastructure and the timber plantations as well as its relation to the other entities (Boleni and Ezitendeni).

### 4.3.1 QUESTIONNAIRE EVALUATION: WATER AND SANITATION ISSUES (ACCESS AND PROVISION)

#### 4.3.1.1. DRINKING WATER

##### 4.3.1.1.1 Roofing types

Table 4.11 The predominant type of roof on buildings (expressed as a percentage)

<i>Type of Roofing</i>	<i>PLAAT ESTATES ENTITIES</i>			<i>%</i>
	<i>Bholeni</i> <i>(n = 4)</i>	<i>Ezitendeni</i> <i>(n = 4)</i>	<i>Tapashiya</i> <i>(n = 4)</i>	<i>Total</i> <i>(n = 12)</i>
1. Thatched grass roofs with no gutter	-	50	75	41.6
2. Corrugated iron roof with no gutter	100	25	25	50
3. Corrugated iron roofs with temporary gutter draining into removable drums	-	25	-	8.4
<b>Sustainability Score (SS)</b>	2	2	1.5	
<b>Composite SS ( <math>\sum SS / 3</math> )</b>				1.8

There is always a need for utilizing rainwater in rural areas as a source of drinking water as rainwater is perceived to be clean and pure. The collection systems of rainwater is important and therefore roofing systems are an indication of households ability to collect rainwater (refer Plate 7). All of the respondents stated that the roofing systems did not have permanent guttering which makes collection of rainwater difficult. A relatively small proportion of households (8.4%) indicated that their houses had corrugated iron roofs with makeshift temporary gutters draining into removable drums. The majority (91.6%) do not have any guttering even though 50% have corrugated iron roofing which could easily be fitted with gutters. Although temporary guttering

are available to 8.4%, none were installed with proper rain collection tanks. Appropriate roofing together with the rain collection tanks is therefore important for collecting clean drinking water.

The sustainability score (SS) calculated for all three of the entities is Boleni (2.0), Ezitendeni (2.0) and Tapashiya (1.5), with the composite sustainability score (CSS) calculated at 1.8. This indicates that the sustainability of these roofing types are “bad” (according to Watson, 1998, KC&I), which explains why the rainwater requirements stipulated in Table 4.12 is low, as the roofing types determines the ability to collect rainwater.



Plate 7: Examples of the roofing types (thatched, corrugated iron and corrugated iron with temporary guttering draining to removable containers) at the Platt Estates. The photo also illustrates the variety of roofing types on a single property

#### 4.3.1.1.2 Rainwater requirements

Table 4.12 The proportion of drinking water needs obtained from rainwater (expressed as a percentage)

<i>Needs from Rainwater</i>	<i>PLAAT ESTATES ENTITIES</i>			<i>%</i>
	<i>Bholeni</i> <i>(n = 4)</i>	<i>Ezitendeni</i> <i>(n = 4)</i>	<i>Tapashiya</i> <i>(n = 4)</i>	
1. Most of needs	-	25	25	16,7
2. Small parts of needs	100	50	75	75
3. None	-	25	-	8,3
<b>Sustainability Score (SS)</b>	1.5	1.5	1.6	
<b>Composite SS ( <math>\sum SS / 3</math> )</b>				1.5

The proportion of drinking water obtained from rainwater constitutes only a small proportion of the community needs with three quarter (75%) of the respondents stating that it makes up only a small part of their needs whilst 8.3% did not utilize rainwater. This ties in proportionally with the roofing structures, as according to Table 4.11, 91.6% of the respondents have thatched and/or corrugated iron roofing without having guttering to capture rainwater. Only 16.7% of the respondents stated that most of their drinking water needs come from rainwater and the mechanism to capture rainwater is through temporary guttering methods which captures water in removable drums.

The sustainability score (SS) calculated for all three of the entities is Boleni (1.5), Ezitendeni (1.5) and Tapashiya (1.6), with the composite sustainability score (CSS) calculated at 1.5. This indicates that the sustainability of the rainwater requirements are “bad” to “very bad”, considering Watson’s (1998), KC&I. The predominant small needs is a direct consequence of the inappropriate roofing structures that are available to the households as indicated in Table 4.11, which does not support the collection of rainwater as well as seasonal variations.

#### 4.3.1.1.3 Primary sources of drinking water

Table 4.13 The primary/ main sources of drinking water identified (expressed as a percentage)

Source	PLATT ESTATE ENTITIES			%
	Bholeni (n = 4)	Ezitendeni (n = 4)	Tapashiya (n = 4)	
1. Spring or well	100	50	-	50
2. Stream or river	-	50	100	50
Sustainability Score (SS)	3	2.8	2.5	
Composite SS ( $\sum SS / 3$ )				2.8



Plate 8: The photos above are examples of a typical spring (a), spring collection point (b) and river/ stream (c) systems that are found in the Platt Estate

The primary sources of drinking water is from springs (50%) and from the streams or non-perennial rivers (50%) (refer to Plate 8). Both of these sources of drinking water are unprotected and can lead to the transmission of disease carrying organisms as animals frequent the water sources and the community members utilize these areas for washing and bathing. What is also important to note is that the communities border each other and some members utilize the other communities water supplies especially with respect to Ezitendeni where 50% use the spring and



50% use the stream or river.

Since there is no piped water supply systems, which would indicate a very good sustainability score, the use of rivers and springs by the beneficiaries indicates sustainability scores (SS) of: Boleni (3.0), Ezitendeni (2.8) and Tapashiya (2.5), with the composite sustainability score (CSS) calculated at 2.8. This according to the KC&I rating indicates a moderate rating. There is therefore a need to upgrade the water supply to piped supply in order to make water supply sustainable.

#### 4.3.1.1.4 Secondary sources of drinking water

Table 4.14 The secondary/ alternate sources of drinking water identified (expressed as a percentage)

<i>Source</i>	<i>PLATT ESTATE ENTITIES</i>			<i>%</i>
	<i>Bholeni</i> <i>(n = 4)</i>	<i>Ezitendeni</i> <i>(n = 4)</i>	<i>Tapashiya</i> <i>(n = 4)</i>	
1. Borehole	-	50	-	16.7
2. Rain water	100	25	75	66.7
3. No other source except primary source	-	25	25	16.7
<b>Sustainability Score (SS)</b>	1	1.3	1	
<b>Composite SS ( <math>\sum SS / 3</math> )</b>				1.1



Plate 9: Secondary sources of water supply through borehole (a) and rainwater (b)

Although 66.7% of the respondents indicated that they use rainwater as a secondary source (refer Plate 9b), the roofing structures as indicated in Table 4.11, where 41.6% has thatched with no gutter and 50% has corrugated iron roof with no permanent gutter, indicate a concern as to where and how they acquire the rain water. The responses were that on each property there are many structures, sometimes three or four buildings and one of the buildings that has been fitted with corrugated iron roofs are innovatively fitted with make-shift gutters to capture rain water for use. However, this is a secondary source and 16.7% of the respondents do not have a secondary source. This is of concern as an alternative water source is very important, especially when all of the primary sources of water are springs as well as streams or rivers, as indicated in Table 4.13. If these primary sources dry up, especially in winter as indicated by the respondents, then an alternative source is needed. However, some of the respondents also stated that they move from spring to spring or to the borehole (refer to Plate 9a).

The sustainability score (SS) calculated for all three of the entities is Boleni (1.0), Ezitendeni (1.0) and Tapashiya (1.0), with the composite sustainability score (CSS) calculated at 1.1. This indicates that the sustainability according to the KC&I is very “bad”, as during dry seasons there is an inadequacy of rainwater as well as that the borehole which is not easily accessible to all dries up.

#### **4.3.1.1.5 The adequacy throughout the year, of the sources of drinking water**

The water sources do not meet the needs of the community throughout the year in terms of supply and/ or volume. All of the respondents stated that their water requirements were not adequate throughout the year. However, all responded that during the rainy summer months, their water needs were adequate but during the dry winter months their supply was inadequate as the rivers and springs would dry up. The use of the borehole in dry months was the only other alternative, which was a great distance away and it meant waiting in queues.

The sustainability score (SS) calculated for all three of the entities is Boleni (1.0), Ezitendeni (1.0) and Tapashiya (1.0), with the composite sustainability score (CSS) calculated at 1.0. This indicates that the sustainability is “very bad”, as there is no continuous supply of water throughout the year as rivers/ streams and springs dry up during the dry seasons.

#### **4.3.1.1.6 The frequency of the primary sources of drinking water being inadequate**

All of the respondents stated that their main sources of drinking water were frequently inadequate. Although the water supply is inadequate, the respondents stipulated that it was often inadequate during the dry winter months and sufficient during the rainy summer months

The sustainability score (SS) calculated for all three of the entities is Boleni (1.0), Ezitendeni (1.0) and Tapashiya (1.0), with the composite sustainability score (CSS) calculated at 1.0. This indicates a sustainability rating of “very bad”, as the primary sources are only seasonal as well as that during seasons of drought and floods, their plight is further exacerbated.

#### **4.3.1.1.7 The frequency of the primary sources of water becoming polluted**

All of the respondents believed that the primary sources of water becomes polluted often or frequently. The main concern for the cause of pollution was that the animals frequent the water

sources and defecate on or in close proximity to the source (refer to Plate 10). When it rains, the runoff is into the water source, for example the river and spring. The springs are also not protected. It was also stated that many bathe and defecate in the streams or river as well as wash their clothing which also contaminate the water. Others responded that the water gets polluted (dirty/ discoloured due to siltation) during heavy rains and floods. Some indicated that due to animals and people defecating and bathing near and in the water sources, they were afraid to use the water for drinking as it could contain cholera.



Plate 10: Animal faeces near stream and spring (a and b) and non protection of spring (c)

The sustainability score (SS) calculated for all three of the entities is Boleni (1.0), Ezitendeni (1.0) and Tapashiya (1.0), with the composite sustainability score (CSS) calculated at 1.0. This is an indication of a very “bad” sustainability rating, as faecal contamination is a reality due to poor control of animals, poor sanitary methods and poor protection measures.

#### 4.3.1.1.8 Pollution of secondary sources

Table 4.15 Pollution of the alternative or secondary drinking water source (expressed as a percentage)

<i>Response</i>	<i>PLATT ESTATE ENTITIES</i>			<i>%</i>
	<i>Bholeni (n = 4)</i>	<i>Ezitendeni (n = 4)</i>	<i>Tapashiya (n = 4)</i>	
1. Yes : The water source gets polluted and cannot be used for drinking purposes.	-	100	25	41.7
2. No : The water source does not get polluted to the extent that it cannot be used for drinking.	100	-	75	58.3
<b>Sustainability Score (SS)</b>	2	1	2.5	
<b>Composite SS ( <math>\sum SS / 3</math> )</b>				1.8



Plate 11: Open container with contaminated rainwater

According to Table 4.14, the respondents indicated that rainwater (66.7%) and borehole water (16.7%) were the secondary sources of drinking water. According to the table above (Table

4.15), 41.7% of the respondents stated that their secondary water source gets polluted to an extent that it cannot be used for drinking (refer to Plate 11). Therefore there is concern as to how, what is predominantly rainwater and borehole water, gets polluted. The indications from some were that mosquito larvae found in drums, dust and dirt from the roofs and insects contaminate the collected rainwater. This is understandable as the drums are open and not protected. On the other hand, 58.3% of the respondents indicated that the alternate water source does not get polluted to an extent that it cannot be used for drinking.

The sustainability score (SS) calculated for all three of the entities is Boleni (2.0), Ezitendeni (1.0) and Tapashiya (2.5), with the composite sustainability score (CSS) calculated at 1.8. This indicates a sustainability rating of “bad”, as a secondary source is seen as a “fall-back option”. If this source is contaminated then that option is unavailable to them which would necessitate alternative means to be reviewed, such as purchasing water or walking great distances to the perennial rivers. This would be an added burden upon the beneficiaries.

#### **4.3.1.1.9 The identified main water transportation system**

All the respondents stipulated that mainly the women and children carried water from its source physically (by hand or head), as the main sources of water supply were from rivers, streams and springs. This was due to the sources being situated in valleys. However, some respondents especially from Ezitendeni who had access to the only borehole in Platt Estate, sometimes used manual carts and wheelbarrows as the distance to the borehole was great (more than a kilometer).

The sustainability score (SS) calculated for all three of the entities is Boleni (1.0), Ezitendeni (1.0) and Tapashiya (1.0), with the composite sustainability score (CSS) calculated at 1.0. Piped water is seen as a very good sustainability indicator and carrying water over great distances, indicates a sustainability of “very bad”. Strongly supporting the low rating is the fact that 66.7% (as per Table 4.16), undertake three to six trips per day to collect water, 58.4% (as per Table 4.17) take between thirty minutes to an hour per round-trip to collect water and all the respondents (as per Table 4.18) travel greater than 200 meters to collect water, which goes against the resolution by



the Department of Water Affairs and Forestry to provide piped water to within 200 meters from each household. Therefore, the carrying of water as a main transportation system is not a sustainably acceptable method if the trips undertaken, time consumed and distance travelled is unacceptable.

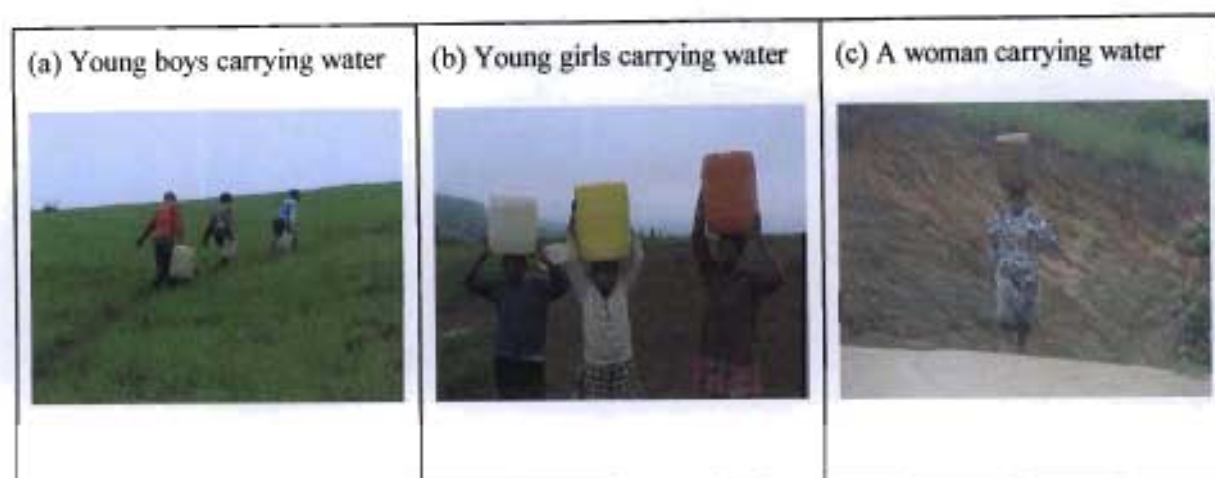


Plate 12: Women and children carrying water up steep slopes

#### 4.3.1.1.10 Trips undertaken for water collection

Table 4.16 Identified number of trips undertaken per day by the individual or a family member to collect water (expressed as a percentage)

<i>Frequency</i>	<i>PLATT ESTATE ENTITIES</i>			<i>%</i>
	<i>Bholeni (n = 4)</i>	<i>Ezitendeni (n = 4)</i>	<i>Tapashiya (n = 4)</i>	
1. One or Two	100	-	-	33.3
2. Three or four	-	25	25	16.7
3. Five or six	-	75	75	50



Plate 13: Women and children collection water from a spring runoff

Women and children are responsible for collection of water from the water sources (refer Plate 13). One third of the respondents stated that they undertook one or two trips per day whilst 16.7% of the respondents indicated that they undertook three or four trips per day to collect water. Of concern is that half of the respondents stated that they undertake five or six trips per day. The main water sources as stated in Table 4.13 are mainly situated in the valleys which makes transporting the water containers very difficult. It was, however, pleasing to note that a male respondent was concerned about the frequency of the trips especially with the issues pertaining to the safety of the women.

#### 4.3.1.1.11 Duration of round-trip to collect water

Table 4.17 Identified duration of each round-trip to collect water (expressed as a percentage)

<i>Duration</i>	<i>PLATT ESTATE ENTITIES</i>			<i>%</i>
	<i>Bholeni</i> ( <i>n = 4</i> )	<i>Ezitendeni</i> ( <i>n = 4</i> )	<i>Tapashiya</i> ( <i>n = 4</i> )	
1. Five to fifteen minutes	-	-	50	16.7
2. Fifteen to thirty minutes	-	50	25	25
3. Thirty to forty-five minutes	100	-	25	41.7
4. Forty-five minutes to an hour	-	50	-	16.7



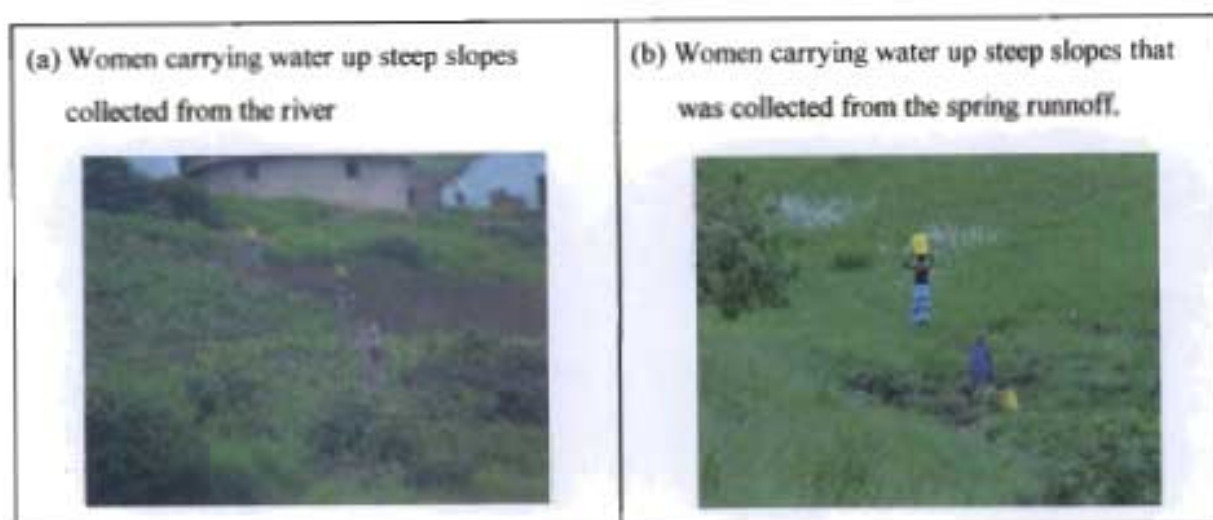


Plate 14: Women collecting and carrying water up steep slopes which impacts on productive time lost

Linked to the number of trips undertaken to collect water as listed in Table 4.16, the duration of the trips are of importance as it details, especially women's valuable time lost. According to the respondents, 16.7% indicated that it takes five to fifteen minutes, a quarter indicated that it takes fifteen to thirty minutes, 41.7% indicated that it takes thirty to forty-five minutes and 16.7% indicated that it takes forty-five minutes to an hour per trip to collect water. Working with the percentages and possibilities, two thirds undertake three to six trips per day and 58.4% take between 30 minutes to an hour (60 minutes) to collect water. This relates to approximately an hour and half (90 minutes) to six hours per day that is lost for the collection of water only. Although six hours might be the extreme, this still relates to too much productive time being lost to collect water, which could be utilised elsewhere. Some of the reasons as to why it takes so long is that they have to wait in line at the springs, boreholes as well as the steep slopes that they have to traverse to collect water (refer to Plate 14).

#### 4.3.1.1.12 Distance traveled to collect water

Table 4.18 Identified approximate distance that is traveled to collect water (expressed as a percentage)

<i>Distance Traveled</i>	<i>PLATT ESTATE ENTITIES</i>			<i>%</i>
	<i>Bholeni</i> <i>(n = 4)</i>	<i>Ezitendeni</i> <i>(n = 4)</i>	<i>Tapashiya</i> <i>(n = 4)</i>	
1. 200 meters to 500 meters	100	100	75	91.7
2. 500 meters to 1 kilometer	-	-	25	8.3

Most of the respondents (91.7%) indicated that the primary water source was between 200 to 500 meters and only 8.3% indicated that it was between 500 meters to a kilometer. However, those in Ezitendeni stated that during dry seasons they frequent the borehole which is greater than a kilometer away. One responded that it was even more than one and half kilometers away.

When one considers water collection which consolidates Table 4.16 (the trips undertaken), Table 4.17 (the duration) and Table 4.18 (the distance traveled to collect water), then one recognises that water collection is an arduous and time consuming task that is the responsibilities of women and children.

#### 4.3.1.1.13 Community Water Committee

All the respondents agree that the communities do not have water committees or even a water committee for the entire Platt Estate. There is a definite need for government to explain the need for establishing a water committee. However, with the 6 000 litres free water promised by the national government, there may not be a reason for the establishment of a committee unless water is piped to the individual homes. With 200 litres of free water being provided to each household per day, only water additional to that will need to be paid for. Thus, if households do not use more than their allotted 200 litres per day, then a water committee is not feasible as it would not be able to recover management costs unless subsidised by the government.

#### 4.3.1.1.14 Payment for Water

All the respondents indicated that they do not pay for water nor do they purchase water. No water tankers or carriers frequent the area even though the area is accessible by road. There is no need to pay for water as they utilise the spring and the stream or river. According to the National Water Act, No. 36 of 1998, if water is to be used for domestic use from the natural water bodies, then there is no need to pay for water. However, if water is to be piped and the usage is greater than 6 000 litres per month per household, then water will have to be paid for.

#### 4.3.1.1.15 Animals frequenting the source/s of drinking water

All of the respondents indicated that the animals frequent the main sources of drinking water as this is the main source of drinking water for all, community and animals. Refer to Plate 15 for evidence of animals grazing near the unprotected spring (a) and animal tracks at the pond (b). The significance is that the water sources could become contaminated due to animal defaecation on or near the water sources.

The sustainability score (SS) calculated for all three of the entities is Boleni (1.0), Ezitendeni (1.0) and Tapashiya (1.0), with the composite sustainability score (CSS) calculated at 1.0. The sustainability rating of “very bad” is indicative of the susceptibility of the water sources to contamination due to the evidence of faeces found on or near the water sources.

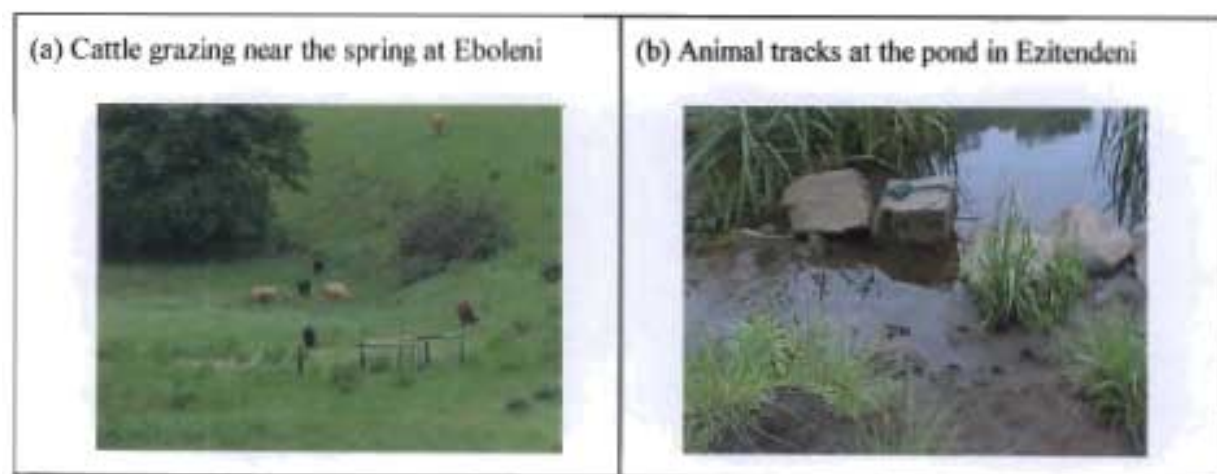


Plate 15: Cattle utilising the spring and pond for drinking water

#### 4.3.1.1.16 Illness caused by drinking contaminated water

Table 4.19 Identified outcomes of illness of individuals and family members related to drinking contaminated water (expressed as a percentage)

<i>Response</i>	<i>PLATT ESTATE ENTITIES</i>			<i>%</i>
	<i>Bholeni</i> <i>(n = 4)</i>	<i>Ezitendeni</i> <i>(n = 4)</i>	<i>Tapashiya</i> <i>(n = 4)</i>	
1. Yes, the children sometimes	-	50	50	33.3
2. No / Never	100	-	50	50
3. Unsure	-	50	-	16.7
<b>Sustainability Score (SS)</b>	5	2.8	3.8	
<b>Composite SS ( <math>\sum SS / 3</math> )</b>				3.9

One third of the respondents indicated that the children became sick due to drinking contaminated water, with half indicating that they and their children did not get sick and 16.7% were unsure. Many, especially those that were unsure, indicated that they were not certain as to what the cause of their illness was as when they went or took their children to the clinic or doctor they were not told the cause of the illness. Some respondents claimed that the children sometimes suffer from diarrhoea, but no one suffered from cholera. Some respondents indicated that the children would break out in a rash after being bathed in water from the stream or river.

The sustainability score (SS) calculated for all three of the entities is Boleni (5.0), Ezitendeni (2.8) and Tapashiya (3.8), with the composite sustainability score (CSS) calculated at 3.9. The sustainability rating of moderate to good is indicative on the premise that community members do not consider that they become sick due the water related diseases. On closer inspection it is due to the uncertainty of the cause of their illnesses.

#### 4.3.1.2. BATHING WATER

##### 4.3.1.2.1 Primary source of bathing water

Table 4.20 Identified primary/ main source of water for bathing, washing and personal hygiene (expressed as a percentage)

<i>Source</i>	<i>PLATT ESTATE ENTITIES</i>			<i>%</i>
	<i>Bholeni</i> <i>(n = 4)</i>	<i>Ezitendeni</i> <i>(n = 4)</i>	<i>Tapashiya</i> <i>(n = 4)</i>	
1. Spring or well	100	50	-	50
2. Stream or river	-	50	75	41.7
3. Rainwater	-	-	25	8.3
<b>Sustainability Score (SS)</b>	3	2.8	2.1	
<b>Composite SS ( <math>\sum SS / 3</math> )</b>				2.6

The main source of bathing or water used for bathing was from the primary sources, that is, the spring (50%) and the river or stream (41.7%). Rainwater is also used by 8.3% of the respondents. However, the respondents also stated that the alternate source for bathing in Bholeni was rainwater, Ezitendeni were borehole as well as and rainwater and Tapashiya was rainwater.

The sustainability score (SS) calculated for all three of the entities is Boleni (3.0), Ezitendeni (2.8) and Tapashiya (2.1), with the composite sustainability score (CSS) calculated at 2.6. The sustainability rating is indicative of a “bad” to moderate rating as individuals bathe at the rivers/ streams or carry water to their households to bathe. The issues of contaminating water sources and disposal of the waste water are applicable

#### 4.3.1.2.2 Reliability of the primary source

Table 4.21 Reliability throughout the year of the primary source of water identified for bathing/ washing/ personal hygiene (expressed as a percentage)

<i>Reliability of Source</i>	<i>PLATT ESTATE ENTITIES</i>			<i>%</i>
	<i>Bholeni</i> <i>(n = 4)</i>	<i>Ezitendeni</i> <i>(n = 4)</i>	<i>Tapashiya</i> <i>(n = 4)</i>	
1. Yes : It is reliable.	-	-	25	8.3
2. No : It is not reliable.	100	100	75	91.7
<b>Sustainability Score (SS)</b>	1	1	1.3	
<b>Composite SS ( <math>\sum SS / 3</math> )</b>				1.1

The respondents (91.7%) indicated that the bathing water source was not reliable, whilst 8.3% indicated that it was reliable throughout the year. The inadequacy was related to seasonal availability of water, where during the dry winter months water was scarce as the springs and stream or rivers would dry up as well as there would be little alternate rainwater source available for bathing. However, most indicated that during the summer months water was adequate.

The sustainability score (SS) calculated for all three of the entities is Boleni (1.0), Ezitendeni (1.0) and Tapashiya (1.3), with the composite sustainability score (CSS) calculated at 1.1. The reliability of the primary source indicates a sustainability rating of “very bad”, as the reliability is seasonally determined which indicates that it is not freely available throughout the year for 91.7% of the respondents.

### 4.3.1.3 WATER FOR WASHING CLOTHES

#### 4.3.1.3.1 Primary source

Table 4.22 Identified primary/ main source of water for washing clothes (expressed as a percentage)

<i>Source</i>	<i>PLATT ESTATE ENTITIES</i>			<i>%</i>
	<i>Bholeni</i> <i>(n = 4)</i>	<i>Ezitendeni</i> <i>(n = 4)</i>	<i>Tapashiya</i> <i>(n = 4)</i>	
1. Spring or well	100	50	-	50
2. Stream or river	-	50	100	50
<b>Sustainability Score (SS)</b>	3	2.8	2.5	
<b>Composite SS ( <math>\sum SS / 3</math> )</b>				2.8

The main source of water for washing clothes was identified as the spring (50%) and the stream or river (50%). Clothes were washed at home with spring water or at the stream or river. Washing at the stream or river increased the contamination loading of the water source.

The sustainability score (SS) calculated for all three of the entities is Boleni (3.0), Ezitendeni (2.8) and Tapashiya (2.5), with the composite sustainability score (CSS) calculated at 2.8. The sustainability scores indicates a rating of moderate. Water obtained from the stream/ river or the spring/ well is acceptable, provided that the washing is not done at source as this could lead to further nutrien and chemical loading to the stressed water systems. Notwithstanding this, washing clothing in flowing water is more acceptable than washing clothes in a pool of water or stagnant water. However, this does not mean that washing clothing in the river/ stream is an acceptable practice.





Plate 16: Water collected from the spring or river/ stream used for washing clothes

#### 4.3.1.3.2 Reliability of the primary source

Table 4.23 Reliability throughout the year of the main source of water identified for washing clothes (expressed as a percentage)

<i>Reliability of Source</i>	<i>PLATT ESTATE ENTITIES</i>			<i>%</i>
	<i>Bholeni (n = 4)</i>	<i>Ezitendeni (n = 4)</i>	<i>Tapashiya (n = 4)</i>	
1. Yes : It is reliable.	-	-	50	16,7
2. No : It is not reliable.	100	100	50	83,3
<b>Sustainability Score (SS)</b>	1	1	1,3	
<b>Composite SS ( <math>\sum SS / 3</math> )</b>				1,1

The respondents (83.3%) indicated that the washing clothes water source was not reliable, whilst 16.7% indicated that it was reliable throughout the year. The inadequacy was related to seasonal availability of water, where during the dry winter months water was scarce as the springs and stream or rivers would dry up as well as there would be little alternate rainwater source available for washing clothes. However, most indicated that during the summer months water was adequate.



The sustainability score (SS) calculated for all three of the entities is Boleni (1.0), Ezitendeni (1.0) and Tapashiya (1.3), with the composite sustainability score (CSS) calculated at 1.1. The reliability of the primary source indicates a sustainability rating of “very bad”, as the reliability is seasonally determined which indicates that it is not freely available throughout the year for 83.3% of the respondents.

#### 4.3.1.4 WATER FOR LIVESTOCK

##### 4.3.1.4.1 Primary source

Table 4.24 Identified primary/ main source of drinking water for livestock (expressed as a percentage)

<i>Source</i>	<i>PLATT ESTATE ENTITIES</i>			<i>%</i>
	<i>Bholeni (n = 4)</i>	<i>Ezitendeni (n = 4)</i>	<i>Tapashiya (n = 4)</i>	
1. Spring or well	100	50	-	50
2. Stream or river	-	50	100	50
<b>Sustainability Score (SS)</b>	3	2.8	2.5	
<b>Composite SS ( <math>\sum SS / 3</math> )</b>				2.8



Plate 17: Pond/ dam used as a water source for animals

The main sources of drinking water for livestock were identified as the spring (50%) and the stream or river (50%). Of concern was that the animals frequent the stream or river thereby increasing the contamination loading of the water sources as they defecate on or near the water sources. Some of the respondents from Ezitendeni, during the transect walk, indicated that there was a dam that was used for livestock as well (refer to Plate 17). However, this was not indicated as a response.

The sustainability score (SS) calculated for all three of the entities is Boleni (3.0), Ezitendeni (2.8) and Tapashiya (2.5), with the composite sustainability score (CSS) calculated at 2.8. Although the sustainability rating is considered moderate, there is concern that the sources of water available for livestock is seasonal, there is competing interest with community members and that there is the issue of animal faecal contamination of the sources. Therefore, the total sustainability index needs to be reviewed after consideration of the concerns raised above.

#### 4.3.1.4.2 Reliability of the primary source

Table 4.25 Reliability throughout the year of the primary/ main source of drinking water identified for livestock (expressed as a percentage)

<i>Reliability of Source</i>	<i>PLATT ESTATE ENTITIES</i>			<i>%</i>
	<i>Bholeni</i> <i>(n = 4)</i>	<i>Ezitendeni</i> <i>(n = 4)</i>	<i>Tapashiya</i> <i>(n = 4)</i>	
1. Yes : It is reliable	-	25	-	8.3
2. No : It is not reliable	100	75	100	91.7
<b>Sustainability Score (SS)</b>	1	1.3	1	
<b>Composite SS ( <math>\sum SS / 3</math> )</b>				1.1

Most of the respondents (91.7%) indicated that the drinking water source was not reliable, whilst 8.3% indicated that it was reliable throughout the year. The inadequacy was related to seasonal

availability of water, where during the dry winter months water was scarce as the springs and stream or rivers would dry up. Stored rainwater was inadequate to feed the livestock. However, most indicated that during the summer months water was adequate. The dam that was used by the Ezitendeni community for watering livestock was considered inadequate as some respondents stated that it was polluted.

The sustainability score (SS) calculated for all three of the entities is Boleni (1.0), Ezitendeni (1.3) and Tapashiya (1.0), with the composite sustainability score (CSS) calculated at 1.1. The reliability of the primary source indicates a sustainability rating of “very bad”, as the reliability is seasonally determined which indicates that it is not freely available throughout the year for 91.7% of the respondents as well as that there is competing use for the same water sources by the community members.

#### 4.3.1.5 WATER FOR IRRIGATION

##### 4.3.1.5.1 Primary source for irrigating vegetable gardens

Table 4.26 Identified primary/ main source of water for irrigating vegetable gardens (expressed as a percentage)

<i>Source</i>	<i>PLATT ESTATE ENTITIES</i>			<i>%</i>
	<i>Bholeni (n = 4)</i>	<i>Ezitendeni (n = 4)</i>	<i>Tapashiya (n = 4)</i>	
1. Stream or river	-	50	100	50
2. Rainwater	100	50	-	50
<b>Sustainability Score (SS)</b>	1	1.8	2.5	
<b>Composite SS ( <math>\sum SS / 3</math> )</b>				1.8

The main source of water for irrigating vegetable gardens was identified as the stream or river

(50%) and rainwater (50%). However, some respondents used their wash and bathing water for the vegetable gardens. Others indicated that they did not plant seeds that needed water, that is, constant irrigation.

The sustainability score (SS) calculated for all three of the entities is Boleni (1.0), Ezitendeni (1.8) and Tapashiya (2.5), with the composite sustainability score (CSS) calculated at 1.8. The sustainability rating indicates “bad”, as 50% of the respondents affirmed that the water is obtained from the river/ stream, which means that water needs to be transported from source to the household garden. This is therefore an arduous task, mainly carried out by women and children. Further to this, 50% responded that they rely on rainwater, that is, from collection to use or general precipitation upon the gardens, which is not sustainable as rainfall is seasonal.

**4.3.1.5.2 Reliability of the primary source for irrigating vegetable gardens**

Table 4.27 Reliability throughout the year of the primary source of water identified for irrigating vegetable gardens (expressed as a percentage)

<i>Reliability of Source</i>	<i>PLATT ESTATE ENTITIES</i>			<i>%</i>
	<i>Bholeni (n = 4)</i>	<i>Ezitendeni (n = 4)</i>	<i>Tapashiya (n = 4)</i>	
1. Yes : It is reliable	-	-	75	25
2. No : It is not reliable	100	100	25	75
<b>Sustainability Score (SS)</b>	1	1	1.8	
<b>Composite SS ( <math>\sum SS / 3</math> )</b>				1.3

Three quarter of the respondents indicated that the water sources for irrigating vegetable gardens was not reliable, whilst a quarter indicated that it was reliable throughout the year. The inadequacy was related to seasonal availability of water where during the dry winter months water was scarce as the stream or rivers would dry up.

The sustainability score (SS) calculated for all three of the entities is Boleni (1.0), Ezitendeni (1.0) and Tapashiya (1.8), with the composite sustainability score (CSS) calculated at 1.3. The reliability of the primary source indicates a sustainability rating of “very bad”, as the reliability is seasonally determined which indicates that it is not freely available throughout the year for 75.% of the respondents.

#### **4.3.1.5.3 Primary source for irrigating other fields**

All of the respondents identified rain water as the source of water supply for irrigating other fields as there was no irrigation system in place. The sustainability score (SS) calculated for all three of the entities is Boleni (1.0), Ezitendeni (1.0) and Tapashiya (1.0), with the composite sustainability score (CSS) calculated at 1.0. The sustainability rating of “very bad” indicates that the fields are not sustainably watered as there is no irrigation system in place, as well as that the community relies on rainfall which is seasonal. However, on the positive side some respondents indicated that they did not plant seeds that needed volumes of irrigated water for survival

#### **4.3.1.5.4 Reliability throughout the year of the primary source for irrigating other fields**

All the respondents indicated that rainwater, the main source of water for irrigating other fields was inadequate throughout the year. The inadequacy was related to seasonal availability of water where, during the dry winter months water was scarce and in summer months there was an abundance of rain for the other fields. There are no proper irrigation systems for irrigating other fields as there is no source of electricity as well.

The sustainability score (SS) calculated for all three of the entities is Boleni (1.0), Ezitendeni (1.0) and Tapashiya (1.0), with the composite sustainability score (CSS) calculated at 1.0. The reliability of the primary source indicates a sustainability rating of “very bad”, as the reliability is seasonally determined which indicates that it is not freely available throughout the year as indicated by all of the respondents.

#### **4.3.1.6 OBSERVATION**

##### **4.3.1.6.1. Observation of the primary drinking water source**

The springs and the streams that are frequented by the community for their drinking water needs in the three communities were visited. The following observations were noted:

- None of the springs were fenced off to prevent animals from accessing them.
- None of the springs were protected by any concrete or rock structures to prevent soil from falling into it.
- None of the springs were covered to prevent potential pollutants and evaporation.
- Animal faeces were found in and around the streams, springs the dam/ pond.
- Rags and debris were found in and around the streams and at the dam/ pond at Ezitendeni.
- Although not abundant, there were signs of algae growth especially in the dam/ pond at Ezitendeni and the stream at Tapashiya.
- There was a high rate of reed encroachment in the dam/ pond at Ezitendeni with the dam/ pond being completely enveloped by reeds.
- The water appeared clear, with no offensive smell. The water was not tasted.

Utilising the scoring system after considering the above factors, it was concluded that the impacts on the water resources sustainability was high and the sustainability scores given for all entities were conservatively estimated as being two (2.0). Thus, sustainability scores (SS) calculated for all three of the entities is Boleni (2.0), Ezitendeni (2.0) and Tapashiya (2.0), with the composite sustainability score (CSS) calculated at 2.0. The sustainability rating therefore equates to “bad”, as the protection measures of the water sources are unacceptable. There is always the probability of contamination, which could lead to water related diseases as is the case of the prevalent Cholera in Kwazulu-Natal.

#### 4.3.1.7 SANITATION AND WASTE DISPOSAL

##### 4.3.1.7.1 Types of sanitation systems

Table 4.28 Types of existing sanitation system (expressed as a percentage)

<i>Sanitation / Toilet Systems</i>	<i>PLATT ESTATE ENTITIES</i>			<i>%</i>
	<i>Bholeni</i> <i>(n = 4)</i>	<i>Ezitendeni</i> <i>(n = 4)</i>	<i>Tapashiya</i> <i>(n = 4)</i>	
1. Pit Latrine (PL)	100	100	75	91.7
2. Other (use neighbours PL)	-	-	25	8.3



Plate 18: Examples of pit latrines at Eboleni

The existing sanitation systems available to the community is the self constructed pit latrines (refer to Plate 18) which constitutes 91.7% of the communities use. Only 8.3% of the respondents indicated that they do not have a pit latrine but are in the process of building them. However, in the interim they use their neighbour's pit latrines. The suitability of pit latrines are questionable as it is plagued with problems which is listed in Table 4.29. The National Sanitation Programme in South Africa which is backed by the DWAF, has therefore encouraged that Ventilated Pit Latrines (VIPs) be used as a minimum requirement for sanitation systems.

#### 4.3.1.7.2 Distance of sanitation system from the drinking water supply.

All of the respondents indicated that their sanitation system is greater than 100 metres from the source of drinking water. This is acceptable practice as according to the Mvula Trust (1997), a sanitation system should be a minimum distance of 30 metres from any water source to prevent faecal contamination of groundwater sources. However, it must be noted that pathogenic movement has been noted by the Microbiology Department of the University of Durban-Westville (Water Research Commission, 1997b) in ground water sources. What has been observed is that the only borehole that is situated in Ezitendeni, is situated less than 30 meters from the sanitation system. This is of concern as the water could be contaminated. This, therefore, needs to be tested for faecal contamination.

#### 4.3.1.7.3 Problems experienced

Table 4.29 Problems experienced with the sanitation system (expressed as a percentage)

<i><b>Problems</b></i>	<i><b>PLATT ESTATE ENTITIES</b></i>			<i><b>%</b></i>
	<i><b>Bholeni</b></i> <i><b>(n = 4)</b></i>	<i><b>Ezitendeni</b></i> <i><b>(n = 4)</b></i>	<i><b>Tapashiya</b></i> <i><b>(n = 4)</b></i>	
1. Smell	100	100	100	100
2. Clogs up	100	50	25	58.3
3. Flies	100	100	100	100
4. Collapses	100	100	50	83.3





Plate 19: Surface water runoff penetrating pit latrine

The respondents were asked to state all the problems experienced with their sanitation system. All of the respondents believed that smell and flies were a major problem, whilst 58% believed that the pit latrine clogs up and 83% confirmed that the pit latrine collapses. One respondent who did have a pit latrine, but utilizes the neighbours expressed the same concerns raised by all the other respondents. During the transect walk, it was noticed that some systems were being penetrated by surface water flow especially during heavy rains and that some were collapsing (refer Plate 19). This could be one of the main reasons as to why the pit latrines are collapsing together with poor construction and sandy soils.

#### 4.3.1.7.4 Household waste disposal methods

Table 4.30 Main disposal method of household refuse/ rubbish/ waste (expressed as a percentage)

<i>Waste Disposal Method</i>	<i>PLATT ESTATE ENTITIES</i>			<i>%</i>
	<i>Bholeni (n = 4)</i>	<i>Ezitendeni (n = 4)</i>	<i>Tapashiya (n = 4)</i>	
1. Dig a Hole	-	100	100	66.7
2. Burn	100	-	-	33.3



Plate 20: Waste being buried as a means of waste disposal

All the respondents stated that there was no formal waste disposal system and that they were primarily responsible for their waste disposal. Two thirds of the respondents stated that they primarily dig a hole and bury their waste (refer Plate 20) whilst one third primarily burns their waste. However, all responded that they bury and or burn their household waste. One reported that the waste is stockpiled in a hole/ pit. Once it is full it is burnt. Another respondent stated that the waste is separated and the plastics, glass, paper, metals (tins/cans) are recycled and the rest is buried or burnt. It is pleasing to note that the waste is not being disposed off at the sources of drinking water as waste disposed off near or in the sources of water could lead to contamination of the water resources.

#### **4.3.1.8 EXPECTATIONS VERSUS REALISATION**

##### **4.3.1.8.1 Expectations and realisations with respect to water services**

All the respondents indicated that they expected or expect to be given clean water and a good quality sanitation system. The expectations were that by now government should have provided water and sanitation. These expectations have as yet not been realised according to all the respondents. However, according the Department of Land Affairs officials, the properties have as yet not been transferred to the beneficiaries. Once the land is transferred, the Settlement and Land Acquisition Grant (SLAG) available could be used for these services, which will then be the

responsibility of the local district council. When compared to the Quality of Life Report of 2000 as illustrated in Table 4.10, it is evident that the expectations for Kwazulu-Natal was high at 73.5% for water and 72.2% for sanitation, but only 8% and 4.9% respectively were realised. The trend shows that the actual realisations of the communities expectations are extremely low and therefore government needs to address these shortcomings urgently.

#### 4.3.1.9 PREFERRED NEEDS

##### 4.3.1.9.1 Preferred primary water supply

Table 4.31 Preferred primary/ main water supply requirement (expressed as a percentage)

<i>Water Supply System</i>	<i>PLATT ESTATE ENTITIES</i>			<i>%</i>
	<i>Bholeni (n = 4)</i>	<i>Ezitendeni (n = 4)</i>	<i>Tapashiya (n = 4)</i>	
1. Piped (tap) inside dwelling	100	75	100	91.7
2. Piped (tap) outside dwelling	-	25	-	8.3



Plate 21: Water tank that can be used for water storage

According to the respondents, 91.7% preferred to have piped water inside their houses whilst 8.3% preferred to have piped water outside their house but on their properties. This is optimistic

when one considers that the settlements are scattered, there is no electricity, the primary sources of water are situated in deep valleys, the main water sources are not reliable, the cost of supplying water is high and that there is no water committee to take up their concerns and needs. However, in Ezitendeni piped water could become a reality as there is an existing pipeline from the river to a tank that was built prior to 1994 (refer to Plate 21). This was subsequently discontinued in 1994 according to the respondents. Water to their yards or even inside their houses can become a reality as the primary underground piping installation is available, there is a pump available to pump water from the river, the settlements are clustered and are on lower ground to the tank for gravitational distribution.

#### 4.3.1.9.2 Preferred secondary water supply

Table 4.32 Preferred secondary/ alternate water supply requirement (expressed as a percentage)

<i>Water Supply System</i>	<i>PLATT ESTATE ENTITIES</i>			<i>%</i>
	<i>Bholeni (n = 4)</i>	<i>Ezitendeni (n = 4)</i>	<i>Tapashiya (n = 4)</i>	
1. Piped (tap) outside dwelling	100	75	75	83.3
2. Public tap	-	25	25	16.7

Failing to get piped water inside their houses, the respondents indicated that their alternate preferences would be piped water outside their houses but on their premises (83.3%) or a public tap (16.7%). As discussed above, piped water is problematic to achieve in the short term apart from in the case of Ezitendeni. Public taps are also difficult in the short term as it also means a piped system. Boreholes and protected springs could be feasible after further investigation of the geo-hydrology of the area is undertaken.

#### 4.3.1.9.3 Preferred primary sanitation system

Table 4.33 Preferred primary/ main sanitation/ toilet requirement (expressed as a percentage)

<i>Sanitation / Toilet System</i>	<i>PLATT ESTATE ENTITIES</i>			<i>%</i>
	<i>Bholeni (n = 4)</i>	<i>Ezitendeni (n = 4)</i>	<i>Tapashiya (n = 4)</i>	
1. Flush toilet (inside house)	100	50	75	75
2. Flush Toilet (outside house)	-	50	25	25

It was indicated by the respondents that three quarter of them were optimistic to receiving flush toilets inside the house whilst one quarter indicated the need of having flush toilets outside the house but on their properties. The VIP as required by the National Sanitation Programme as a minimum requirement was not regarded as the communities first choice. What was not indicated was whether or not this was a long or immediate term need. This request was optimistic considering that they do not have piped tap water on their properties, the cost of installing flush systems with sewer lines being expensive and that VIPs are a minimum requirement for non-densified rural areas.

#### 4.3.1.9.4 Preferred secondary sanitation system

Table 4.34 Preferred secondary/ alternate sanitation/ toilet requirement (expressed as a percentage)

<i>Sanitation / Toilet System</i>	<i>PLATT ESTATE ENTITIES</i>			<i>%</i>
	<i>Bholeni (n = 4)</i>	<i>Ezitendeni (n = 4)</i>	<i>Tapashiya (n = 4)</i>	
1. Flush Toilet (outside house)	100	50	75	75
2. Ventilated Pit latrine (VIP)	-	50	25	25

Three quarter of the respondents indicated that their alternate choice to flush toilets inside the house would be flush toilets outside the house but on their properties with a quarter of them opting for VIPs (refer to Plate 22). The VIPs are more in keeping with the rural development strategy for sanitation systems, especially in the short to medium term.



Plate 22: Example of a Ventilated Pit Latrine situated at the Agricultural offices at the Platt Estate

#### **4.3.2 SUSTAINABILITY OF WATER RESOURCES**

The sustainability of the water resources for the three entities (Boleni, Ezitendeni and Tapashiya) utilising the sustainability scores (SS) and composite sustainability scores (CSS) is evaluated in this section. The sustainability scores evaluated previously in section 4.3.1 is compositely tabulated below. The aim is to evaluate the sustainability of the individual entities as well as to determine compositely the sustainability index for the project, thereby determining the overall assessment of water sustainability.



Table 4.35 Overall assessment of water sustainability for the Platt Estate Entities

		PLATT ESTATE ENTITIES			
		Boleni	Ezitendeni	Tapashiya	
No	SOURCES	SS	SS	SS	CSS
<b>Drinking Water</b>					
1	Roofing types	2	2	1.5	1.8
2	Rainwater requirements/ needs	1.5	1.5	1.6	1.5
3	Primary sources	3	2.8	2.5	2.8
4	Secondary sources	1	1.3	1	1.1
5	Adequacy of sources	1	1	1	1
6	Frequency of adequacy/ inadequacy	1	1	1	1
7	Frequency of pollution of primary source	1	1	1	1
8	Pollution of secondary source	2	1	2.5	1.8
9	Transportation methods	1	1	1	1
10	Animals frequenting water source	1	1	1	1
11	Illness due to contaminated water	5	2.8	3.8	3.9
<b>Bathing Water</b>					
12	Primary source	3	2.8	2.1	2.6
13	Reliability	1	1	1.3	1.1
<b>Washing Clothing</b>					
14	Primary source	3	2.8	2.5	2.8
15	Reliability	1	1	1.3	1.1
<b>Livestock</b>					
16	Primary source	3	2.8	2.5	2.8
17	Reliability	1	1.3	1	1.1
<b>Irrigation</b>					
18	Source for vegetable gardens	1	1.8	2.5	1.8
19	Reliability for vegetable gardens	1	1	1.8	1.3
20	Source for other fields	1	1	1	1
21	Reliability for other fields	1	1	1	1

Observation					
22	Observation of the drinking water sources	2	2	2	2
<i>Sum of Entities (<math>\sum SS</math>)</i>		37.5	34.9	36.9	36.5
<i>Entity Assessment (<math>EA = \sum SS/22</math>)</i>		1.7	1.6	1.7	
<b>OVERALL ASSESSMENT (<math>OA = \sum CSS/22</math>)</b>					<b>1.7</b>

The overall assessment of the projects obtained using the methodology as described in chapter 3, gives a good indication of the un-sustainability of the water resources for each and all of the entities combined as the overall assessment score is calculated as being 1.7 and is regarded as being "bad", according to Watson's 1998 methodology. The assessments scores for the individual entities range between 1.6 and 1.7. An assessment of 1.6 and 1.7 falls in between the rated scores of 1 and 2, which according to Watson's (1998) rating, indicates "very bad" and "bad". This indicates that the water sources are currently unsustainable to meet present and future generations needs unless the water sources are protected and, according to Watson (1998), a reliable, adequate and clean supply of water to the beneficiary communities must be provided.

This statistical analysis must therefore be used as a baseline from which future analysis of the beneficiary communities water resources sustainability can be determined. According to Watson (1998), if the evaluation of the natural resource system is repeated annually over three to five years and a similar score or lower score is obtained, a deterioration in the transferred project's resources sustainability becomes evident, indicating detrimental environmental impacts. The ideal from here is for the assessment scores to increase over time, showing a positive impact of the land reform programme, which would indicate that the communities water resources are sustainable and that the communities needs are being addressed.

### 4.3.3 MENTAL MAP

The mental map for Tapashiya (refer Map 5) draws on the location of the settlement in comparison to the water resources, the road infrastructure and the timber plantations as well as its relation to the other entities (Boleni and Ezitendeni). It is evident that the majority of the

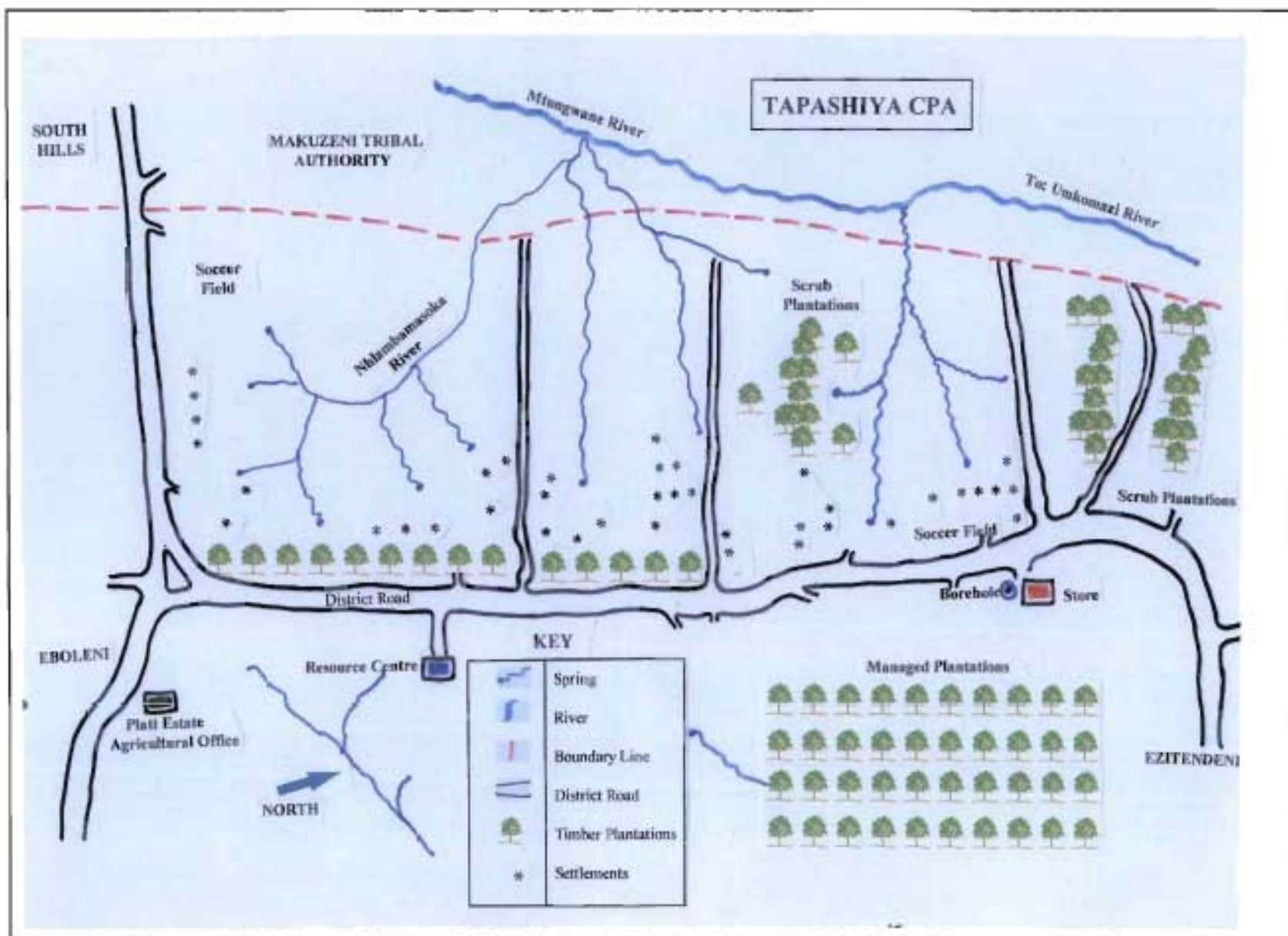


settlements are situated on the plateau overlooking the deep incised valleys. The settlements are not clustered as observed at Ezitendeni. The settlements are located in close proximity to the road infrastructure for the purpose of access. The settlements are also situated in close proximity to the water sources. It therefore shows the significance that is placed on location to primary access and water sources. There are also a number of springs in the area which converts to minor streams and feeds the tributaries to the rivers. The streams and tributaries are therefore non-perennial (does not flow throughout the year), which means that the households have to look for alternative sources of water during dry seasons. Water is collected from the valley slopes which are steep and this is tiring and time consuming. The borehole is a relative distance from most of the households and only those that are located in close proximity to it, make use of it.

However, what is not clearly illustrated on the map is the infrastructure. Therefore, notwithstanding the mental map (Map 5), a brief appraisal of the infrastructural arrangements need to be reviewed as an additional observation. The building structures are mainly huts with thatched roofing. However, on the majority of the properties are more than one or two structures with at least one structure having corrugated iron roofing, with or without makeshift guttering to collect rainwater. Some properties are fenced-off but the respondents indicated that it was to prevent others from moving onto their land.

Pumping water from the rivers may be expensive and difficult as the valleys are incised as well as there is no electricity supply in the area. The nearest electricity supply, whilst driving through the area is approximately 10 kilometres away.

Therefore, an interim measure is to protect the springs with concrete structures and fencing as well as constructing small dams. With proper formal housing structures, gutters with rain-tanks could be installed to collect rainwater for drinking purposes. The feasibility of boreholes as well as alternative technologies for water protection and supply need to be investigated. The sanitation methods need to also be investigated in an attempt to move away from pit latrines.



Map 5: Mental Map of Tapashiya

#### **4.3.4 SUMMARY OF PRIMARY DATA ANALYSIS**

The data collected from the questionnaire survey was analysed above, together with the statistical analysis of the sustainability of the water resources for the case studies. The indications from the questionnaire survey is that the beneficiary community have a serious concern regarding water and sanitation issues. This is further supported by the statistical analysis which indicates that the water resources sustainability is “bad”, according to the KC&I rating of 1.7 (indicated in Table 4.35). There is therefore an urgent need by the land reform implementation agencies to rectify the current situation. Further to this, a mental map was drawn up and reviewed which provides insight of the *status quo*, with respect to the dynamics of the settlements in relation to transport networks, water sources, settlement densities and timber plantations.

# CHAPTER FIVE

## RECOMMENDATIONS AND CONCLUSION

**Why is it that there is always enough time and resources available to do something right the second time, but never enough time and resources to do it right the first time?**

### 5.1 SUMMARY OF DATA ANALYSIS

Conyers and Hill (1994) states that planning is a process of decision making and that decisions cannot be made without minimum information. This statement sums up the need for analysing information, determining recommendations and planning appropriately and sustainably for the benefit of the beneficiaries of rural land reform. The summary reviews the water services issues in the land redistribution projects, sourced from the Department of Land Affairs Quality of Life Reports in 1998 and 2000, together with the primary sources of data analysed from the Platt Estate project entities in Kwazulu-Natal.

#### 5.1.1 Secondary Data Analysis

The secondary information presented reviews mainly the redistribution land projects at the transferred stage, that is, where approval was granted for the projects, business plans drawn up and beneficiaries occupied the land.

##### 5.1.1.1 Department of Land Affairs (1998a): Quality of Life Report

The Department of Land Affairs (1998a) report concludes, with respect to water services issues, that 40.2% of households interviewed regarded a lack of water as being a priority problem, with insufficient land second on the list at 22.8%. In Kwazulu-Natal, ten of the twelve projects reviewed (85.7%) regarded water issues as a major challenge (Department of Land Affairs, 1998a). Of concern was the high incidence (78%) of beneficiaries in Kwazulu-Natal, having no

water source or using unprotected sources (Department of Land Affairs, 1998a). This is of concern when one considers disease transmission and the high mortality rates of infants where in water deprived rural areas the loss of 370 infants per 1 000 births is not uncommon due to the unavailability of clean potable water (Department of Water Affairs and Forestry, 1997c). Coupled with the use of unprotected water sources is the great distances that mainly women and children have to travel to collect water. This is unacceptable and goes against the RDP and DWAF's promise to provide an adequate clean supply of water to within 200 meters from people's dwellings, which has been reviewed to within 500 meters. Some respondents from the 1998 survey, argued that they were better off where they were living before settling on the redistribution land (Department of Land Affairs, 1998a). Sanitation systems used in Kwazulu - Natal was pitiful as 36% used traditional pit latrines and 64% did not have any system (Department of Land Affairs, 1998a). This is alarming when one considers that waterborne diseases are transmitted through faecal contamination of the water sources by surface runoff and subsurface leaching as concluded by the University of Durban Westville's Microbiology Department (Water Research Commission, 1997b). None of the respondents in Kwazulu-Natal had VIPs which has been endorsed by the National Sanitation Programme in South Africa as being a minimum requirement (Mvula Trust, 1999a).

#### **5.1.1.2 Department of Land Affairs (2000): Annual Quality of Life of Land Reform Beneficiaries**

The Department of Land Affairs Quality of Life Report prepared in 2000 was the second report to monitor and evaluate the land reform programme. It reported that 76.6% of dwellings did not have simple guttering systems to collect rainwater which is considered clean and potable. If appropriate roofing systems were in place, at least as an interim measure, whilst the national and local governments speed up the process of services provision, beneficiaries would have had an alternate and relatively safe water collection system. However marginal the improvements from the 1998 survey in Kwazulu-Natal with respect to piped water to households (11.7%) and flush toilets (10.6%), the high incidence (83.2%) of beneficiaries using non-protected systems as a water source continued. 91.9% fetched water and 88.3% used informal sanitation systems. The concerns relate to the probability of disease transmission, loss of productive time especially for women who carry the burden and the false expectations that people had, as the realisations were

only 8% for reticulated water and 4.9% for sanitation.

What is more of concern is that the Department of Land Affairs argued that it does not have the mandate nor the resources to provide for basic infrastructure and services, beyond that of land transfers (Department of Land Affairs, 1998a). Even though this may be true, government needs to ensure sustainable development and not piecemeal development, which must be ensured through co-operative governance and integrated development processes. It is evident that beneficiaries who had settled through the land redistribution programme have done so without adequate provision of services, especially water and sanitation, which has left many beneficiaries unhappy and not better off than what they originally were.

### **5.1.2 Primary Data Analysis**

The secondary data analysis qualifies and quantifies the status of land redistribution projects after transfer. However, the case study review illustrates pre-transfer status and determines the *status quo* and the needs as well as the desirability of the beneficiaries with respect to water services issues. The need to look at pre-transfer, is to determine the *status quo*, its sustainability and to determine the needs and desirability that can be incorporated into transfer and implementation. The information can also be used as a baseline which can be reviewed on a regular basis (every 2 years), to determine progress or regression. If regression occurs then new or additional measures would need to be taken to rectify the situation if necessary, but through consultation. This determines overall sustainability of the project. However, it must be argued that this is only a review of one criteria of the land reform project which determines water sustainability. Therefore, Watson's (1998) complete methodology and checklist needs to be undertaken and evaluated to determine project sustainability. Notwithstanding this, water issues are regarded as a key criteria which has a ripple effect upon the sustainability of any project.

The primary data obtained is through the critical analysis of key issues which considered drinking water, bathing water, water for washing clothing, water for livestock and irrigation, as key criteria. An observation survey was also undertaken which further supports the beneficiaries

concerns. This questionnaire survey data and the observation data is statistically analysed, reviewed and scored to determine a sustainable score. The statistical analysis can be used as a baseline from which future analysis of the beneficiary community's water resources and services sustainability can be determined.

The mental map draws attention to the beneficiaries settlements in relation to the road infrastructure, water sources and timber plantations. The settlements show that they are dispersed along the road infrastructure, but in close proximity to the water sources and timber plantations, especially the scrub plantations which are used a source of wood for energy supply.

The drinking water status shows that the primary source of water is from springs (50%) and stream/ river (50%)(Table 4.13), which are unprotected and the secondary source is the borehole (16.7%) and rainwater (66.7%)(Table 4.14). The supply is not adequate throughout the year due to seasonal variations. Of concern is that the major systems of water sources are still unprotected, which is susceptible to contamination especially through faecal means. The respondents also argued that the primary and secondary sources of water become polluted and therefore was of concern. Their main concerns related to the contamination of the sources by animal defaecation, where all responded that animals frequent the water sources and human activities are widespread (defaecation, washing clothes and bathing in the primary sources). Others indicated that siltation due to heavy rains was another concern. However, according to Table 4.19, respondents are not certain as to the cause of illnesses as 33% argue that the children get sick due to contaminated water but 50% negate that contaminated water is the cause, with 16.7% being unsure. The use of rainwater as a critical source is dampened by the fact that 91.6% do not have appropriate roofing and guttering systems (Table 4.11) and therefore the response to use of rainwater as a small requirement or no use is relatively high at 83.3% (Table 4.12).

The productivity and pressures especially of women is of concern as they are the primary collectors of water. They generally carry water by hand or on their heads, from incised valleys, 66.7% (Table 4.16), undertake more than 3 trips per day and 58.4% (Table 4.17) take greater than 30 minutes to collect water which is located greater than 200 metres from their properties (Table 4.18). This relates to the arduous task undertaken by women which impacts on their productive

time.

The primary sources of water for bathing according to Table 4.20 and water for washing clothes (Table 4.22), is the spring and river/ stream, with 91.7% of the respondents indicating that bathing water is not reliable (Table 4.21) and 83.3% (Table 4.23) indicating that water for washing clothes is not reliable. This poor reliability is due to seasonal variations.

Water for livestock is also problematic as 91.7% (Table 4.25) indicated that the primary source (spring and river/ stream) was not reliable due to seasonal variations. However, an informal dam at Ezitendeni was used for watering animals. This information was gathered during the transect walk.

The main source of water for irrigating vegetable gardens and other fields was river/ stream and rainwater, with seasonal variations being a problematic factor for poor reliability.

The general observations around the water sources relate to the non-protection of the springs, animal defaecation near surface water sources, algae growth in dams/ ponds and reed encroachment which signifies nitrate loading. This proves that the possibility of the water being contaminated is high and this needs urgent attention.

The sanitation system that directly or indirectly impacts on the water sources are of concern. 91.7% reported having pit latrines, with 8.3% indicating using their neighbour's pit latrine (Table 4.28). What is positive to note is that the pit latrines are situated greater than 100 metres from the source of drinking water which is in keeping with the recommendations that pit latrines must be greater than 30 metres from any drinking water source (Mvula Trust, 1997). However, the general problems experienced still equate to smell, clogging up, flies and collapsing systems which was evident during the transect walk.

Waste disposal does not seem to be a problem for water sources, as waste is buried and/ or burnt (Table 4.30) and is not situated close to water sources. However, some waste material does find its way to the water sources, but mainly windblown.



The respondents indicated that they had been optimistic to receive services, especially water and sanitation by now through the programme. However, their expectations have as yet not been realised. From the government's perspective, the project has as yet not been transferred and no business plans have as yet been drawn up. Therefore, infrastructural arrangements have to be borne by the beneficiaries in the interim.

Furthermore, the community are highly optimistic when it comes to preferred needs. They prefer to have piped water to their houses (Table 4.31) as a primary need, with flush toilets as a preferred sanitation system (Table 4.33). Public taps and VIPs are alternatives that are acceptable to them. However, these needs have to be agreed upon and negotiated upfront and incorporated into the business plans if it is to bare fruition. This still remains an optimistic request that government needs to consider.

The overall sustainability score calculated is 1.7, which according to Watson's 1998 rating equates to "bad". This means that the *status quo* of the water resources are unsustainable and therefore needs to be upgraded and protected. The plans to do so need to be included in the negotiations and incorporated into the business plans for implementation.

It is evident that the project from a water sustainability perspective, is in trouble. Infrastructure is desperately needed and protection of water sources in the interim is a necessity, especially when one considers the resurgent cholera epidemic in Kwazulu-Natal that is costing millions of rand to treat. However, it must be noted that this project is still in the pre-transfer stage and the needs and desirability of the beneficiaries need to be considered through public consultation to ensure sustainability.

## **5.2 RECOMMENDATIONS**

### **5.2.1 General**

Communities need to be provided with sustainable, continuous, effective and affordable water services (Mvula Trust, 2001d). However, the affordable services need to be placed into perspective, especially in light of the implementation of the free 6 000 litres of water per household, endorsed by the national government. The recommendations outlined below gives an indication of the holistic needs that may be required to ensure sustainability of water services provision for land reform projects and rural development as a whole.

Access to finances would be a key factor in addressing land and water issues for rural communities. Ensuring access to water for redistribution beneficiary projects in rural areas will make land reform a more effective programme, enabling land reform to address the laudable intentions articulated in the White Paper on South African Land Policy (1997). Addressing the vexing problem of water access and control of households and communities in many redistribution projects in a meaningful and sustainable way is important to ensure that land reform projects do not be new dumping grounds for the rural poor. Fundamental to any rural development programme such as rural land redistribution is the provision of water. The cycle of poverty and the degeneration/ degradation of land reform projects may persist if rural people are not provided with adequate, affordable and clean water.

From an engineering and technology perspective, water can be piped to every part of the country. However, budgetary constraints and the cost benefit analysis of projects militate against this happening. Hence, the DLA and the DWAF must develop creative ways of generating finance to support water projects that provide safe drinking water, water for agricultural purposes and sanitation to land redistribution projects.

There is also the need to ensure that appropriate measures are instituted to protect water sources such as springs, boreholes and dams. Measures such as fencing, alien vegetation eradication,

spring water collection to reservoirs, proper surfacing and drainage at piped water collection points and stormwater management needs to be instituted.

Appropriate roofing systems need to be built with guttering leading to rainwater collection tanks. This must be instituted where appropriate and in consultation with beneficiaries. This system helps ensure the beneficiaries have an on site alternative means of water supply. Education of the beneficiaries in the management of these systems need to be undertaken, to ensure use and sustainability.

In the absence of a clear set of procedures to establish access to water sources that are located on privately owned land by local communities in rural areas, the government should charge levies to existing owners who insist on denying communities access to water. Furthermore, pollution laws need to be reviewed and brought in line with other countries where the vigorous monitoring of the contamination of rivers and groundwater reserves are supported by the imposition of heavy fines on offenders.

The Water Services Act (Act 108 of 1997) sets out the institutional framework for the provision of water services. The roles and responsibilities of the local authority as a water services authority is outlined, especially in terms of ensuring the effective and efficient provision of water services. However, according to Mvula Trust (2001d: 1), "South Africa is facing daunting municipal service delivery challenges." As is the case in many rural local government areas, the capacity available to provide water services is problematic and therefore such local governments need to investigate options for municipal service partnerships with service providers (Mvula Trust, 20001c). Partnerships with other public authorities (eg. another municipality or a water board), stakeholders such as NGOs, commercial farmers, industries, etc. need to also be encouraged. However, a critical concern relating to partnerships pertain to issues of power relations, participation as well as decision-making processes. Industries and the commercial agricultural sector, in particular, need to be encouraged to subsidize sanitation and water projects. They need to be encouraged to see the benefits of a healthy work-force free from cholera, diarrhoea and dysentery and not look purely at their profit margins. The Land Bank should also provide financial, low cost assistance to rural communities to address their water problems. There is also

the need to ensure that the national government monitors and evaluate these partnerships, as there is the need to use a portion of the equitable share that is given from the nationally raised revenue that is allocated to local government, for use in water services provision. The national government must therefore ensure that an appropriate amount of money is allocated to the Equitable Share and that cross-subsidisation is promoted together with a legal provision that the local government spends a certain fixed proportion on water (Mvula Trust, 2001e)

There is also the need to ensure that Integrated Development Plans (IDPs) of local authorities are drawn up as it is at the heart of sustainable service provision (Mvula Trust, 2001f). A Water Services Development Plan (WSDP) which is a component of the macro planning tool (IDP) must be drawn up to ensure that the socio-economic, technical, financial, organisational and environmental issues in terms of water services are recognised and implemented (Mvula Trust 2001f). The WSDP is therefore important, as it serves as a planning tool for municipalities to prioritise their actions around meeting urgent needs as well as develop a holistic strategy for poverty alleviation (Mvula Trust, 2001f).

Community participation is essential for the success of water projects (Manikutty, 1997). Participation by the beneficiaries is viewed as a key factor in increasing effectiveness and efficiency of rural development. An important premise to remember is that water supplies and development need to be, as the RDP advocates, equity and gender propelled. To ensure that the water needs of redistribution beneficiaries are addressed in a community empowerment framework, the DLA must include the formation of water committees to address water issues and the after-care of water projects and facilities. Spaces must be created to ensure the participation and centralization of women in these processes. Women must be actively involved in all levels of project development as according to Mvula Trust (1999d), women are the primary collectors, managers and users of water in the home and the primary providers of health care to the family. Therefore, they have the best information on availability, reliability and purity of water sources (Mvula Trust, 1999d). However, a point of warning is that community participation must not be accomplished in a way that it shifts the burden of water provision to communities who do not have adequate access to information and resources, including financial and legalistic aspects.

Where there is a change of land use or there is subdivision of agricultural land, as is the case in many land reform programmes, the projects are controlled by the Environmental Impact Assessment legislation. This means that these projects are controlled by the Environment Conservation Act, Act 73 of 1989 and the National Environmental Management Act, Act 107 of 1998. The need to ensure that these projects undergo an Environmental Impact Assessment is critical on three levels: firstly, to be legally compliant; secondly, to ensure that an external authority is responsible to dictate the direction a project takes to ensure sustainability; and thirdly, to ensure that a liability clause is attached to the applicant. Apart from the Department of Land Affairs monitoring and evaluating the land reform project, the provincial authority ensures compliance and enforcement of the Environmental Management Plans and could oversee the implementation of the business plans that generally does not get implemented.

### **5.2.2 Alternative Technologies for Rural Water Supply**

McIntosh and Marawa (1991) assert that the expense of providing reticulated water systems to dispersed rural settlements and the poverty of rural populations often places the delivery of conventional services beyond the means of rural communities. Furthermore, it has been found that many technically designed water schemes are often under-utilized or abused by local people in favour of traditional sources which are more convenient. The primary reason for this is related to the appropriateness of the technologies. In many rural areas, western technologies instead of systems appropriate to local conditions and needs are implemented. Due to highly centralized, top-down planning that generally characterize development projects in rural South Africa, planners tend to choose and decide on technologies they believe are suitable for rural communities. Some authorities embark on piped water supply projects which usually involve millions of rand without regard to affordability, how costs will be recovered and the multiple water needs of the rural populace. If piped water is the only source of water in a community that has aspirations to engage in livestock and crop production, piped water will be too costly. Only a few of the better-off households in the community will benefit from such a scheme. The following factors must be considered when looking at alternative technologies to provide and treat water:

- location of the facilities (how does it impact the workloads of primary water collectors and

users);

- appropriateness (will the priority needs of the community be met);
- affordability (can users afford the technology and the long-term costs associated with the use of the specific technology); and
- maintenance (do users have the capacity in terms of skills, finances and knowledge to maintain the technologies after the “experts” have left).

For rural areas, especially remote areas where electricity and piped water is problematic, a possible viable alternative is the use of solar powered energy. As stated above, important aspects to water supply are proximity and quality of water. Pumps are therefore necessary for both bringing water closer to the households as well as treating water. Solar power supply can therefore assist in addressing local water needs. The use of Photovoltaic Pumps (PVP) are an important option that needs to be considered (Department of Water Affairs and Forestry, 1996). According to the Department of Water Affairs and Forestry (1996), PVP is an attractive technology due to its high reliability, low recurrent costs and utilization of renewable energy. PVP's strengths include:

- **Economic viability:** it requires no fuel, is self starting, needs little maintenance and is generally reliable.
- **Social feasibility:** PVP projects allow for community involvement and education relating to planning, implementation and maintenance of installations. An additional advantage is that the installation and reliability of PVP systems means that women's workloads associated with collecting and treating water from traditional sources (springs, rivers, wells, etc.) will be greatly reduced. This time saving results in economic benefits to the whole community and ensures the protection and conservation of the natural water base.
- **Ecologically sound:** The PVP system does not need diesel/ fuel and emits no fumes. It has a less negative impact on hydrological and riparian ecosystems than large scale water projects. It does not lead to the degradation of soils or contribute to water pollution.
- PVP systems are particularly useful in pumping water from boreholes and surface water bodies. Currently, PVP is used minimally in South Africa, operating on private owned farms and game reserves. They are economically competitive and there are an estimated 8 500 unserved communities where this technology can be applied in South Africa (Department of Water Affairs and Forestry, 1996). To facilitate sustainable application of

this technology in land reform projects, it is necessary to initialize pilot programmes to establish the viability and sustainability of this option. Eskom and other stakeholders must be integrated into this venture to assist in the funding.

When implementing PVP technology as a possible option, the following concerns need to be taken into consideration and addressed ( Department of Water Affairs and Forestry, 1996) :

- high initial costs without any adequate financing arrangements is the biggest constraint;
- high risk of damage or theft;
- very few manufacturers and installers that tend to be geographically concentrated; and
- isolated communities have little access to organized infrastructure, causing logistical problems in technology applications.

Apart from pumping water from boreholes (groundwater) or from surface water supplies, water today must be pre-treated before being used for domestic purposes. This is due to the increasing pollution effects to the water bodies including groundwater. Umgeni Water together with Pollution Research Group of the Chemical Engineering Department at the University of Natal, have evaluated 10 pretreatment plants for rural areas (SA Waterbulletin, 1997a). These pre-treatment plants have a major role to play in the provision of water to remote rural areas and therefore Umgeni Water aims to provide a cost effective supply of purified water to areas where the population does not have a reliable supply. According to SA Waterbulletin, (1997a), the advantages of packaged water treatment includes :

- suitable capacity for small isolated settlements;
- operations to full capacity within days of delivery;
- easy transportation and installation within a short period of time; and
- lower capital costs and simple operation and maintenance.

However, aspects such as plant performance and uncertainties about the long term operating costs were being evaluated.

Development of a Dynamic Cross Flow Sand Filter for rural water treatment has also been developed with financial assistance from Mvula Trust and the Thukela Joint Services Board in KZN. The study has shown that the Dynamic Cross Flow Sand Filter is sufficient to enable rural



communities to construct, operate and maintain the filter to yield drinking water of acceptable quality (Water Research Commission, 1997b). Tests have shown that turbidity was reduced by 76% and faecal coliform removal efficiencies were over 70%, but disinfection was still required (Water Research Commission, 1997b).

Another disinfection water treatment system for rural water supplies is the SOLAIR. It utilises natural sunlight as an effective disinfectant to damage, inactivate and/ or kill the coliform bacteria found in contaminated water (Meyer and Reed, 2001). It is a natural process and is self managed, with no need to add any hazardous chemicals or use expensive equipment. It has been tested in informal rural areas with satisfactory results. Water was drawn from an unlined and heavily contaminated well and results showed a significant reduction (99.99%) in both the faecal and total coliform tests with no growth after 24 hours (Meyer and Reed, 2001). The disinfected water complied with all South African standards for domestic water and therefore can be used where water is obtained from rivers, streams, boreholes, wells, community taps and dams as an efficient and economically feasible method for disinfecting hand-drawn water (Meyer and Reed, 2001).

### **5.2.3 Alternate Sanitation Systems**

Sanitation affects the quality of life and the quality of the water sources. Within the constraints of limited national resources, consideration must be given to on-site sanitation, especially water borne sanitation. It has been shown that in developing countries where water borne sanitation is used, there has been substantial improvements in health and environmental quality.

The need for alternate sanitation systems stems from the followings issues:

- South Africa is chronically short of water, which makes utilisation of waterborne sanitation for rural areas an unrealistic option.
- The cost required for waterborne sanitation results in communities unaffordability in many situations.
- According to the Water Research Commission (1997b), research by the Microbiology Department of the University of Durban Westville have conclusively proven that nitrate



loaded effluent and movement of pathogens from pit latrines is responsible for contamination of valuable groundwater resources.

- The regular operating and maintenance costs for sanitation systems such as bucket, pit latrines, VIPs, septic tanks, chemical toilets, waterborne toilets (flush systems) are high and over time are uneconomical and unfeasible.

Thus, alternate requirements are needed to satisfy the following needs, according to Enviro Options (2000 : 2):

- a hygiene system approvable by communities that meets the health and communities functional requirements;
- must meet authorities requirements and standards;
- reduction or elimination of pollution to the surrounding environment including the surface and groundwater sources;
- it must satisfy the privacy and dignity requirements of the users;
- it must follow the Demand-Led Approach;
- it must be feasible and should require minimal water usage and operate efficiently; and
- it should require minimal operational and maintenance costs.

The general trend by various technology companies are moving towards utilizing bacterial and biological technology by creating Liquid and Solid Separation or Urine Diversion Methods. This is done by making the waste safe to handle and with an option of re-using the composted or dehydrated manure, including the mulch as fertilizer or for compost piles incorporating other biodegradable materials (Enviro Options, 2000). This makes good sense when one considers that human faeces is 95% water (Enviro Options, 2000). This is in keeping with waste minimisation and re-use potential strategies endorsed by the Waste Management Strategies in South Africa.

One such solution is the Enviro Loo Dry Sanitation System, which provides an adequate environment for human waste, paper and organic material to break down through natural processes into inoffensive compost-like material. According to Enviro Options (2000), the system separates liquid and solid waste using bacterial and biological activity technology with the use of plate and container systems. Internal generated heat energy evaporates the liquid to atmosphere

via the ventilation system, resulting in the solid matter drying-up. The solid waste decomposes to a compost-like material approximately 5 - 10 % of its original mass. The Enviro Loo solution therefore meets the alternative safe sanitation systems, which prides itself in (Enviro Options, 2000: 1):

- the system does not use water or chemicals (adequate for a water scarce country);
- it is a closed circuit system with evaporation of liquid under its own generated heat energy, via the ventilation system;
- it is odourless and fly resistant;
- there is no need for expensive secondary treatment plants;
- no electricity or power is needed;
- minimum monthly operating costs, with low servicing costs every 2 to 3 years and with annual removal of solids by raking through a manhole;
- indoor and outdoor installation;
- environmentally friendly, as there is no effluent seepage into the soil or groundwater reserves; and
- proven technology used in National Parks, rural schools, farms, rural clinics, areas with high water tables, etc.

This is one of many types of liquid and solid separators which is available and is an appropriate alternative that is needed for rural sanitation.

#### **5.2.4 Information Dissemination and Education Strategies**

The clarification of water rights and the dissemination of information to various stakeholders, especially the rural marginalized poor and commercial farmers, pertaining to these rights are required. Furthermore, extensive research is needed relating to the water constraints and needs of the rural populace. This should provide the framework for re-allocation, pricing and priorities associated with water programmes and activities. Additionally, a wide scale educational focus is necessary to address health issues related to water usage in the communities, human impacts of water quality, conservation options and water project management. Manikutty (1997) noted that

the education of rural people is imperative to the success of water projects, the after-care of projects, the sustainability of rivers and groundwater sources and water conservation initiatives. The Department of Water Affairs and Forestry's macro-policy does mention an educational framework. However, it is the micro-policy that needs to be modified for development to be meaningful.

The target groups that the Department of Land Affairs (DLA) and the Department of Water Affairs and Forestry (DWAF) should consider are chiefs, educators, religious leaders, women's groups and government extension officers. Local people must be trained to manage and maintain water resources and programmes. Furthermore, indigenous water practices need to be acknowledged and integrated into the water project planning and implementation stages.

The land reform programme as a whole must incorporate new approaches to water policy, planning and management principles linked to sustainability and equity principles. The traditional "supply-fix" solutions (Forster, 1994) such as building dams or boreholes need to be revisited.

The water problems discernable in poor rural communities need also to be linked to the relationship between rural and urban areas more generally. The urban bias in distribution and supply of water contributes to overuse and pollution. This leads to water shortages and the degradation of environmental resources, including land.

The strides made by the Department of Land Affairs and the Department of Water Affairs and Forestry is acknowledged. However, the need to assist local authorities with their mandate of service delivery is needed to ensure the equitable distribution of the scarce but vital resource, water, in South Africa. The fragmentation of the different line function departments results in the lack of co-ordination at the local level. The absence of mechanisms to provide support for integrated development in land redistribution projects results in the inability for people to acquire adequate services and facilities with the land.

### 5.3 CONCLUSION

The lack of access to water in land reform redistribution projects in rural South Africa has a detrimental impact on agricultural production, it fails to free women and children from the arduous and time consuming tasks of collecting and managing the use of water and it further impedes sanitation and promotes health risks. Marcus et al (1997) contends that land without access to water resources will pose many challenges to rural development. Improved water supply to land redistribution communities and the rural marginalized is one of the most important needs. This is critical for sustainable development. To summarize, when considering water provision and sanitation in rural land redistribution communities the following aspects need to be considered:

- legal aspects and security of land tenure
- community participation
- use of affordable, sustainable technology
- overall development of the community (access to education and health care facilities, for example)
- operation and maintenance
- funding
- role of NGOs and other government departments

What is clear is that there exists a gap between the well articulated and highly regarded policies of the Department of Water Affairs and Forestry and the Department of Land Affairs, and the ability to actually implement.

Furthermore, the following issues need to be integrated into community planning, implementation and management of water:

- water management and conservation
- water supply
- water treatment and disposal

The land redistribution process needs to be re-evaluated. As demonstrated in this dissertation, settling people on land without adequate water resources is setting them up for social and economic failures. "The thirst for land is a thirst for water." (Department of Land Affairs, 1997: 10). Granting rural people land rights without sufficient water resources is highly problematic.

An important concern is the sustainability of the water services infrastructure, where according to the Mvula Trust (1999e), sustainability is concerned with whether or not something continues to work over a period of time, for which it was designed or arranged for. The local government is finally responsible for the implementation of the projects and, according to the Mvula Trust (1999e), must ensure the following:

- sustainability must be the primary management objective;
- focus must be on the needs of the community;
- water service providers must provide the level of service that communities want, but also what they can afford; and
- all technical standards and guidelines must take into account both social and economic constraints

However, notwithstanding this, the local government must encourage environment, health and community awareness through educational programmes, as well ensure that support services are available.

It is obvious that in rural South Africa, water for domestic purposes and irrigation or agricultural production uses will be the main demands. This depends to a large extent on ownership of land since the access to water, especially natural water sources, is linked to land ownership. The Department of Water Affairs and Forestry is viewed as being one of the most successful government departments. The Department of Water Affairs and Forestry has asserted that the new water policy provides for poor rural inhabitants to access water. It remains to be seen whether the Department of Land Affairs and the Department of Water Affairs and Forestry will re-align their priorities and functions to ensure that through the implementing local government, redistribution projects gain access to both land and water,

Another challenge is to revisit the projects that have been surveyed in the 1998 and 2000 Quality of Life Reports, to see if the beneficiaries' concerns, have in fact been addressed. This is a challenge that is important to determine whether or not these monitoring and evaluation exercises are shelf reports or a means to ensure that the shortcomings of the land reform programme are being addressed.

In most instances, rural communities that have settled on the land under the land redistribution programme in South Africa has done so without adequate provision of services, including water (Department of Land Affairs, 1998a). Despite the relatively few years that the land redistribution processes have been in place, inadequate access to and inappropriate management of water resources has led to increased or exacerbated existing ecological, human health and workloads (especially for rural women) crises in redistribution projects. Government has to ensure services are provided for on an ongoing basis, to ensure that sustainability is achieved. After all, development does entail the improvement of the quality of all life.

## REFERENCES

- Abrams L. J. 1996. "Policy Development in the Water Sector: The South African Experience," Paper written for the Cranfield International Water Policy Conference, September 1996.
- ANC, 1994. The Reconstruction and Development Programme, Umanyano Publications, Johannesburg.
- Bob, U. 1998. Kwazulu-Natal Quality of Life Survey Report Department of Land Affairs: Monitoring and Evaluation Directorate.
- Bob, U. 1999. African Rural Women and Land Reform in South Africa: Case Studies from the Midlands Region of Kwazulu-Natal PHD submitted to West Virginia University.
- Bob, U. 1999 and Moodley, V. 1999. Compliance to Business Plans in Land Reform Projects Department of Land Affairs: Monitoring and Evaluation Directorate. University of Durban Westville: Department of Geography and Environmental Studies.
- Bob, U. and Ali, M. 1999. "Land Redistribution Without Water: A Recipe for Disaster," Paper Presented at the Third Biennial International Conference for the Society of South African Geographers Held in Namibia.
- Conyers, D and Hill P. 1994. An Introduction to Development Planning in the Third World Pitman Press Limited, Scotland.
- De Klerk, M. (ed) 1991. A Harvest of Discontent: The Land Question in South Africa Cape Town: IDASA.
- Denkelman, I. and Davidson, J. 1988. Women and Environment in the Third World: Alliance for the Future Earthscan Publications Limited, London.

Department of Environmental Affairs and Tourism, 1998. "South African Wetlands Conservation Programme," Proceedings of the Southern African Sub-regional Ramsar Meeting, held at the Farm Inn, Pretoria, 2-6 February 1998.

Department of Land Affairs, 1997. "Thirst for Land is a Thirst for Water," Land Info: 4 (2), February/ March 1997: 10 - 11.

Department of Land Affairs, 1998a. Annual Report CTP Book Printers, Cape Town.

Department of Land Affairs, 1998b. Annual Quality of Life Report Monitoring and Evaluation Directorate.

Department of Land Affairs, 1998c. A Guide to the Department of Land Affairs Land Reform Programme Pretoria.

Department of Land Affairs, 2000. Annual Quality of Life of Land Reform Beneficiaries 1998/1999 Monitoring and Evaluation Directorate.

Department of Water Affairs and Forestry, 1991. Water Quality Management Policies and Strategies in the Republic of South Africa CTP Book Printers: Capetown.

Department of Water Affairs and Forestry, 1996. "Use of Photovoltaic (PVP) Water Pumping and its Potential in Community Water Supply in SA," Water SA July 1996.

Department of Water Affairs and Forestry, 1997a. Sustainable Forestry Development for South Africa.

Department of Water Affairs and Forestry, 1997b. National Forestry Action Programme: Introduction to the National Forestry Action Programme and the Likely Issues to be Discussed.



Department of Water Affairs and Forestry, 1997c. Fundamental Principles and Objectives for a New Water Law.

Department of Water Affairs and Forestry, 1998. An Introduction to the Water Services Act (Act 108 of 1997).

Department of Water Affairs and Forestry, 1999a. The Working for Water Programme: South Africa is Under Siege.

Department of Water Affairs and Forestry, 1999b. The Working for Water Programme: Secondary Industries.

Department of Water Affairs and Forestry, 1999c. The Working for Water Programme: Social Development.

Department of Water Affairs and Forestry, 2000. "Regulating Water Use," National Water Act News March 2000.

Department of Water Affairs and Forestry, 2001. Water and Sanitation Business: The Roles and Responsibilities of Local Government and Related Institutions.

Development Facilitation Act, 1995. Pretoria.

Dixon, C. 1990. Rural Development in the Third World Routledge, London and New York.

Enviro Options. 2000. Environmentally Friendly Dry Sanitation Toilet Systems Manufactured and Supplied.

Environment Conservation Act, Act 73 of 1989. Pretoria

Erskine, M.J. 1996. "Rural Dweller Development: Rhetoric and Reality," Paper Presented at the Workshop on Rural Economic Development and Entrepreneurship, Stutterheim, 1 - 2 February 1996.

Forestry South Africa, 1999. Rural Development Forestry.

Forster S. F. 1994. Critical Water Issues Affecting Rural Development in South Africa. Johannesburg.

Genthe, B. 1998. A Field Kit for Microbial Water Quality Assessment in Small and Rural Communities.

Green, K. 1993. Land Law MacMillan Press Ltd, London.

Haffajee, F. 2001. "Exposing South Africa's Rural Underbelly," Financial Mail, 19 January 2001.

Hedman, B.; Perucci, F. and Sundstrom, P. 1996. Engendering Statistics: A Tool for Change Stockholm: Statistics Sweden

Hlatshwayo, Z. 2000a. "Mbeki's Speech offers Little to Rural Poor," Business Day 10 February 2000.

Hlatshwayo, Z. 2000b. "Land Reform Policy is in Trouble," Business Day 5 July 2000.

Hlatshwayo, Z. 2001. "Hurling Accusations at Landless People," Press Article from the National Land Committee, July 2001.

Holden, R.D. and Austin, L.W. 1999. "WEDC Introduction of the Urine Diversion in South Africa," Paper at the 25<sup>th</sup> WEDC Conference, 30 August - 3 September 1999, Addis Ababa, Ethiopia.

Integrated Rural Development White Paper for Kwazulu-Natal, 1998.

Johns Hopkins University: Centre for Communication Programs, 1998. Population Reports: Population Growth, Water Shortages Volume XXVI, Number 1 September 1998.

Johnson, R. J. et al, 1986. The Dictionary of Human Geography Second Edition: Butler and Tanner LTD, Frome and London.

Jooste, P.G. and Liebenberg, E.C. 1997. A Geographical Study of Perception of the Environment Unisa, Pretoria.

Jordan, C. F. 1995. Conservation John Wiley and Sons, Inc. Canada.

Khan, A.H. 1997. "The Sanitation Gap: Developments Deadly Disease," Water and Sanitation Commentary.

Kirsten, J. Perret, S. and van Zyl, J. 2000. "Land Reform and the New Water Management Context in South Africa: principles, Progress and Issues," Paper prepared for a seminar of the Natural Resources Management Cluster and Land Thematic Group, The World Bank Washington, DC. 27 September 2000.

Lamerink M.P., Bolt, E., de Jong, D. and Schouten, T. 2000a. "Strengthening Community Water Management," <http://www.irc.nl/products/planotes35/pnts5.htm>

Lamerink M.P., Bury, P and Bolt, E. 2000b. "An Introduction to Participatory Action Development (PAD)," <http://www.irc.nl/products/planotes35/pnts6.htm>

Lamerink M.P. 2000. "A Detailed Look at the PAD Approach," <http://www.irc.nl/products/planotes35/pnts7.htm>

Laurence P, 2001. "Brave New World of Free Water for the Poor," Financial Mail: Water Affairs 02 March 2001.

Leedy, P.D. 1993. Practical Research: Planning and Design Fifth Edition, Macmillan Publishing Company, New York.

Levin, R. 1990. "Is This the Swazi Way? State Democracy and the Land Question," Transformation: 13: 13-21.

Levin, R. 1997. "Land Restitution and Democracy," in Levin, R. and Weiner, D. (eds.) No More Tears...: Struggles for Land in Mpumalanga, South Africa, Trenton, NJ: Africa World press Inc.

Lima Rural Development Foundation, 1998. Platt Estate Stateland Project. First Draft Report: Model and Options For the Disposal of the Platt Estate Farms November 1998.

Lima Rural Development Foundation. 1999. Project Business Plan: Platt Estates: Commercial Timber Final Draft, November 1999.

Manikutty, S. 1997. "Community Participation: So What? Evidence from a Comparative Study of Two Rural Water Supply and Sanitation Projects in India," Development Policy Review 15: 115 - 140.

Mattingly, D.J. and Falconer-Al-Hindi, K. 1995. "Should Women Count? A context for Debate," The Professional Geographer 47: 427 - 435.

McIntosh, A and Marawa, G. 1991. Institutional Dimensions of Unconventional Water Supplies: Factors to Be Considered in Promoting Effective and Sustainable Utilization in Rural Areas Report for the Human Science Research Council, University of Natal.

McIntosh Xaba and Associates, 1998. An Integrated Rural Development White Paper for KwaZulu Natal Submitted and approved for public comment by the KwaZulu - Natal Provincial Cabinet in June 1998.

McLafferty, S. 1995. "Counting for Women," The Professional Geographer 47 (4): 436 - 442.

Meyer, V. and Reed, R.H. 2001. "SOLAIR Disinfection of Coliform Bacteria in Hand-Drawn Drinking Water," Water SA 27 (1): 49-52.

Mngxitama, A, 2001. South Africa: Country Report Johannesburg: Social Watch.

Mvula Trust, 1995. Rural Sanitation Review.

Mvula Trust, 1997. Sanitation: Guidelines to Community Managed Water and Sanitation Services, Module 13.

Mvula Trust, 1999a. Water and Sanitation Diary 1999: Water is a Scarce Resource  
[http://www.mvula.co.za/pubdocs/diaries/1999/d99\\_scarce.html](http://www.mvula.co.za/pubdocs/diaries/1999/d99_scarce.html)

Mvula Trust, 1999b. Water and Sanitation Diary 1999: A Way Forward for Sanitation  
[http://www.mvula.co.za/pubdocs/diaries/1999/d99\\_san.html](http://www.mvula.co.za/pubdocs/diaries/1999/d99_san.html)

Mvula Trust, 1999c. Water and Sanitation Diary 1999: The Water Services Act  
[http://www.mvula.co.za/pubdocs/diaries/1999/d99\\_wsa.html](http://www.mvula.co.za/pubdocs/diaries/1999/d99_wsa.html)

Mvula Trust, 1999d. Water and Sanitation Diary 1999: Give the Primary Water Providers a Voice  
[http://www.mvula.co.za/pubdocs/diaries/1999d\\_99gender.html](http://www.mvula.co.za/pubdocs/diaries/1999d_99gender.html)

Mvula Trust, 1999e. Water and Sanitation Diary 1999: Some Hints for Ensuring Sustainable Services  
[http://www.mvula.co.za/pubdocs/diaries/1999/d99\\_hints.html](http://www.mvula.co.za/pubdocs/diaries/1999/d99_hints.html)

Mvula Trust, 2000a. The Demand Responsive Approach to Community Water Supply and Sanitation: Assumptions Which Affect the Implementation of the DRA Mvula Documents: Strategic and Planning Committee.

<http://www.mvula.co.za/documents/strategic/strap2.2.html>

Mvula Trust, 2000b. Water and Sanitation Diary 2000: The Demand Responsive Approach – What are the Benefits [http://www.mvula.co.za/pubdocs/diaries/2000/d2000\\_chapter2.html](http://www.mvula.co.za/pubdocs/diaries/2000/d2000_chapter2.html)

Mvula Trust, 2000c. Water and Sanitation Diary 2000: The Importance of Sanitation, Health and Hygiene Promotion [http://www.mvula.co.za/pubdocs/diaries/2000/d2000\\_chapter6.html](http://www.mvula.co.za/pubdocs/diaries/2000/d2000_chapter6.html)

Mvula Trust, 2000d. Water and Sanitation Diary 2000: Sustainability of Sanitation – What is Appropriate [http://www.mvula.co.za/pubdocs/diaries/2000/d2000\\_chapter7.html](http://www.mvula.co.za/pubdocs/diaries/2000/d2000_chapter7.html)

Mvula Trust, 2000e. Water and Sanitation Diary 2000: Municipal Community Partnerships (MRPs) for Service Delivery [http://www.mvula.co.za/pubdocs/diaries/2000/d2000\\_chapter3.html](http://www.mvula.co.za/pubdocs/diaries/2000/d2000_chapter3.html)

Mvula Trust, 2001a. Water and Sanitation Diary 2001: January – The Legislative and Policy Environment [http://www.mvula.co.za/pubdocs/diaries/2001/d2001\\_chapter2.html](http://www.mvula.co.za/pubdocs/diaries/2001/d2001_chapter2.html)

Mvula Trust, 2001b. Water and Sanitation Diary 2001: February – The National Sanitation Policy Redrafted [http://www.mvula.co.za/pubdocs/diaries/2001/d2001\\_chapter3.html](http://www.mvula.co.za/pubdocs/diaries/2001/d2001_chapter3.html)

Mvula Trust, 2001c. Water and Sanitation Diary 2001: May – Choosing Appropriate Water Services Providers [http://www.mvula.co.za/pubdocs/diaries/2001/d2001\\_chapter6.html](http://www.mvula.co.za/pubdocs/diaries/2001/d2001_chapter6.html)

Mvula Trust, 2001d. Water and Sanitation Diary 2001: June – Municipal Public Partnerships for Sustainable Services [http://www.mvula.co.za/pubdocs/diaries/2001/d2001\\_chapter7.html](http://www.mvula.co.za/pubdocs/diaries/2001/d2001_chapter7.html)

Mvula Trust, 2001e. Water and Sanitation Diary 2001: September – Free Water : Ensuring this Isn't a Pipe Dream [http://www.mvula.co.za/pubdocs/diaries/2001/d2001\\_chapter10.html](http://www.mvula.co.za/pubdocs/diaries/2001/d2001_chapter10.html)

Mvula Trust, 2001f. Water and Sanitation Diary 2001: April – Prioritising Planning : The Importance of Water Services Development Plans and Integrated Development Plans  
[http://www.mvula.co.za/pubdocs/diaries/2001/d2001\\_chapter5.html](http://www.mvula.co.za/pubdocs/diaries/2001/d2001_chapter5.html)

National Water Act, Act 36 of 1998. Pretoria.

National Land Committee, 2000a. Rural Development Policy.

National Land Committee, 2000b. Land Redistribution.

National Land Committee, 2000c. Implementation of the Integrated Programme of Land Redistribution and Agricultural Development The National Land Committee's Response  
November 2000.

National Land Committee Press Statement, 2001. The Rural Development Strategy: A Civil Society Vision: What the National Land Committee Hopes to Hear from the Government Rural Development Strategy Media Briefing on Thursday 15 February 2001

Percival, V and Homer-Dixon, T. 1995. Environmental Scarcity and Violent Conflict: The Case of South Africa Occasional Paper, October 1995: Project on Environment, Population and Security, Washington D.C.

Redding S, 2001. "Reconstruction and Development Programme, 1994 - Curricular Crossings," Women's Studies and Area Studies 11 (2): 78-83.

Rivett-Carnac J. L, 2001. "Community Water Supplies in Rural South Africa: Facing the Cholera Epidemic," <http://www.wisa.co.za/Divisions/community/cwsfacingcholeraepidemic.htm>

Rodda, A. 1994. Women and the Environment Zed Books, London.

Rose, G. 1993. Feminism and Geography: The Limits of Geographical Knowledge Minneapolis: The University of Minnesota Press.

Rural Development Task Team (RDP) and Department of Land Affairs, 1997. Rural Development Framework CTP Book Printers, Capetown.

Rural Peoples Charter, 1999. (Adopted at the Rural Development Initiative Convention - Bloemfontein 25 April 1999)

SA Waterbulletin, 1997a. "Guidelines for Selection of Package Water Treatment Plants for Rural Areas," July/ August 1997: 16 - 18.

SA Waterbulletin, 1997b. "Water and Health - WRC Publishes Atlas of Water-related Diseases," September/ October 1997: 9.

SA Waterbulletin, May/ June 2000, "Government to Speed-Up Delivery of RDP Services," 26 (3): 4.

Scott Wilson, 2000. Nonoti River Mouth Land Redistribution Project: Environmental Impact Assessment Scoping Report.

Southern Illinois University (SIU) Public Policy Institute and International Water Resources Association, 1999. "The Role of Desalination in Averting a Global Water Crisis: Global Water Supply Needs - A Growing Dilemma," September 19 and 20.

The Constitution of the Republic of South Africa 1996. Pretoria.

The Rural Development Task Team (RDP) and Department of Land Affairs, 1997. Rural Development Framework CTP Book Printers, Capetown.

The Provision of Certain Land for Settlement Act, Act 126 of 1993. Pretoria.

Umgeni Water, 2000. "An Evaluation of the Feasibility of Implementing Riparian Corridor Rehabilitation: Recommendation for an Umgeni Water Strategy," August 2000.



Water, Engineering and Development Centre (WEDC), 1997. "Water and Sanitation for All: partnerships and Innovations," Proceedings of the 23<sup>rd</sup> WEDC Conference, Durban, South Africa, 1 - 5 September 1997.

Water Institute of South Africa, 2001. "In Rural Areas Free Water Will Mean No Water," Current Debates on Community Water Supply and Sanitation Issues in South Africa. <http://www.wisa.co.za/Divisions/community/FreeWaterDebate.htm>

Water Research Commission, 1997a. "Twenty Five Years. Agricultural Water Utilization," 3: 41.

Water Research Commission, 1997b. Technical Report: Developing Communities Water Supply and Sanitation 17 - 21.

Water Research Commission, Department of Water Affairs and Forestry and the Department of Health, 1999. Quality of Domestic Water Supplies: Assessment Guide.

Water Services Act, Act 108 of 1997. Pretoria.

Watson, H. K. 1998. Assessing the Environmental Impact of the Land Reform Programme Methodology developed for the Department of Land Affairs: Monitoring and Evaluation. Directorate.

Watson, H. K. 2001. "Soil Sustainability and Land Reform in South Africa," in Conacher, A. J.(ed), Land Degradation Netherlands: Kluwer Academic Publishers.

White Paper on Sanitation, 1996. Pretoria.

White Paper on South African Land Policy, September 1998. Pretoria.

White Paper on the National Water Policy, 1997. Pretoria.

World Bank, 1998. Decentralised Water Services: Irrigation and Water Supply and Sanitation  
Washington D.C.

Worldwide Financial Membership Organisation, 2001. Global Water Problem.

# **APPENDIX A**

## **QUESTIONNAIRE:**

**Water Resources and Sanitation Sustainability**

**27 November 2001**

## **QUESTIONNAIRE SURVEY**

### **MONITORING AND EVALUATION OF THE KWAZULU-NATAL LAND REFORM PROGRAMME : LAND REDISTRIBUTION IZINGUQUKO MAYELANA NOMHLABA**

#### **WATER RESOURCES AND SANITATION SUSTAINABILITY**

**MASTERS DISSERTATION : 27 November 2001**

**UNIVERSITY OF DURBAN - WESTVILLE  
ENVIRONMENT AND DEVELOPMENT PROGRAMME**

**ALL RESPONSES ARE STRICTLY CONFIDENTIAL, FOR THE BENEFIT OF THE  
COMMUNITY, THE DEPARTMENT OF LAND AFFAIRS AND THE DISSERTATION.**

#### **PROJECT DETAILS**

<b>Name of project/ Entity</b>	<b>:</b>	
<b>Number of Households</b>	<b>:</b>	
<b>Project transferred</b>	<b>:</b>	<b>Year :</b>
<b>Responsible District Council</b>	<b>:</b>	
<b>Main Activity</b>	<b>:</b>	

## SUSTAINABILITY OF WATER RESOURCES

### 1. Drinking Water :

1.1 Record the predominant type of roof on buildings for each of the **FOUR** sample households

Roof Type	Homesteads				(F)	(R)	(S)
	1	2	3	4			
1. Thatch grass roofs with no gutters						1	
2. Corrugated iron roof with no gutters						2	
3. Corrugated iron roofs with gutter draining into removable drums						4	
4. Corrugated iron roof with gutters draining into permanent specifically constructed water tanks						5	
5. Other (please specify)							
<b>Total</b>							
<b>Sustainability Index (S/4)</b>							

1.2 What proportion of your drinking water needs do you obtain from rainwater?

Proportion of needs	Homesteads				(F)	(R)	(S)
	1	2	3	4			
1. Most of needs						2	
2. Small parts of needs						1.5	
3. None						1	
<b>Total</b>							
<b>Sustainability Index (S / 4)</b>							

1.3 Identify your primary/ main source of drinking water.

Source	Homesteads				(F)	(R)	(S)
	1	2	3	4			
1. Piped (tap) water to property						5	
2. Public tap						4	
3. Spring or well						3	
4. Stream or river						2.5	
5. Dam/reservoir or vlei						2	
6. Borehole						1.5	
7. Rain water						1	
8. Other (please specify)							
Total							
Sustainability Index: (S / 4)							

1.4 Identify your secondary/ alternate/ supplementary source of water for drinking purposes

Source	Homesteads				(F)	(R)	(S)
	1	2	3	4			
1. Piped (tap) water to property						5	
2. Public tap						4	
3. Spring or well						3	
4. Stream or river						2.5	
5. Dam/reservoir or vlei						2	
6. Borehole						1.5	
7. Rain water						1	
8. Other (please specify)							
Total							
Sustainability Index: (S / 4)							

1.5 Is the source of drinking water identified in 1.3 and 1.4 above, adequate in terms of supply or volume to meet your needs throughout the year?

Response	Homesteads				(F)	(R)	(S)
	1	2	3	4			
1. Yes						2	
2. No						1	
Total							
Sustainability Index (S / 4)							

If No, why is it inadequate? Or when is it inadequate:

.....  
 .....  
 .....

1.6 How often is the primary/ main sources of drinking water identified in 1.3 inadequate?

Response	Homesteads				(F)	(R)	(S)
	1	2	3	4			
1. Seldom						2	
2. Often / Frequently						1	
Total							
Sustainability Index (S / 4)							

1.7 How often/ frequently does the primary/ main sources of water identified in 1.3 above, become polluted?

Response	Homesteads				(F)	(R)	(S)
	1	2	3	4			
1. Seldom						2	
2. Frequently						1	
Total							
Sustainability Index (S / 4)							

1.8 Does the secondary/ alternate sources of water identified in 1.4 above, become polluted?

Response	Homesteads				(F)	(R)	(S)
	1	2	3	4			
1. Yes: The water source gets polluted and cannot be used for drinking purposes						1	
2. No: The water source does not get polluted to the extent that it cannot be used for drinking.						2	
<b>Total</b>							
<b>Sustainability Index (S / 4)</b>							

If yes, how does it get polluted: .

.....

.....

.....

1.9 How is water transported from the source to where you use it?

Mode Of Transport	Homesteads				(F)	(R)	(S)
	1	2	3	4			
1. Physically / carrying/ on head						1	
2. Manual cart						2	
3. Animal drawn cart						3	
4. Furrows						3.5	
5. Plastic pipe						4	
6. Motor vehicle						4.5	
7. Pumped/piped						5	
8. Other (please specify)							
<b>Total</b>							
<b>Sustainability Index (S / 4)</b>							

Other: .

.....

.....

.....



1.10 How many trips do you or a family member undertake to collect water?

<i>Number of trips</i>	<i>Homesteads</i>			
	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>
1. One or two				
2. Three or four				
3. Five or six				
4. More than six				

1.11 How long does it take for a round-trip, to collect water?

<i>Time</i>	<i>Homesteads</i>			
	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>
1. Five to fifteen minutes				
2. Fifteen to thirty minutes				
3. Thirty to forty-five minutes				
4. Forty-five minutes to an hour				
5. Greater than an hour				

1.12 What is the approximate distance that you or a family member undertake/ travel, to collect water?

<i>Distance</i>	<i>Homesteads</i>			
	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>
1. Less than 200 meters				
2. 200 meters to 500 meters				
3. 500 meters to 1 kilometer				
4. Greater than a kilometer				

1.13 Does the community have a water committee?

<i>Response</i>	<i>Homesteads</i>			
	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>
1. Yes				
2. No				

1.14 Do you or any family member pay for water?

Response	Homesteads			
	1	2	3	4
1. Yes				
2. No				

1.15 Does the animals frequent the source/s of drinking water.

Response	Homesteads				(F)	(R)	(S)
	1	2	3	4			
1. Yes						1	
2. No						2	
Total							
Sustainability Index (S / 4)							

1.16 Have you and/or spouse and/or any of your children become sick from drinking contaminated water?

Response	Homesteads				(F)	(R)	(S)
	1	2	3	4			
1. Yes, I, my spouse and my children often						1	
2. Yes, the children often						2	
3. Yes, I, my spouse and children, sometimes						2.5	
4. Yes, the children sometimes						3	
5. Unsure						3.5	
6. No, never						5	
Total							
Sustainability Index: (S / 4)							

## 2. Bathing Water

2.1 Identify the primary/ main source of water for bathing, washing and personal hygiene.

Source	Homesteads				(F)	(R)	(S)
	1	2	3	4			
1. Piped (tap) water to property						5	
2. Public tap						4	
3. Spring or well						3	
4. Stream or river						2.5	
5. Dam/reservoir or vlei						2	
6. Borehole						1.5	
7. Rain water						1	
8. Other (please specify)							
<b>Total</b>							
<b>Sustainability Index: (S / 4)</b>							

2.2 Is the primary/ main source of water identified in Q.2.1 reliable?

Response	Homesteads				(F)	(R)	(S)
	1	2	3	4			
1. Yes						2	
2. No						1	
<b>Total</b>							
<b>Sustainability Index: (S / 4)</b>							

If No, why or when is it not reliable?:

.....

.....

.....

### 3. Water for Washing Clothes

#### 3.1 Identify the primary/ main source of water for washing clothes

Source	Homesteads				(F)	(R)	(S)
	1	2	3	4			
1. Piped (tap) water to property						5	
2. Public tap						4	
3. Spring or well						3	
4. Stream or river						2.5	
5. Dam/reservoir or vlei						2	
6. Borehole						1.5	
7. Rain water						1	
8. Other (please specify)							
Total							
Sustainability Index: (S / 4)							

#### 3.2 Is the primary/ main source of water identified in Q.3.1 reliable?

Response	Homesteads				(F)	(R)	(S)
	1	2	3	4			
1. Yes						2	
2. No						1	
Total							
Sustainability Index: (S / 4)							

If No, why or when is it not reliable?

---



---



---

**4. Water for Livestock**

4.1 Identify the primary/ main source of drinking water for livestock. ALSO RANK IN ORDER OF PRIORITY

Source	Homesteads				(F)	(R)	(S)
	1	2	3	4			
1. Piped (tap) water to property						5	
2. Public tap						4	
3. Spring or well						3	
4. Stream or river						2.5	
5. Dam/reservoir or vlei						2	
6. Borehole						1.5	
7. Rain water						1	
8. Other (please specify)							
<b>Total</b>							
<b>Sustainability Index: (S / 4)</b>							

4.2 Is the primary/ main source of water identified in Q.4.1 reliable?

Response	Homesteads				(F)	(R)	(S)
	1	2	3	4			
1. Yes						2	
2. No						1	
<b>Total</b>							
<b>Sustainability Index: (S / 4)</b>							

If No, why or when is it not reliable?

---



---



---

5. **Water for Irrigation**

5.1 Identify the primary/ main source of water for irrigating vegetable gardens.

Source	Homesteads				(F)	(R)	(S)
	1	2	3	4			
1. Piped (tap) water to property						5	
2. Public tap						4	
3. Spring or well						3	
4. Stream or river						2.5	
5. Dam/reservoir or vlei						2	
6. Borehole						1.5	
7. Rain water						1	
8. Other (please specify)							
<b>Total</b>							
<b>Sustainability Index (S / 4)</b>							

5.2 Is the primary/ main source of water identified in Q.5.1 reliable?

Response	Homesteads				(F)	(R)	(S)
	1	2	3	4			
1. Yes						2	
2. No						1	
<b>Total</b>							
<b>Sustainability Index (S / 4)</b>							

If No, why or when is it not reliable?:

.....

.....

.....

5.3 Identify the primary/ main source of water for irrigating other fields

Source	Homesteads				(F)	(R)	(S)
	1	2	3	4			
1. Piped (tap) water to property						5	
2. Public tap						4	
3. Spring or well						3	
4. Stream or river						2.5	
5. Dam/reservoir or vlei						2	
6. Borehole						1.5	
7. Rain water						1	
8. Other (please specify)							
Total							
Sustainability Index: (S / 4)							

5.4 Is the primary/ main source of water identified in Q.5.3 reliable?

Response	Homesteads				(F)	(R)	(S)
	1	2	3	4			
1. Yes						2	
2. No						1	
Total							
Sustainability Index: (S / 4)							

If No, why or when is it not reliable?

---



---



---

6. Sanitation and Waste Disposal

6.1 What type/s of sanitation/toilet system do you have?

Sanitation/Toilet Systems	Homesteads			
	1	2	3	4
1. Flush toilet				
2. Chemical toilet				
3. Ventilated Pit Latrine (VIP)				
4. Pit latrine				
5. Bucket toilet				
6. None / Bush				
7. Other (specify)				

6.2 What distance is the sanitation system (identified in Q.6.1 above) from the drinking water supply?

Distance	Homesteads			
	1	2	3	4
1. Less than 30m				
2. 30m to 100m				
3. Greater than 100 m				

6.3 What problems do you experience with the sanitation system (NB. LET RESPONDENTS STATE PROBLEMS; CROSS APPROPRIATE ANSWERS)

Sanitation issues	Homesteads			
	1	2	3	4
1. Smell				
2. Clogs up				
3. Gets flooded / overflows				
4. Flies				
5. Collapses				
6. No problems				
7. Other (please specify)				



- 6.4 How is the refuse or rubbish of this household mainly disposed off? (NB. LET RESPONDENTS STATE METHOD: CROSS APPROPRIATE ANSWERS)

<i>Waste Disposal Method</i>	<i>Homesteads</i>			
	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>
1. Removed by the local authority at least once a week				
2. Removed by the local authority less than once a week				
3. Communal Refuse Dump				
4. Own refuse dump				
5. Burn				
6. No Rubbish Disposal				
7. Dig a Hole				
8. Other (please specify)				

7. Expectations vs Realisation

- 7.1 Did you expect from government to receive water and sanitation/toilets when you were given the property / moved onto property / given property rights?

<i>Response</i>	<i>Homesteads</i>			
	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>
1. Yes				
2. No				

- 7.2 Did you receive clean water and good quality toilets when you were given the property / moved onto the property/ given the property rights?

<i>Response</i>	<i>Homesteads</i>			
	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>
1. Yes				
2. No				

8. Preferred Needs

8.1 What is your preferred primary and secondary need with respect to water supply for domestic/household use (RANK IN ORDER OF PRIORITY)

Preferred Sources	Homesteads			
	1	2	3	4
1. Piped (tap) inside dwelling				
2. Piped (tap) water on site in the yard				
3. Public tap				
4. Water carrier / tanker				
5. Rain water				
6. Spring or well				
7. Stream or river				
8. Dam/reservoir or vlei				
9. Borehole				
10. Other (please specify)				

8.2 What is your preferred primary and secondary requirement with respect to sanitation / toilet in order of priority (RANK IN ORDER OF PRIORITY)

Preferred Sanitation/Toilet Systems	Homesteads			
	1	2	3	4
1. Flush toilet (inside house)				
2. Flush toilet (outside house)				
3. Ventilated Pit Latrine (VIP)				
4. Pit latrine				
5. Bucket toilet				
6. Other (specify)				