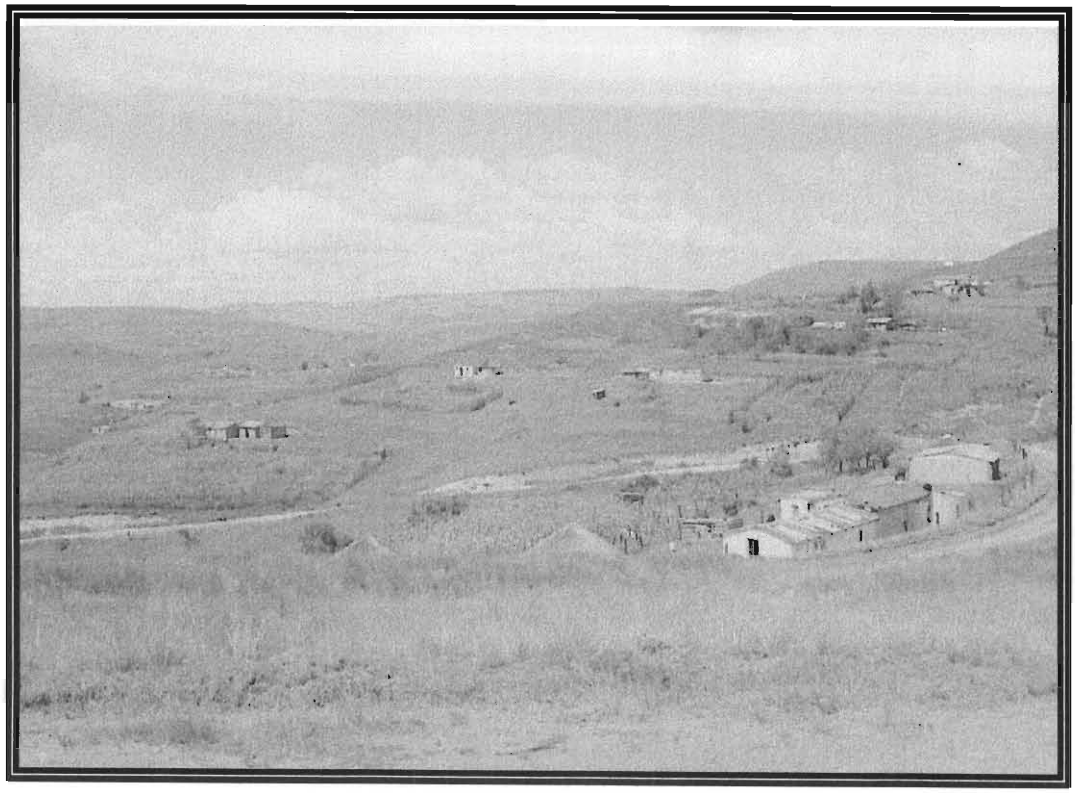
IMPACT OF THE TURN TABLE TRUST WORKING FOR WATER PROJECT ON FUELWOOD SUPPLY AND HOUSEHOLD INCOME OF THE RURAL BULWER COMMUNITY



by

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ABSTRACT

In the context of the post-apartheid era and under the new Government of National Unity, the Reconstruction and Development Programme (RDP) was initiated in 1994. To assist in the realisation of the goals of this programme the macro-economic strategy, Growth, Employment and Redistribution (GEAR), was implemented in 1996. It was within these frameworks that the Department of Water Affairs and Forestry (DWAF) launched its Working for Water (WFW) programme in October 1995. This programme was based on three pillars, namely: enhancing water supply and water security; creating jobs, building communities and improving quality of life and; conserving ecological functioning and biological diversity.

Since October 1995 the Working for Water Programme has created 42 059 jobs, 220 884 hectares have been cleared with follow-up clearing in 55 731 hectares as part of the programme strategy to enhance water supply. Investment has been made in 240 projects, with a budget of R365 147 259 as at 31 March 1998.

The impact of the Turn Table Trust WFW Project, a sub-project of the Central Umkomaas WFW Project, was examined in terms of fuelwood supply and household income of three small rural communities, namely: Xosheyakhe, Intabamakhaba and Mkhohlwa, referred to in this dissertation as the Rural Bulwer community. The research was carried out by means of questionnaire interviews and a workshop held at the Pholela Tribal court.

The results of this study indicate that the Bulwer community depend on four energy types, in order of importance; wood, paraffin, dung and electricity. Many of the households perceive that, since the Turn Table Trust WFW Project began in the area in November 1995, there is less wood available and trees which are used for fuelwood are being cleared. Certain areas have felt the impacts of the clearing programme. People who have access to electricity still rely on fuelwood as they can not afford to use electricity exclusively. Indigenous forests are important as a source

of fuelwood and for the harvesting of medicinal plants. The indigenous forests could be put under severe stress if wattle becomes unavailable for fuelwood purposes. The impact of the Turn Table Trust WFW Project on the fuelwood supply of the Bulwer community is small at present, but likely to increase.

Households that have members employed by the Project, rely on this income to cover most household expenses. These households struggle to survive if or when employment by the Turn Table Trust WFW Project is periodically terminated. The businesses in Bulwer have also come to rely on the income earned by those employed by the Project.

The Working for Water programme has far reaching implications for a local community and its surrounds and these need to be taken into account when both beginning and, importantly, ending a project in an area.

PREFACE

The work contained in this dissertation, unless indicated otherwise in the text, is entirely that of the author and has not been submitted in part or in whole to any other university or institution. The work was carried out from August 1998 to March 1999. Professor R. Fincham (Director of The School of Environment and Development, University of Natal, Pietermaritzburg) supervised the author of this dissertation.

The field research was carried out in the area to the north east of Bulwer, a small town in KwaZulu-Natal, South Africa. This area falls within the Working for Water programme`s Central Umkomaas Project. The study area included three small rural communities namely, Xosheyakhe, Intabamakhaba and Mkhohlwa (Map 1). For the purposes of this study these were grouped together and are referred to as the Bulwer community.

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LIST OF ACRONYMS

ANC - African National Congress
DWAF - Department of Water Affairs and Forestry
GEAR - Growth, Employment and Redistribution
GDP - Gross Domestic Product
GNP - Gross National Product
GNU - Government of National Unity
Ha - Hectares
Kg - Kilograms
Km - Kilometres
KZN - KwaZulu-Natal
NGO - Non-Governmental Organisations
PRA - Participatory Rural Appraisal
R - Rands
RDP - Reconstruction and Development Programme
RRA - Rapid Rural Appraisal
SADC - Southern African Developing Countries
SAPP - South African Pulp and Paper Industry
SEA - Strategic Environmental Assessment
WFW - Working for Water

σ - Population standard deviation
μ - Population mean

CHAPTER 1
INTRODUCTION

The implementation of a national programme to remove alien plants from vulnerable areas in South Africa resulted from the fact that approximately 9% (4 445 million m^3) of the mean annual water runoff is lost. This water loss occurs through the transpiration of woody invaders in catchments, wetlands and riparian zones. This programme named the Working for Water (WFW) programme will cost the country an estimated R6.97 billion. Although the main thrust of the programme is the removal of alien plants to prevent water loss, it also has many other benefits, eg. conservation (biodiversity) and agricultural (Olckers, Zimmermann and Hoffmann 1998). As the programme has been implemented in an increasing number of areas, so has an ever increasing emphasis been placed on employment creation, skills development, community development and small business opportunities.

The 1997/98 annual WFW Programme report shows that 42 059 jobs have been created since October 1995, 55% of which are have gone to women. 220 884 hectares have been cleared with follow-up clearing in 55 731 hectares. These results have been achieved with a budget as at 31 March 1998 of R365 147 259. Investment has been made in 240 projects across the country. The impact of a programme of such proportions is potentially immense.

Geraldine Fraser-Moleketi (Minister of Welfare & Population Development) expresses her support for the programme. She mentions that the Working for Water programme "*looks at the bigger picture*" in its commitment to dealing with needs of marginalised groups such as the youth, the disabled and women. Dr Nkosazana Zuma highlights the contribution the WFW programme has made to the health of the nation through job creation and health promotion (DWAF 1998).

The programme has not been without its problems as highlighted in the 1997/98 annual report. The abuse of alcohol and other drugs, 23 deaths, loan sharking,

"ghost workers", inconsistency in the allocation of Poverty Relief Funding and problems with monitoring and evaluation are all present.

Dr Guy Preston (Programme Leader) acknowledges that a coherent strategic plan and the research that accompanies such a plan are lacking. The urgency in allocating Poverty Relief Funding, among others, did not allow for the research to be undertaken. However, Dr Preston indicates that mechanisms are being put in place to address many of these issues. He states, in his report (DWAF 1998) for example, that the implications of 1 437 jobs provided in the Bulwer area or the 733 jobs in the Richmond area are not known.

It is with the above in mind that the present study was conceived. The Bulwer area is a rural area with agriculture and forestry being the major industries. The impact of a large scale programme on the rural population is bound to be significant. This study aims to examine two areas of possible impact on the Rural Bulwer community, namely: the impact of the removal of alien tree species on household fuelwood supply and secondly, the impact concerning developing a reliance on the income earned from the Working for Water programme by households. Three small communities, namely: Xosheyakhe, Intabamakhaba and Mkhohlwa, were selected as being representative of the Bulwer community.

The post-apartheid economic climate, employment trends, the Reconstruction and Development Programme (RDP) and the Growth, Employment and Redistribution (GEAR) macro-economic strategy, the Working for Water (WFW) Programme and the issue of energy, particularly fuelwood, are reviewed. A description of the methods used in gathering and analysing information is given. The results of the study are examined and described. The results are discussed to derive insight into the WFW programme`s impact on the Bulwer community in terms of the aim and objectives of the study. Finally, conclusions are drawn from the study, which it is hoped will benefit those involved in the WFW programme.

CHAPTER 2
LITERATURE REVIEW

2.1 Introduction

The intention of this chapter is to provide the context within which the current study falls. Discussion begins with the transition to democracy and the challenges facing a united nation. The South African economy is examined since it has been suggested that the achievement of many of the Government of National Unities goals will depend on the economic capacity of the country. A brief view of the employment trend in South Africa is given followed by development issues and the intentions in addressing both of these problems. Mention is made of the importance of environmental considerations in development programmes. The RDP and GEAR are defined and their roles in employment and energy are briefly examined in order to provide the context of the WFW programme. The WFW programme is discussed focussing on the possible impacts and dependencies that may develop concerning income and fuelwood. Chapter 2 ends with a consolidation of the discussion into the aim and objectives of the current study.

2.2 The New South Africa

In April 1994 South Africa held its first democratic elections. The change over to a democratic government began with the inauguration of President Mandela and the opening of South Africa`s first non-racial parliament receiving international media attention. The transition was smooth when compared with failed transitions in other parts of the world and is described as a "small miracle" (de Villiers 1995; Mtimkulu 1995).

Post-apartheid South Africa is no longer the centre of world attention. At the end of the twentieth century, South Africa faces several problems and threats to its young democracy and the efforts to rebuild a united nation. These problems could be as large if not more so than those of the past, considering the current economic climate. Many of these problems are common to the rest of Southern Africa: unrestrained

population growth, rapid urbanization, a large subsistence sector, heavy structural unemployment, a serious shortage of skilled labour, major deficiencies in primary and secondary education, a vast backlog in respect of low cost housing, rural poverty, a shortage of facilities and services, and the results of the HIV/AIDS epidemic. Further complicating issues are; the distribution of resources, the deliverance on promises made to a large previously disadvantaged sector of the population and South Africa`s insufficient growth rates to address the country's economic crises (Bauer 1995; Cole 1994; de Villiers 1995; Mtimkulu 1995).

2.3 South African Economy

The social and economic problems in South Africa can only be dealt with in a climate of rapid economic growth (Dollery 1994). A growing economy will create opportunities for the country's people and revenue for government's development programmes.

2.3.1 Global Context

The South African economy is small when compared with its major trade partners. According to the World Bank as quoted in Spies (1998), South Africa is an above average income developing country. This puts the country on a par with such countries as Algeria, Uruguay, Portugal and Greece. The economy of South Africa is double that of New Zealand`s, less than half that of Australia and approximately one eighth that of the United Kingdom. Although it has a relatively small economy, only 20% of the world's economies produce more goods and services than South Africa.

2.3.2 African Context

In the African context, the South African economy is a giant particularly in the Southern African region. The Nigerian economy is only 30% and the Zimbabwean only 5% that of South Africa`s. The countries surrounding South Africa excluding Namibia and Botswana are among the poorest in the world according to the World Bank (Spies 1998).

2.3.3 Regional Context

Ronald Green describes South Africa as "the only powerful regional economic system (in Africa) still functioning reasonably well", as quoted in Bauer (1995). South Africa is responsible for more than three-quarters of the region's GNP. Having a per capita GNP almost two and a half times that of the regional means, South Africa only has one third of the population of the subcontinent (Bauer 1995).

2.3.4 State of the Economy

The South African economy has been in structural decline since the 1970`s. For more than two decades the economic growth rates have been low and falling relative to growth capacity (Dollery 1994; Donaldson 1997). The long-term growth trend has been approximately 1% since the early 1980`s. Low growth rates have resulted in no creation of new job opportunities in the formal economy over this period, resulting in serious economic and socio-political implications.

Spending by central government has increased from 19.4% of GDP in 1950 to 32.8% of GDP in 1996. The most rapid increases having occurred in the last decade. The cost of servicing debt has risen to 19% of government spending. This form of spending is at the expense of either increases in socio-economic spending or decreases in the tax burden. Also of concern, is that government borrowing has been used to finance current government spending which has had to be increasingly funded by private sector savings so that these savings are no longer available for productive private sector investments. This trend leads to the inhibition of the longer term growth potential of the economy (Spies 1998; Bauer 1995; Donaldson 1997; Dollery 1994; Cole 1994; SA Government, Dept. of Finance - Budget 1998)

The economic order of a country with many processes such as social, political, institutional, technological and natural resources determine the structure within which the economy follows its cyclical pattern of revival and recession. With time this structure will become out of step with global trends and its internal functioning will become weak. Such an economy must be rejuvenated or it will be destroyed (Spies 1998).

2.4 Employment

Economic growth greater than 6% per annum is necessary to make any meaningful impact on unemployment in South Africa and to attain the goal of creating 400 000 jobs per annum by the year 2000 (African National Congress 1994). In reality the economy has grown nearly 3% per annum since mid-1993. The gross domestic product (GDP) has been declining over the long term and coupled with high population growth rates, has resulted in a notable decline in real GDP per capita, especially since 1982. Linked to this is the steady deterioration of labour absorption in the South African economy over the last three decades. A brief examination of the employment trend since the 1960`s will make clear the employment situation in South Africa.

In the 1960`s non-agricultural employment grew at an annual rate of 4.2% per annum - well in excess of population growth and reflecting the rapid real income growth of about 6% per annum in that decade. In the 1970`s average annual real GDP growth fell to 3.9% with only 2.7% per annum growth in non-agricultural employment, in spite of a few years of high GDP growth due to buoyant primary product prices (the price of gold in particular). This GDP growth was barely equal to the increase in population. In the 1980`s the situation deteriorated sharply with GDP averaging only 1.4% growth per annum and employment 1% - well below the increase in population. More recently, with negative GDP growth, the employment situation has continued to worsen, making employment a primary concern of the GNU. While accurate statistics exist for employment in the formal sectors of the economy, estimates of full or part-time employment in the semi-subsistence African rural areas and informal urban sector are subject to wide margins of error. Formal sector employment has been growing very slowly, with approximately one in ten new entrants into the labour force finding work in the formal sector (Bauer 1995; Cole 1994; Donaldson 1997; Dollery 1994; RDP 1994; Spies 1998).

The unemployment problem has been aggravated not only by low growth but also by a sharp increase in capital intensity (investment in heavy and specialised industry)

over time. A steady shift towards heavy industry is a normal accompaniment of economic development. However, this process has been accentuated and accelerated in South Africa due to strategic decisions related to sanctions. This applies in particular to industries concerned with the conversion of coal to oil, and more recently gas to oil. It can also be said that capital-intensive methods of production were looked upon favourably by the apartheid system, as they reduced the demand for unskilled black labour and therefore slowed down the rate of urbanization. Comparing South Africa with middle income countries with GDP per capita levels that are similar, such as Brazil, South Korea and Malaysia, it will be noticed that the average economy-wide capital-labour ratio in South Africa was two or three times that of these countries by the early 1980`s. With the end of sanctions and apartheid, the favouring of sectors or techniques of production that contribute to reduced demand for labour is no longer necessary (Cole 1994).

2.5 Development

Since the first democratic elections in April 1994, government's economic policies have shifted significantly towards meeting socio-economic needs. This shift is evident by the free market orientation and the fiscal and monetary policies aimed at reducing inflation while simultaneously emphasising social services and economic growth. The government is also attempting to address the inequalities caused by apartheid policies and the protection of vested interests. The restructuring will be a painful process for the latter. However, it may be essential for the emergence and sustainability of a viable and healthy economy in the long term (Spies 1998).

The inequitable income distribution and access to facilities and services in South Africa have resulted in the forcibly imposed lower standards of living for the black majority. Table1 gives a summary of some representative facts that highlight the extensive inequalities that define present day South Africa.

Table 1: Descriptive facts highlighting inequalities that exist in South Africa

Criteria	Description
Income	9.5 times more for whites than blacks
Per Capita Spending	3.7 times more for whites than blacks
Poverty	18 million people are below the poverty line, 11 million are in rural areas
Health	R550 per capita is spent annually on health care, while most of the population are still without adequate or any health services
Literacy	5.3 million people functionally illiterate
Education	1.8 million (90% black) have no education
Housing	Backlog for black population of between 1.2 and 1.3 million units
Electrification	29% of black houses in urban areas electrified; 13% of black houses in rural areas electrified; 19 000 schools (86%) and approximately 4 000 clinics have no electricity
Water	12 million people have no access to water services
Sanitation	21 million people do not have adequate sanitation
Employment	50% of the black workforce is without wage employment
Life Expectancy	Life expectancy at birth for whites is 9 years more than for blacks

(Bauer 1995; Donaldson 1997; van Horen & Eberhard 1995; Phillips, Delius & McCutcheon 1995; Shackleton 1994; UNDP 1994).

The expectations of the people are high and poverty reduction must be a central aim of economic policy. To achieve these expectations, a mobilization of investment funds is necessary to redress the damage of apartheid whilst simultaneously restoring the economy to reasonable growth (Bauer 1995). Since unemployment is one of the major causes of poverty in South Africa, as elsewhere, it is important that a strategy to promote labour absorption is an integral element in the economic policy of post-apartheid South Africa.

Turok *et al.* (1994) suggest that development requires the restructuring of society and the empowerment of the deprived majority so that new resources are provided not

as handouts but as real allocations from the new government. This means addressing the huge inequalities of income and wealth.

> "But we need to be careful that we go beyond the current rhetoric about 'new dispensations', 'post apartheid democracy' and the like. For real advances to occur in the living conditions of the black majority, new sustainable policies must be identified and a home-grown development strategy conceived that is rooted in the widest consultations. This process must be accompanied by the release of real resources that reach the people at grass roots and which are not frittered away by middle layers of bureaucrats" (Turok *et al.* 1994, pg 3).

It is important that the powers that make policy take note of two lessons learnt in other developing countries:

- people are the countries main assets. Development must be planned and implemented with them and not for them by others.
- development policies and strategies in South Africa must be human centred and give due emphasis to the rural and agricultural sector.

2.6 Environment

Eighty percent of African people depend for survival on the surrounding environmental resources. They do not have access to technology to lessen this close relationship with the environment. This explains why the cumulative degradation of basic resources (land, biomass and water) has contributed to the poverty in the continent and why environmental and political issues are inseparable in Africa. Democracy and sound politics improve the quality of life and green the land. Suppression harms both the people and their environment (Turok *et al.* 1994).

To attempt to tackle the problems of development outside the realm of the environment will not ease the problems of South Africa. Preventing further land degradation and loss of biomass and water as the first and basic condition for sustainable development strategies in South Africa is thus important.

Turok *et al.* (1994, pg 184) suggest further that:

- To achieve this goal allowing the people greater access to a larger resource share is imperative as an indispensable condition for people; centred development, for genuine democratic transformation and for irreversible control of economic and political power by the people. The more control their people exercise over their natural resources, the more empowered they are.
- The second element in the framework is the need for people's participation at all levels of social and environmental transformation.
- A third dimension is the supremacy, in the African situation, of biological diversity over monoculture, the chemicalisation of agriculture, mining operations and their impact on life and landscape.

2.7 The Reconstruction and Development Programme

In an effort to begin addressing the problems resulting from the apartheid legacy and many of the consequences of the present economic situation of the country, the Government of National Unity (GNU) has embarked upon a "Reconstruction and Development Programme" (RDP) (de Villiers 1995). The RDP was drafted by the majority party within Government, the ANC, but now enjoys a consensus of support among all major participants in the GNU. This policy was implemented in 1994 shortly after the GNU was elected.

The RDP contains five key programmes (African National Congress 1994) which aim to improve the standard of living and quality of life for all South Africans:

1. Meeting basic needs,
2. Developing human resources,
3. Democratizing the state and society,
4. Building the economy and
5. Implementing/Financing the RDP itself.

Of relevance to the current study is the RDP`s call for the creation of two-and-a-half million jobs through a public works programme. In addition, the electrification of an

additional 2.5 million households by the year 2000 is also envisaged. The RDP intends to build a people-centred approach to development that emphasises popular participation in decision making and the implementation of development activities. Implementation of the RDP will thus involve not only central Government Ministries, but the Provincial and Local authorities, parastatals and organizations within civil society (eg. Trade Unions, civics, the private sector, NGO`s, women`s organisations, etc.). The RDP seeks to promote sustainable human development (African National Congress 1994; UNDP 1994).

An RDP Fund of an initial 2.5 billion Rand was established to help leverage other funds within government departments, to begin allocating resources to new priorities and to "kick-start" specific development projects (UNDP 1994), such as the Working for Water programme.

The programme is not intended to be an "add-on" to other government strategies, but to provide the overarching development programme within which all other government and civil development initiatives should fit. Funding for the RDP (both the Fund and other government programmes) is intended to come from the manner in which the new Government reorganizes expenditures and consolidates the duplicative structures of the old apartheid system of government. Current and future foreign development assistance can play an important role in helping the South African government to realize the objectives of the RDP (African National Congress 1994; UNDP 1994).

2.8 Growth, Employment and Redistribution

In mid-1996, the South African Government adopted a macro-economic strategy in keeping with the RDP, entitled "Growth, Employment and Redistribution" (GEAR). The strategy highlights the link between improved economic growth and the sustainability of the governments social, development and economic goals (Donaldson 1997).

The core elements of the strategy as layed out in GEAR applicable to the current study are:

- a faster fiscal deficit reduction programme to contain debt service obligations, counter inflation and free resources for investment;
- a consistent monetary policy to prevent a resurgence of inflation;
- tax incentives to stimulate new investment in competitive and labour absorbing projects;
- a speeding up of the restructuring of state assets to optimise investment resources;
- an expansionary infrastructure programme to address service deficiencies and backlogs;
- a strengthened levy system to fund training on a scale commensurate with needs, and
- an expansion of trade and investment flows in Southern Africa.

It is an optimistic economic strategy which has received some criticism. The most common of which has been the contradiction between government's social service and development commitments and, its deficit reduction targets and the associated reduction in government consumption expenditure as a share of the GDP. Some consider that GEAR implies a macro-economic constraint that will undermine progress towards equitable and developmental social service delivery. Dollery (1994) argues that rational maximising behaviour under simple majority rule in a social choice process which permits redistribution of property rights may lead instead to reallocation of scarce resources away from wealth creation towards wealth redistribution. Over time redistributive activity of this kind can cause economic growth to decline and even to become negative. The solution might be the fact that spending will be targeted at the poor according to the RDP policy, whereas apartheid was about public policy bias in favour of a relatively affluent minority. Restructuring, reforming and reprioritisation of aspects such as government expenditure programmes, infrastructure investment programme, governing of public corporations,

wage determinations and social agreements among others, will contribute to the success of the macro-economic strategy according to GEAR. Also several areas of expanding public investment are financed from extra-budgetary sources, for example electrification and telecommunications (Donaldson 1997).

2.8.1 Employment Addressed by GEAR

A main focus of GEAR is to increase employment opportunities. At the time GEAR was introduced, the trend in the economy lead to employment growth of 100 000 to 130 000 jobs per annum. However, unemployment was rising to 37% by the year 2000. Employment opportunity for the poor was deteriorating resulting in worsening income distribution to the poor. The GEAR macro-economic strategy hopes to increase the employment trend reaching 409 000 jobs per annum by the year 2000. This will mean the creation of 833 000 jobs over a five-year period. GEAR intends to achieve this in three ways. Firstly, economic growth will account for one third of the job creation. Secondly, government programmes will add a quarter of the new jobs through increased labour-based infrastructural development and maintenance of public works in urban and rural areas. Thirdly, 30% of increased employment and over half of new formal private sector employment opportunities will result from institutional reforms to the labour market, employment enhancing policy shifts and private wage moderation. However, pressure is on labour to be more productive and competitive due to the greater openness and competitiveness of the economic policy, which will be increasingly subject to global forces (GEAR 1996).

The labour market that will emerge because of GEAR will be more flexible. This flexibility will take various forms and levels. The nature of the South African labour market allows for considerable adaptability. Importantly, the labour market policy must deal with employment security and the kinds of employment insecurity that results in the alarmingly low number of years of employment that black work seekers can expect in their lifetimes (Donaldson 1997).

2.8.2 GEAR and Delivery

GEAR can be viewed as the overall framework created to facilitate the successful implementation of a more focussed and specific programme such as the RDP. As mentioned earlier the GNU is under pressure to deliver on its pre-election promises. 1997 was declared the "year of delivery" which according to Freidman (1997) raises some questions with regards governance and development. Freidman (1997; pg 465) asserts that the "current conceptions of delivery tend to equate with numerical targets, rather than focussing on the quality of delivery and the manner in which it occurs." He also suggests that by setting quantifiable targets to measure delivery may not provide a true reflection of the impact on the quality of life, the perceived well-being of the recipients or the sustainability of the programme.

Gear itself appears to measure its success by setting numerical targets. The assumptions are that investors are interested in defined numerical goals as evidence of progress. This could easily lead to the situation where commitment is to targets rather than steady progress which could prove counter productive. An example is the GEAR`s job creation and growth targets that depend on the ability to control the deficit which risks disappointing public expectations. The concern is that the emphasis on delivery is not necessarily developmental. Also of concern is that the need to address society's challenges and its citizen's requirements is not confused with the new government's need to show its ability to deliver numerically defined products by a promised date. This appears to be the current trend, with programmes such as the Working for Water (WFW) Programme continually emphasizing elements such as, numbers of jobs created and numbers of hectares of alien vegetation cleared (DWAF 1997). If the delivery targets have to be slowed to build the citizens' ability to enhance their own opportunities, then they should be slowed. Also, insider political interests and abstract planning exercises seldom develop effective strategies. The need for delivery is acknowledged, so long as it is concerned with meeting the needs of the people, quality of delivery and lastly quantity. A necessity of setting objectives and a means of measuring progress towards delivery, so long as these are reasonable and viable measures, is also acknowledged (Freidman 1997).

2.9 The Working for Water Programme

The National Working for Water (WFW) Programme of the Department of Water Affairs and Forestry (DWAF) is one programme that has attempted to address aspects of the RDP`s five key programmes as listed above. The WFW programme is striving towards three goals, which are clearly described in *The Green Trust Environment Award* that the WFW programme received in 1996 for *The Best Conservation Project in South Africa*.

* enhancing water supply and water security;
* creating jobs, building communities and improving quality of life and;
* conserving ecological functioning and biological diversity.

The main activity or means by which this is being achieved is through clearing invasive alien plants in many catchment systems throughout the country.

Dr Guy Preston is quoted in Yeld (1998; pg 25) "... in a sense, the environmental benefits to date have not been a surprise - the programme is merely working as it should. But the big prize is the social impact. We know that we are making a difference.". Besides the ecological achievements of the Working for Water programme, the multiplicity of social benefits has been hailed as the real success and significance of the programme. The programme is being promoted as one model to illustrate the government's macro-economic strategy for Growth, Employment and Redistribution (GEAR), and its Reconstruction and Development Programme (RDP) (Yeld 1998).

The WFW programme was launched in October 1995 and was operational within a short time. The pressure to be operational as quickly as possible resulted in no strategic environmental assessment (SEA) being undertaken (Schreiner 1998 pers. com[1].). The implications of this programme for the local communities in which

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[1]. Professor Schreiner, Department of Water Affairs and Forestry, Private Bag X313, Pretoria, South Africa

projects have commenced are therefore largely unknown. Added to this is the threat that under the current economic climate funding may not be as liberal as previous years with the possibility that some projects may have to be scaled down or abolished altogether. The implications for the local communities of such an eventuality have not yet been gauged.

How well has the WFW Programme, as an RDP programme addressed the aspects of the five key programmes within the RDP?

2.9.1 Community Reliance on WFW Programme

In the 1996/97 WFW Programme Annual Report (DWAF 1997), Gelderblom and Litha reported the following with regards the social aspects of the programme: More than 8 300 jobs had been created, 53% held by women and 24 jobs by disabled people. Four projects had progressed from daily wages, piece work to contract work suggesting that the WFW Programme was going beyond creating jobs to empowering people with the skills needed for them to become independent contractors. Training has taken many forms including occupational skills, environmental awareness, reduction of drug and alcohol dependence and life skills. Community involvement is as representation on the various steering committees by community leaders. Community projects have also resulted from the project such as creches, subsidised food for children, training centres and sporting facilities. Spin offs have been sporting and cultural activities associated with various projects. The creation of small secondary, for example, production of charcoal, building materials and nurseries for vegetation rehabilitation industries, has been slow to take off.

It appears that the social report was at a national level for the WFW programme, relying on information supplied by project managers and was thus very superficial. No example of case studies of selected projects was evident in the report. A comprehensive social report was planned, but again would possibly be on a national level with minimal time devoted to specific areas. The issue of the implications for a community should a project be terminated was not dealt within the social report.

The WFW programme has grown rapidly since the 1996/97 annual report was produced. It is the single biggest conservation programme in the world in terms of labour and impact, with approximately 26 000 people employed around the country. New projects are being added continuously, for example, the Driftsands WFW project in Port Elizabeth was launched in February 1998, employing 2 050 people (Rogers 1998). On a local scale the KwaZulu-Natal (KZN) Close Down Report as at 31 March 1998 shows that a total of 7 905 people were employed in KwaZulu-Natal alone. This was largely due to the allocation of poverty relief funds that resulted in 5 253 new jobs being created.

It is important to note that 60% of the KZN WFW expenditure; i.e. R20.87 million of the R34.81 million spent during the past year, was on salaries and wages. Fifteen percent of the budget (R5.07 million) was spent on transport and 90% of this money was paid to community members who contracted to the programme to transport workers to and from work. R1.19 million was spent on community creches.

It is possible that dependance may develop on the WFW money moving into the areas where the WFW projects are operational. The implications to the stability of the community should this source of an income cease overnight are not known. This has already occurred to some extent with the 5 253 people employed due to the poverty relief money in 1997 being retrenched on the 31 March 1998. It is important to note that the RDP requires that all short-term job creation programmes should ensure adequate incomes and labour standards, link into local, regional or national development programmes and promote education, training and community capacity and importantly empowerment. It also emphasises the importance of ensuring adequate funding of integrated programmes and that resources reach the targeted communities (African National Congress 1994).

2.9.2 Energy

The fact that most of the rural people in South Africa rely on sources other than electricity for their daily fuel requirements is widely known. Fuelwood provides 80%

of the total domestic energy to the rural poor (Gandar 1994). Fuelwood is an important and, most often, the only source of fuel. The RDP requires that policies to meet energy needs must include, among others, improved management of natural woodlands, social forestry programmes, commercial woodlots and support for the transport of wood from areas of surplus to areas of need. Also, energy efficiency and conservation must be the cornerstones of energy policies (African National Congress 1994).

Energy is required for subsistence needs and for economic development. Energy for subsistence needs is largely met from fuelwood, particularly in rural areas: Energy for economic development is associated with commercial fuels, namely electricity, liquid fuels, natural gas, coal and coal derivatives. Although the situation in South Africa and in the Southern African Developing Countries (SADC) member countries varies enormously, fuelwood is a cause for concern throughout the region. In SADC 75% of the energy supply is biomass, but this resource is under increasing pressure due to the expansion of agriculture. It is a difficult problem to solve because it requires local management of resources in an integrated land-use programme. SADC`s energy sector, however, has taken an international lead with its work on fuelwood provision (Cole 1994).

Energy cannot be discussed without mentioning the environment. The environment of SADC member countries and South Africa is undergoing substantial change. As economic development occurs, people are moving in the people-environment relationship that parallels industrialization and urbanization. Such change has given rise to political concern at international, regional, national and local levels, although, as yet, there is little political resolution of environmental problems.

At a household level, in South Africa, a lack of access to usable and affordable energy is an important aspect of urban and rural poverty. Lack of access to electricity, which is arguably the most convenient source of energy for household consumption, is perhaps the clearest indication of the link between energy and

poverty in South Africa. Whilst there is currently a substantial surplus generating capacity on the national grid, and South Africa produces more than 50% of the electricity generated in the entire African continent, electricity is only provided to the homes of about one third of the population. The majority of the population who lives in unelectrified rural and urban areas are dependant on more expensive and less convenient energy sources such as wood, paraffin, gas and coal.

Fuelwood contributes about 6% of primary national energy consumption and is used by over half of South Africa`s population for heating and cooking. It is clear from a number of studies that fuelwood is becoming an increasingly scarce resource in many rural areas. This has significant impact on the natural environment in terms of deforestation, soil erosion and the loss of habitats. Van Horen and Eberhard (1995) argue that it is not primarily fuelwood collection that is leading to deforestation and land degradation, although it does contribute. They suggest that the situation is far more complex and that the generally excepted reasons of deforestation and land degradation were largely due to the "gap theory". In reality it seems it is more a combination of factors such as wood use for medicinal, building material, crafts amongst other purposes, but the main contribution has been the clearing of land for agriculture.

In South Africa the use of wood for fuel is likely to be a more important factor contributing to deforestation and land degradation. The reliance on wood as a source of fuel resulted from the homeland policy, where large numbers of people were concentrated in areas with no services and employment. It is also unrealistic to expect people to invest resources in growing trees for wood when there is no return in terms of payment. The effect on rural people themselves is also severe: in many areas the distances that must be covered, mostly by women, to collect fuelwood have increased, and some households have been forced to purchase other fuels that they can ill afford.

In many areas, however, the density in wood cover has increased owing to shrub encroachment onto grazing land and the rapid colonization of watercourses by alien tree species such as wattle (van Horen & Eberhard 1995; DWAF 1997) and the current clearing programme of DWAF may be equated to the effects of clearing trees for agriculture in terms of the impact on wood supply. In unelectrified urban areas, households make use of gas, paraffin (especially in coastal areas where it is cheaper) and coal (particularly near the Transvaal and Natal coalfields). Expenditure on energy accounts for a significant (between 7 & 22%) proportion of total household expenditure in informal areas and townships (Cole 1994; van Horen & Eberhard 1995).

Estimates (from 1979 to 1993) of fuelwood consumption in South Africa reveal a per capita consumption of 237 kg in Boputhatswana (Bodibe) to 740 kg in KwaZulu-Natal (Mahlabatini-2) with a household consumption of 1 387 kg to 5 624 kg (Gandar 1994).

Within the homelands, the main sources of fuelwood for distribution and sale are the natural woodlands, woodlots and plantations. Sources in the commercial farming and forestry areas are plantation wastes and residues, wood from thinning and clearing of bushveld and from the *control or removal of invasive species* (possibly a more important source since Gandar`s study due to the inception of the Working for Water programme in October 1995). Possibly 50% of fuelwood in KwaZulu-Natal (approximately 560 000 tons) comes from commercial agriculture and forestry. In KwaZulu-Natal and the old Transvaal it is estimated that self-seeded exotics such as wattle (*Acacia mearnsii* and *Acacia dealbata*) are the source of fuel for 33% of farm workers with a sustainable yield of 40 tons per annum per farm. This would imply a national yield of about 2.5 million tons from self seeded exotics on commercial farms. There are also reports of large quantities of fuelwood from invasive wattles being transported to the former homeland areas from the commercial farmlands (Gandar 1994).

Transport is often hired for the collection of fuelwood. In KwaZulu-Natal fuelwood is transported up to 100 km by truck. This implies that the fuelwood has a monetary value. It also implies that if a free source of wood is removed from a community the implications are that individual households will have an added expense in terms of buying or transporting fuelwood to fulfill their needs.

It is important to take note of traditional management and control of resources. There are number of practices which have an effect on the regulation of the utilisation of indigenous common resources. Deliberate regulation is or was affected by a spiritual or hereditary leader imposing tenurial regulations and/or usufructory rights controlling access to resources. Inadvertent controls include taboos, seasonal and social restrictions and technical inadequacies. According to Gandar (1994) tenure issues relating to trees have not been well researched in South Africa. Trees in communal areas traditionally belong to the chief or tribal authority. Harvesting could only take place with permission often accompanied by a small fee. In much of KwaZulu-Natal these controls have fallen away and people are only vaguely aware that these controls still exist in theory.

A primary activity of the WFW programme is the removal of alien plants, wattle trees (*Acacia mearnsii* and *Acacia dealbata*) being possibly the most common. In Transkei and Ciskei almost all households used fuelwood and paraffin. If the supply of these fuels was to decrease, it would have an immediate impact on the lives of the people (van Horen & Eberhard 1995). A similar reliance on fuelwood by the rural community in the Bulwer area may occur. It is thus important that this aspect be examined since the removal of this source of fuel may force the community to look to other sources for their fuelwood and building materials, such as indigenous forests, paraffin, gas or coal.

2.10 Summary

The GNU is taking on the development challenges facing it through the vehicle of the RDP. To ensure the success of the RDP, the GEAR macro-economic strategy has been introduced. Job creation is a fundamental issue that government is concerned

with addressing. The RDP and GEAR are designed to alleviate the current 37% unemployment rate, among other important issues. The WFW programme as an RDP initiative has emphasised its creation of employment opportunities and has been successful in the creation of thousands of jobs. Energy needs of the poorer sectors of the South African society have also been discussed and their reliance on fuelwood as a primary energy source. The WFW programme has as one of its primary functions the clearing of exotic plants, many of which are wattles and used as fuelwood. The questions that arise are: Is the WFW programme having an impact on the fuelwood supplies of poor rural communities? Is dependance or reliance on the income from being employed by the WFW programme developing? What would the result be should the programme or more specifically projects within the programme be terminated? These questions have been consolidated into the aim and objectives of the study below.

2.11 Aim

To examine the impact of the Turn Table Trust Working for Water Project, a sub-project of the Working for Water programme`s Central Umkomaas Project on certain aspects of the community in the Bulwer area, and the implications should this project be terminated.

2.12 Objectives

1. **To determine** the community's reliance on the alien plants, particularly wattle species (*A. mearnsii and A. dealbata*), being removed by the WFW Project as a source of domestic fuel, and which alternate sources would possibly be sought.
2. **To determine** the possible consequences, from the community's point of view, should the project terminate.

CHAPTER 3
METHODS

3.1 Introduction

The present study is not a longitudinal study but a cross-sectional examination of necessary aspects of the Bulwer community to achieve the aim and objectives of this study. The study can be viewed as establishing a baseline from which further investigations must be made to tease out the finer mechanisms that will have a bearing on the topic of this research. To achieve a meaningful result under the constraints of this study the methods used will be both quantitative and qualitative in nature. The results from the two approaches will be used to compliment each other and to reduce distortion.

The quantitative approach is highly formalised, more explicitly controlled, is close to the physical sciences and tends to the objective. The qualitative approach is not strictly formalised, the scope is more likely to be undefined, a more philosophical/intuitive mode of operation is adopted and tends to the subjective (Mouton and Marais 1994; Matthews 1981; Van Maanen 1983).

3.2 Study Area

The area to the northeast of the small town of Bulwer was selected as the study area. Bulwer is the magisterial seat of a farming district in KwaZulu-Natal, South Africa. It is within a high rainfall area on a southern spur of the Drakensberg approximately 40 minutes by road southwest of Pietermaritzburg (Lipton, Ellis and Lipton 1996). This area falls within the Working for Water programme`s Central Umkomaas WFW Project. The study area included three small rural communities namely: Xosheyakhe, Intabamakhaba and Mkhohlwa (Map 1 & 2 in Appendices 2 & 3 and Figures 1, 2 & 3), which are all within the area covered by the Turn Table Trust WFW Project, a sub-project of the Central Umkomaas WFW Project. For the purposes of this study (for reasons which will become apparent below) these were grouped together and are referred to as the Bulwer community. Xosheyakhe and Intabamakhaba adjoin the main road to Pietermaritzburg, while Mkhohlwa is located at the bottom of the Uhane river valley.

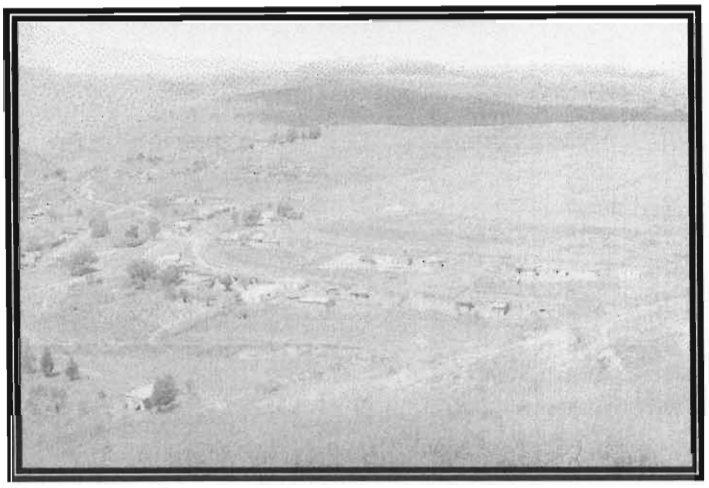

Figure 1: View of section of Mkhohlwa, Bulwer (Photograph: Wendy Ferraz)

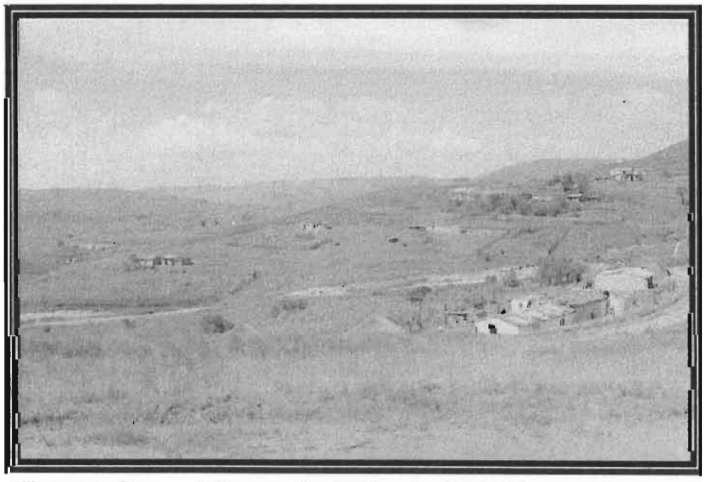

Figure 2: View of section of Xosheyakhe, Bulwer (Photograph: Wendy Ferraz)

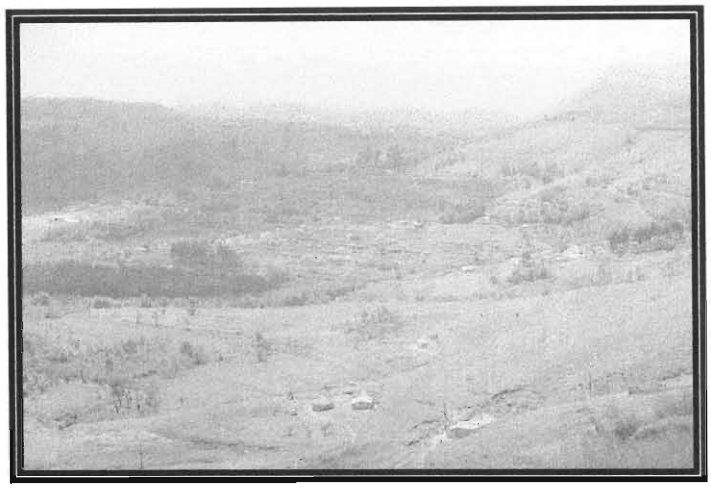

Figure 3: View of section of Intabamakhaba, Bulwer (Photograph: Wendy Ferraz)

3.3 Quantitative Method

Baker (1988) states an old dictum "If you want to find something out, ask!", and suggests four examples of administering surveys supported by other authors (Nachmias & Nachmias 1976; Peil *et al.* 1982), namely: a questionnaire administered to a group, a mail survey, a face-to-face or personal interview and a telephone survey. In the above proposed study it would be unrealistic to use mail or telephone surveys since many of the respondents do not have access to a telephone or a permanent postal address. Also, literacy may be such that the respondents probably could not understand or write their answers/views down.

The schedule of the project was a limiting factor and the resources available to the researcher. Data were therefore collected using personal interviews. The interviews were in the form of a structured questionnaire. Branch *et al.* (1984) provide examples of questions that may be asked of different groups within the context of a social impact assessment. Møller`s (1996) study of perceptions of development in KwaZulu-Natal was used extensively in the design of the questionnaire (Appendix 1).

3.4 Survey`s and Questionnaires

Research which gathers information from a sample of individuals is termed survey research (Schutt 1996). Surveys are used to determine four broad classes of information (Wiesberg *et al.* 1996):

- attitudes, beliefs and behaviour,
- changes in these over time,
- differences between groups of people with respect to their attitudes, beliefs and behaviour and
- causes resulting in these attitudes, beliefs and behaviour.

When preparing survey research much time needs to be spent on the construction of questionnaires (the selected form of survey research as described above). Several important points need to be followed. A clear conception of the research problem under investigation and the population to be sampled must be the starting point. Questions that help in the construction of the questionnaire are: What are the studies objectives?, What substantive variables should be measured?, What questions will help interpret answers?, What do other people think? (Schutt 1996). Questions consist of two basic forms, namely; open-ended and closed-ended. Open-ended allow the respondents to answer in their own words and close-ended offer the respondents a series of alternative answers to choose from. Close-ended are easier to analyse since the respondents code themselves into a category in their selection of an answer, whereas the answers to open-ended questions are coded by the researcher.

3.5 Questionnaire

The questionnaire (Appendix 1) consisted of three sections, namely: socio-economic and demographic, reliance on income from WFW programme and household energy. The first section attempted to gain information concerning the respondents such as age, gender, marital status, educational qualification and employment status. Also information regarding the household was sought such as household size, types of

dwelling, period in the area and some indication of the standard of living of the household. The section dealing with reliance on income from WFW programme sought to gather more information concerning employment (particularly with regards the WFW programme), household income, household expenditure, terms of employment, alternative employment opportunities and reliance on income from household members employed by the WFW programme. The household energy section attempted to gather information concerning household energy sources, preferred energy sources (particularly fuelwood), where and how this is obtained, fuelwood used per household, the reliance on areas being cleared of alien plants by the WFW programme for fuelwood, the perceptions regarding the supply of fuelwood and alternative energy sources.

The questionnaire consisted mainly of close-ended questions with a few open-ended questions.

Examples of the coding for close-ended questions are as follows:

4.16 Is the Working for Water programme removing trees used for fuelwood?

Don`t Know/Uncertain	0
Yes	1
No	2

4.6 How much wood is used per household per day?

(a bundle of wood is what you can carry under one arm)

None	0
One bundle	1
Two bundles	2
Three bundles	3
Four bundles	4
Five bundles	5
Six Bundles	6
Other: Please specify	7

The responses to open-ended questions were coded by the statistical software (see below) that was used.

3.6 Sample Design and Field Work

Considering the nature of the interviews and the aim of the study probability sampling was undertaken. Branch *et al.* (1984) explain that probability sampling procedures are used when making inferences from the sample to the population is important. They suggest that the main purposes of probability sampling in social assessment are as follows:

1. To compare the characteristics and responses of different groups
2. To identify characteristics associated with differences in response
3. To estimate characteristics of the total population (including the distribution of characteristics within the population)
4. To provide a basis for comparing the characteristics of groups or the total population at two or more different periods

As a general principle (Peil *et al.* 1982), having as large a sample as possible is best. In this study due to time, people and monetary constraints using a smaller than ideal sample size was necessary. The sample consisted of 30 respondents however, three more were added on the last day of the survey in the Mkhohlwa area since a few hours were to spare. The first stage of the sampling was stratified. This involved the identification of the three areas that were to be sampled, namely; Xosheyakhe, Intabamakhaba and Mkhohlwa. The samples were equally divided among the three areas giving 10 respondents per area. The second stage of the sampling was done, using the serial sampling procedure. The number of households in each area were counted and the following formula (Møller 1996) was used to calculate the sampling interval.

N = Total Number of households /cluster size for the given area

For each area (rounded to the nearest whole number):

Xosheyakhe: 13 = 130/10

Intabamakhaba: 6 = 64/10

Mkhohlwa: 7 = 66/10

In each area random tables were used to decide the first household to be surveyed.

The above sampling intervals were used to determine the subsequent households to be surveyed. The substitution rule was used if respondents were unavailable at a particular household. The sequence of substitutes was defined as follows (Møller 1996):

- Initially sampled household
- First household to the left of 1
- First household to the right of 1
- Second household to the left of 1, etc.

The third stage of the sampling was of the respondent from each household. Respondents were defined as the most mature person of the household present at the time of interview. The minimum age of an acceptable respondent being 18 years old.

A zulu speaking field worker was trained to carry out the interviews. The interviews were done over the period between 15 November and 05 December 1998.

3.7 Data analysis

Data analysis involves five steps according to Branch *et al.* (1984):

1. Clarifying the purpose and use of the data
2. Reviewing the data collection procedures and assessing the quality and limitations of the data
3. Preparing the information/data for analysis
4. Analysing the data
5. Interpreting and presenting the results

For impact assessment, a major purpose of the analysis will be to provide descriptive information about existing conditions and attitudes and to describe trends. Statistical methods appropriate for the purpose were used in the analysis of the data.

3.8 Statistical Tests

Schutt (1996) introduces statistics to the social scientist by categorising them into two groups, descriptive statistics and inferential statistics. Descriptive statistics can be divided into two basic uses, to describe the results of measuring single variables and to construct and evaluate multi-item scales. Included in these statistics are frequency distributions, graphs, measures of central tendency and variation and reliability tests. Causal validity can also be achieved by describing the association between variables and to control or take account of other variables. Cross-tabulation is one means to achieve this. Inferential statistics are used to estimate the degree of confidence that can be placed in generalisations from the sample to the population from which the sample was drawn, and include statistics such as confidence intervals.

Due to the nature of the data collected, and the fact that one sample was drawn from the Bulwer community, the consideration of statistical tests concerned with describing the differences between samples was inappropriate. Also, the use of statistics such as multiple regression with dependant and independent variables is not suitable due to the nature of the study and the sample size. For the purposes of regression, which is concerned with fitting lines when a variable is cause and the other effect (Williams 1984), a large sample size is necessary.

3.8.1 Frequency Distributions

Masses of raw data are difficult to interpret and understand. Understanding the variation in the data and seeing where the data is grouped is difficult. By grouping the data into several classes or categories the interpretation of the data is easier. Frequency distributions are useful for summarising data, especially when only a few responses from each respondent are possible (Williams 1984; Wilcox 1996). Frequency tables usually show: the value observed, the number of times a value was observed in *n* number of respondents, the cumulative values that give the number of respondents with a response equal to or less than the observed value, the relative frequency showing the proportion of respondents for each observed value and the cumulative relative frequency shows the proportion of respondents at or below the

observed value (Williams 1984; Wilcox 1996; Wiesberg *et al.* 1996 and Schutt 1996). The percentages in frequency tables are not perfect descriptions of the opinions and are affected by many factors other than those being measured such as sampling error and the wording of the questions (Wiesberg *et al.* 1996).

3.8.2 Frequency Histograms

Bar charts or histograms (where the bars are adjacent) are easier to interpret than frequency tables. A histogram is used to depict a frequency distribution in which the intervals have equal size. The base of the bar is the range for that particular interval and the height is equal to number of observations (Melville & Goddard 1996; Schutt 1996; Wiesberg *et al.* 1996; Wilcox 1996 and Williams 1984).

Categorised histograms can often identify effects (expected and unexpected) in the data more quickly and sometimes more effectively than other data analysis methods (http://www.statsoft.com/textbook/stbasics.html, p 13). Three variables are used in the creation of categorised histograms that enables the quick evaluation and visualisation of the data per group (eg: group1-male, group1-female, group2-male, group2-female, group3-male, group3-female for the data: numbers of items solved correctly).

3.8.3 Cross-tabulation

To describe or explore relationships between variables examining the association between two or more variables is necessary. A cross-tabulation displays the distribution of one variable against each category of another variable. It also allows for one variable to be controlled while examining the associations among others (Schutt 1996). A phenomenon of cross-tabulations that have a direct bearing on the data of this study is that when three or more variables are used in the construction of a cross-tabulation, the total number of cells in the sub-tables becomes large. The number of cases that each cell percent is based on becomes smaller. This results in two consequences. Firstly, the number of comparisons that must be made become large and the patterns may become complex. Secondly, the number of cases per category becomes less, and the role of chance is greatly increased. The nature of

the data of this study resulted in several cells that have no cases represented (Schutt 1996). Cross-tabulations for this data, therefore, did not give satisfactory results.

3.8.4 Measures of Central Tendency

One of three measures is generally used to summarize central tendencies, namely: the mean, the median and the mode. The mode is the most frequent value in a distribution. Also, termed the probability average since it is the most probable value likely to occur (Schutt 1996). The mode is used less than the other measures since it can easily give an incorrect impression of a distribution's central tendency. Problems with the mode occur in situations where two values occur most frequently, but only differ slightly. The mode will be the value with more observations and thus will give an incorrect impression of the distribution. The mode is appropriate for characterizing the central tendency of variables measured at the nominal level, for example married vs not married.

The median is the point that divides the distribution in half. If an odd number of values occur, it is the central value with an even number of values either side. If an even number of values occur, the two central values are added and divided by two (Melville & Goddard 1996; Schutt 1996; Wiesberg *et al.* 1996; Wilcox 1996 and Williams 1984). The median is an inappropriate measure of central tendency for nominal data since the values cannot be placed in order (Schutt 1996).

The mean is a weighted average calculated by adding all the values in a distribution and dividing by the number of values. The mean is usually used for data that reflects the interval or ratio level of measurement. It can also be used for ordinal data if it is assumed that ordinal measures can be treated as interval (Schutt 1996).

The decision to use either the mean or the median is influenced by the purpose of the statistical summary. For example, to report that half the population are below or above a particular value the median is used. However, if the purpose is to show how likely different groups are to be affected by a phenomenon such as age-related health

problems, the mean is used here (Schutt 1996).

3.8.5 Confidence Interval

In this study no specific hypothesis needs to be tested. A sample has been drawn and an estimate of the population mean needs to be derived based on the information in the sample (Williams 1984). Knowing how well the sample mean estimates the population mean is important (Wilcox 1996). Once this is known then inferences can be made concerning the population from the results of the sample (Matthews 1981). To determine to what extent the sample mean reflects the population mean, an interval range that contains the population mean with a high probability [eg. It shows the region in which the population mean is 95% likely to fall (Wiesberg *et al.* 1996.)] is calculated using the normal distribution *Z*. However, a practical problem with the normal distribution *Z* method is that it assumes the population standard deviation, σ, is known. In the instance where the population standard deviation, σ, is not known, it would follow then that using the sample standard deviation would be necessary. However, for samples sizes less than 100 this approach is not adequate. A more accurate method for computing the confidence intervals for a sample size smaller than 100 is to use the Students *t-test*, assuming that the sample comes from a normal distribution (Wilcox 1996). The Students *t* distribution differs from the *Z* distribution in that the sample standard deviation has replaced the population standard deviation, σ, and that the *t* distribution has heavier tails. The Student *t* distribution yields more accurate confidence intervals than if it is assumed that the sample standard deviation equals the population standard deviation (Wilcox 1996).

As the degrees of freedom increase, so the Students *t* distribution becomes closer to the *Z* distribution. The confidence interval thus calculated with the data from this study using the Students t-test gives a range in which it can be 95% (P=0.05) certain that the population mean falls. The P-value tells us that the statement or answer or perceptions that we have made about the community's mean falls within the 95% confidence interval. The 1-sample *t*-test is used in the following situation: one sample

has been drawn from the population (in the case of this study 33 measurements were made of the population); the population standard deviation, σ, is unknown; the distribution of measurements is close to normal; to test if the population mean, μ, is a specified value, and to obtain a 95% confidence interval for the mean. The form of the alternative hypothesis may be less than (lower-tailed), not equal (two-tailed) or greater than (upper-tailed). For many tests of the mean in this study, the two-tailed alternative hypothesis will be used. Thus the null hypothesis will be rejected if the α-level is greater than the P-value ($P<0.05$), or alternatively the null hypothesis will be accepted if the α-level is less than the P-value ($P>0.05$).

3.8.6 Statistical Software

The statistical software package MINITAB (supplied by MINITAB Inc. State College, USA) will be used for the quantitative analysis. This software package offers a wide range of statistical functions that are easy to use and are more than adequate for the purposes of this study. This package is commonly used by academic institutes for social science research,
(http://www.minitab.com/products/minitab/rel12/capable.htm).

3.9 Qualitative Method

Mouton and Marais (1994) state "Social sciences is a collaborative human activity in which social reality is studied objectively with the aim of gaining a valid understanding of it". Qualitative methods, particularly for a student of the natural sciences, can be a confusing and vague area of research. As mentioned earlier the mode of operation is more philosophical or intuitive and tends to the subjective. Qualitative research, however, is as necessary a part of the research process as is quantitative research in the understanding of issues related to community studies. The methodologies for qualitative research are varied depending on the type of information required. Added to this is that within the methodologies a variety of techniques are available from which to choose. Many of these techniques are common to several different methodologies. The techniques themselves are often adapted for the particular circumstances under which they are used (Tesch 1992). Rapid Rural Appraisal

(RRA), Participatory Rural Appraisal (PRA) and more recently Action Research and Evaluation are the more common methodologies employed.

3.10 Action Research

The purpose of action research is to achieve both action (change) and research (understanding). Effective action research endeavours to work towards action through good processes and appropriate participation. Action research can be regarded as a cyclical process that alternates between action and critical reflection. It is thus an ongoing process (http://www.scu.edu.au/schools/sawd/areol-home.html).

3.11 Participatory Rural Appraisal (PRA)

With PRA there is a shift away from the extractive mode of information gathering where outsiders set the agenda. PRA has developed beyond a research focus and a resource for investigative work and is used in planning, implementation, monitoring and evaluation of work with communities. PRA is an approach incorporating certain exercises and activities. It is a developing approach and is not seen as solely a method (A Handbook for PRA Practitioners 1993). AFRA News (1993) suggests that the "basis of PRA is to enable rural people to share, enhance and analyse their knowledge of life and conditions to plan and act". Bearing this in mind it is interesting to note that many PRA principles are a result of practical experience of what does and does not work (AFRA News 1993).

An important principle of PRA is for the researcher to learn from the rural people themselves by facilitating exercises, with little input from the researcher. One desires to learn the opinions and views of the community without the influence of the researcher. In other words a subject-object or a top down relationship should be avoided. There should rather be a reversal in the learning process where the researcher becomes the student and the community members, the teachers (Wetmore & Theron 1998). While it is important that the information remains the property of the community and to achieve this would be an ongoing development process with the community, it is not possible with this study. However, this will occur

to a certain extent since the results of this study will be fed back to the community and the managers of the Central Umkomaas Working for Water Project. The current study will use several techniques from the PRA approach to derive rural people's views on the aspects of study.

Stadler (1995) suggests that PRA is rapid, qualitative and uses many different techniques and disciplines. Thus PRA has a holistic approach in its appraisal of development issues. The main thrust of PRA is the handing over of the tools of research to the participants who then control what information is necessary to address a particular issue. PRA has a rural bias, according to Stadler (1995), and the materials and techniques used are thus suited to this bias. Further he suggests that PRA methods tend to present society as harmonious and driven by consensus resulting from the PRA preoccupation with consensus and public knowledge.

3.12 Triangulation

Van Maanen (1983) describes triangulation as a combination of methods in the study of the same problem. The mixing and integration of a variety of methods and data ranges from simple to complex. One form of triangulation that will be used in this study, is the "between methods" approach for convergent validation. The use of complementary methods leads to more valid results and is the most common form used (Van Maanen 1983). Use of more than one method to examine the same problem or phenomenon may lead to the discovery of a unique variance that would have been otherwise missed, had only one method been used.

3.13 PRA Techniques

Many PRA techniques are available and many techniques can be adapted or new ones added depending on the situation. Two techniques were selected for the purposes of this study.

3.13.1 Time Line

Major events are discussed by the participants. These are recorded with approximate dates attached. The purpose of a time line is to establish the history of the area and to show the history of previous developmental work. Time lines also serve as an ice breaker to the rest of the workshop and the whole group is involved in their construction. Specific issues can be dealt with using a time line although the practicalities may differ from a general time line (A Handbook for PRA Practitioners 1993). A time line was used to relax the participants and to get them to discuss events openly.

3.13.2 Matrices

With this technique people identify several criteria for a certain object or issue. They can then rank the listed criteria according to their preferences/uses for/of resources. The participants can then study and compare the advantages and disadvantages of the different items. This technique is used after some discussion in a workshop around the issues to be investigated (A Handbook for PRA Practitioners 1993). Careful explanation of the process needs to be done to ensure that the process is not the focus of the exercise but, rather the issue. Three matrices were constructed by the participants. The first was to establish the tree species used by the Bulwer community and what those trees are used for. The second was to establish where the wood was collected from for the individual species. The last matrix was to determine the preferred sources of income by the Bulwer Community.

3.13.3 Workshop

For the purposes of this study, a workshop was organized through the Central Umkomaas Working for Water project manager who was also a councillor in the study area. The workshop was held at the Pholela Tribal Court in Pholela situated among the areas being examined. The participants were collected from the three areas making up the study area. The researcher facilitated the workshop and explained the reason for the workshop and what was expected of the participants. The techniques were explained before each was carried out. Two assistants were present to assist

with interpretation into zulu and to assist with the exercises, as well as to observe and record. The participants were allowed to take control of the exercises and scribes were selected by them. The researcher and assistants attempted not to guide the participants in terms of the information they recorded, besides initiating the exercises and the issue to be considered during an exercise.

3.14 Data Analysis

Matrices have a number of means of analysis. To draw conclusions from matrices the basic tactics are: noting patterns, themes, counting, making contrasts and comparisons. Initially descriptive matrices are often large attempting to contain all the information gained in a single page (Miles & Huberman 1994). Most conclusions derived from matrices need verification and it is here that triangulation becomes important and the comparison of these conclusions with the quantitative data. The matrices generated by this study are simple and do not contain vast amounts of data. Their interpretation is thus simple and need not lead to further lengthy analysis.

The time line is self explanatory and serves to place major events for those that attended the workshop in order. It also serves to highlight a number of problems that may require further development work in the area.

3.15 Summary

Chapter 3 has given a review of the methods to be used and the manner in which the subsequent data will be analysed. Both quantitative and qualitative methods will be used to make inferences about the Bulwer community with regards the aim and objectives of this study. MINITAB statistical software will be used for the analyses of the quantitative data. The quantitative analysis for this study will make use of descriptive and inferential statistics. Frequency distribution tables and histograms will be used to describe a number of the observations made. Categorical histograms will be used to indicate specific results for which cross-tabulations is unable to give a pattern, due to the data.

The 95% (P=0.05) confidence intervals will be used to infer from the data what can

be expected to be representative of the population. A one proportion test will also show the results of specific data and, where necessary, the a two sample t-test will indicate important differences between means of appropriate data. The 1-sample *t*-test will be used to determine the population mean, μ, with an α-level of 0.05, for a number of observations/measurements with the accompanying 95% confidence interval.

Use will also be made of PRA (participatory rural appraisal) methods, in the form of a workshop, to gather relevant information in a short period of time. Techniques to be used will include time line and matrices. Since the data contained in the time line is serving to place events that are important to the Bulwer community in chronological order, the analysis is straight forward description and emphasis of events that are of relevance to this study. The matrices are simple and thus interpretation does not require sophisticated analytical techniques.

CHAPTER 4
RESULTS

4.1 Introduction

Chapter 4 examines the results obtained from the quantitative method (questionnaire interviews) and the qualitative method (workshop - time line and matrices). The obtained results are separated into three broad categories or issues, namely; demographic and socio-economic, energy and income. The quantitative and qualitative results pertinent to each issue will be presented under the relevant section.

4.2 Demographic and Socio-economic

4.2.1 Introduction

The purpose of this section is to gain an understanding of firstly, the characteristics of the respondents and secondly, characteristics of the population of the Bulwer community. Characteristics include standard of living, income levels, education levels, household size, age and marital status of respondents.

4.2.2 Quantitative Data Results

The respondents were represented by 30% male and 70% female. The age of the respondents varied from the 26-30 year old category to the 70+ year old category with the 41-50 year old category representing both the median and the mode of the respondents age distribution (Table 2). A cross tabulation of gender and age reveals that most of the respondents were represented by females in the 41-50 and 51-60 year-old categories. The highest male representation occurred in the 70+ age group, representing 9% of the respondents. This is indicative of both the migratory labour phenomenon (46% households surveyed had members that slept at another residence for more than four nights a week because they worked away from home) and that the men are the main bread winners of the household and were out working at the time of the survey. The marital status showed that 88% of respondents are or

have been committed to a partner in a formal manner with no examples of people living together. Most of the respondents were married in terms of civil procedure. The proportion of respondents belonging to the widower/widows' category are 24%. These marital results could be the consequence of the more mature age of the respondents or possibly of the rural nature of the community where tradition is still strongly in evidence.

Table 2: Respondents gender, age and marital status

Gender	Percent	Age Category	Percent	Marital Status	Percent
Male	30%	26 - 30	3%	Married civil	39%
Female	70%	31 - 35	12%	Married traditional	18%
		36 - 40	9%	Married civil & traditional	6%
		41 - 50	27%	Betrothed living together	0%
		51 - 60	21%	Divorced	0%
		61 - 70	9%	Living together	0%
		70+	18%	Widower/widow	24%
				Never married	12%
Total Percent	100%		100%		100%
Mode	Female	41 - 50			
Median	n/a	41 - 50			

The frequency histogram shown in Figure 4 gives a good indication of the educational levels of the respondents. The highest representation occurring in the none educational qualification category (24%) followed by the Grade 4 and Grade 8 educational qualification categories (12% each). The median of educational qualification category is Grade 5, and it can be expected, with 95% certainty, that the population's mean educational qualification (of those 31 years and older) will be between Grade 5 and Grade 6.

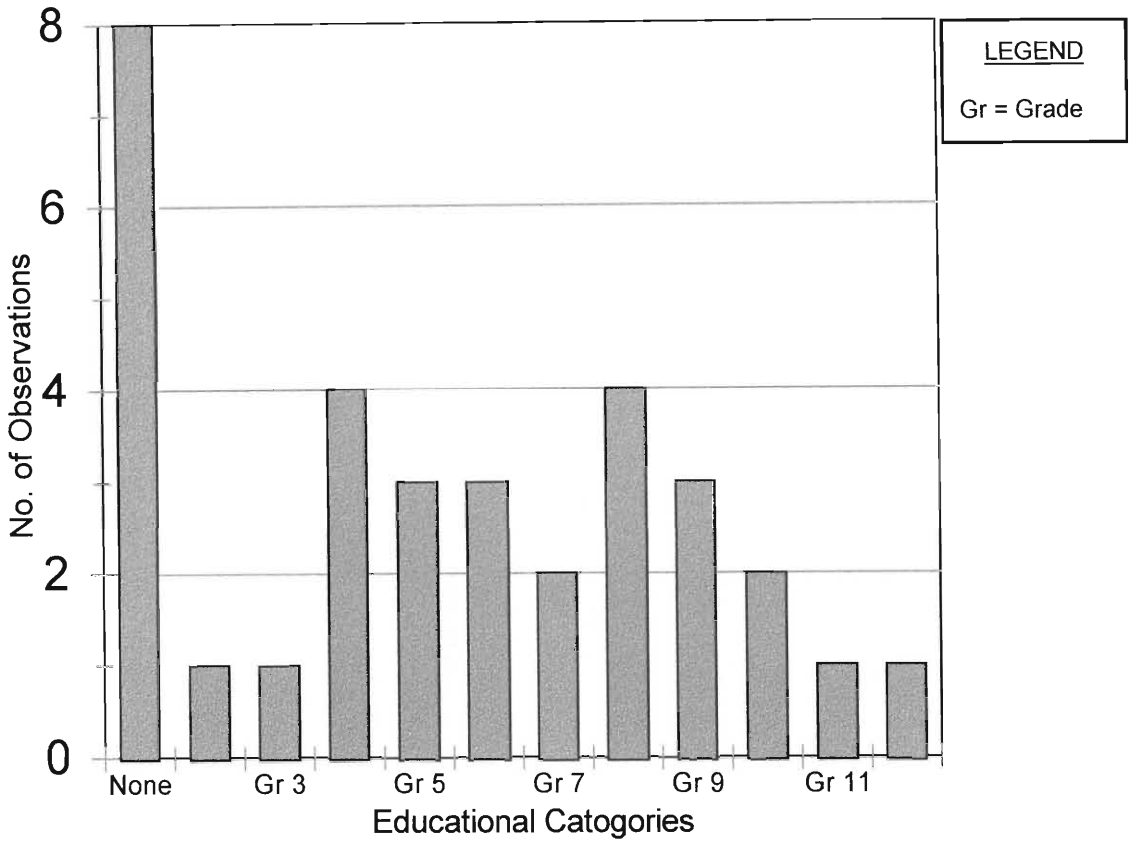

Figure 4: Frequency histogram of respondents educational qualifications.

Zulu is the language of the rural Bulwer community with 100% indication by the respondents. The mean household size of the respondents is 5.3 persons ($P>0.05$) and it can be expected, with 95% confidence, that the average household size in the Bulwer community is 4.6 - 5.99.

Of the respondents, 94% live in a traditional dwelling/hut with only 6% of the respondents living in a formal dwelling/house on a separate site. No other categories were represented in the community.

Most of the households surveyed (64%) had been in the area for more than 20 years, with the next most common category being 5 - 9 years (15%). It can be expected that the mean period that a household in the Bulwer community has been resident in the area will be between 10 and 19 years (95% confidence interval).

Unemployment is a problem in the area with only 9% of the respondents being employed full time. Although this result could be biassed by the time of the survey, it is substantiated by the fact that a large portion of the respondents (30%) were unemployed and looking for work. Thirty percent of the respondents were pensioners and it can be expected that the pensioners' category ($P>0.05$) will be the most represented occupation category in the Bulwer Community. The housewives in the area feel the necessity for further income since all women who classed themselves as housewives (21% of the respondents) are looking for work.

Figure 5 shows the standard of living of the Bulwer community. Three indicators are well represented. They are, that households possess a radio, shop at the local supermarket in Bulwer and have pit latrines (82%, 94% and 97% respectively of the respondents). Only 15% of the respondents owned a car thus showing a reliance on the local transport industry. Electrification in the area is on the increase with 24% of the respondents having access to this form of energy. All other indicators are

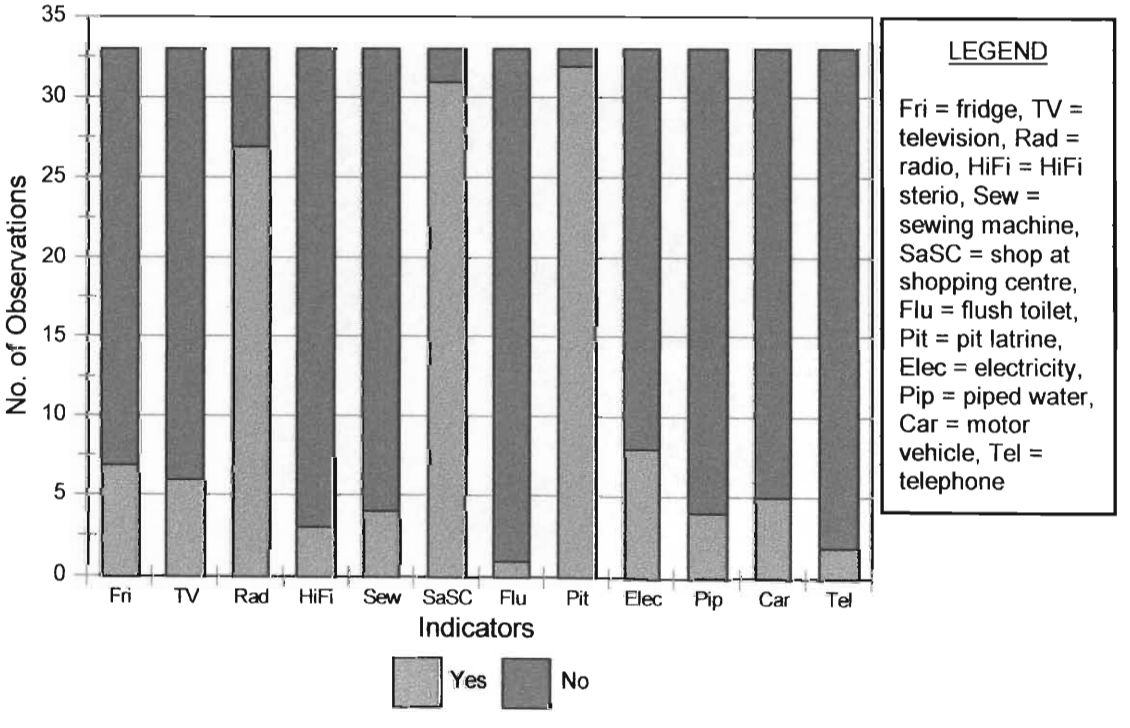

Figure 5: Histogram of household standard of living indicators

treated as luxury items by the community. The increase in electrification has seen an increase in electrical appliances such as fridges (21%), TV's (18%) and Hi-Fi`s (9%).

4.2.3 Qualitative Data Results

The workshop (Figure 6) consisted of 24 community members, 11 men and 13 women. Table 3 gives the age structure of the participants in each of two groups.

Table 3: Age structure of workshop participants employed by the Working for Water programme according to group and gender

Gender	Age Structure		Employees of Working for Water programme	
	Group 1	Group 2	Group 1	Group 2
Male	43, 59, 66	21, 25, 26, 28, 36, 49, 53	1	7
Female	21, 27, 27, 42, 42, 45, 48, 49	29, 32, 34, 44, 45, 49	8	6

Most of the participants (92%) were employed by the WFW programme. Some bias may thus be expected and should be born in mind when examining the results from the workshop.

Figure 6: Workshop held at Pholela Tribal Court - Bulwer (Photograph: Wendy Ferraz)

4.2.4 Time Line

As mentioned in the methods, this served mainly as an ice breaker, however, a few points have become known which will add to the results of this study. During the construction of the time line it was observed that mostly the women were responding with discussions between themselves. They then passed the information on to one woman in particular who then gave the information to the scribe. There appeared to be no subservience to the men as had initially been expected.

Table 4: Time line from the Pholela community workshop

Date	Event
1937	Pholela High School was built.
1943	Pholela Primary Health Care was established. Farmers advisory was started.
1945	Mcube was appointed chief.
1952	SAPPI Forest Plantations established.
1956	SAPPI sponsored Enkelabantwa Primary School.
1969	A bridge was built in the area.
1970	Tribal Court was built.
1972	Mrs Ndlovu organised a creche with the help of the Turn Table Trust and helped people to get pensions.
1985	Drought.
1987	Floods and hail.
1990	Mr Chule built a big house at Bulwer.
1991	Violence in area.
1992	A woman gave birth to three children.
1994	Elections.
1995	Working for Water started. More water available since Working for Water started.
1996	Heavy snow. Built a creche.

Date	Event
1997	Working for Water accident. Streets were named on main roads. WFW in Bulwer donated money for funeral of those that died in accident. WFW organised a big party in Bulwer. A local council was appointed.
1998	Newcastle disease. Lumpy skin disease killing goats. Community Hall built. Since the end of September WFW stopped and people are starving. People are suffering from cholera from dirty water. No training centres. Poor toilets. No electricity. No work opportunities. Poor roads. Few clinics. Poor sports organisers.

Table 4 shows the results of the time line. The participants noted six categories of events, namely: weather, people, infrastructure, WFW programme, politics and services.

The weather events noted, such as drought, floods, hail and snow, were those that had a major impact on the lives of the people. The "people events" were related to specific people within the community who either had a great impact on the community (eg. Mrs Ndlovu organised pensions and a creche for the community members) or had achieved some standing in the eyes of the community, for example Mr Chule building a large house or the women, who gave birth to three children. Infra-structural events included the development of SAPPI plantations and the building of schools, bridges, a community hall, creches and the tribal court. The WFW programme features strongly in the time line possibly due to one of the following reasons: it being a recent event, the fact that most of the participants were involved with the programme, because of its possibly large impact on the community in terms of employment and the flow of resources into the Bulwer community. It is interesting

to note the comment regarding greater water availability since the WFW programme began in the area.

Political events included the appointing of Mcube as chief and the violence in the area in the build up to the first democratic elections in April 1994. The violence in the area has had a long term effect. This became clear from Mr P. Dlamini (Turn Table Trust WFW Project manager) who indicated a large area of land suitable for crop planting, which was lying fallow. He pointed out that people had stopped planting crops during the period of violence and had not planted again, although a number had intended to do so. Asked why the people had not planted Mr Dlamini said they had become "lazy" since they had discovered other means of getting food. From the time line it is clear that people depend on the income from the WFW programme since it was noted that in September 1998 work had ceased on the programme and that people were now "starving". The relationship between the violence in 1991, the lack of crop planting and the WFW programme has only appeared with this study and was not explored further.

The participants used the opportunity during the construction of the time line to voice their grievances and these include poor health (people and animals), and a lack of training, employment opportunities, infra-structure and services in the area.

4.3 Energy

4.3.1 Introduction

Rural energy requirements have been the attention of many studies. This study has focussed particularly on the fuelwood requirements of the Bulwer community and the possible impact that the Central Umkomaas WFW Project will have on the availability of fuelwood from the community's point of view. The results examine energy sources, then focus on fuelwood sources and uses, volumes used and alternate energy sources that the Bulwer community may turn to.

4.3.2 Quantitative Data Results

The energy use of the Bulwer community is depicted in Figure 7, which shows the number of "yes" (1) and "no" (2) answers to the question of whether or not a particular energy source is used by the households.

Using the one sample *t*-test for confidence intervals and test of the mean on the

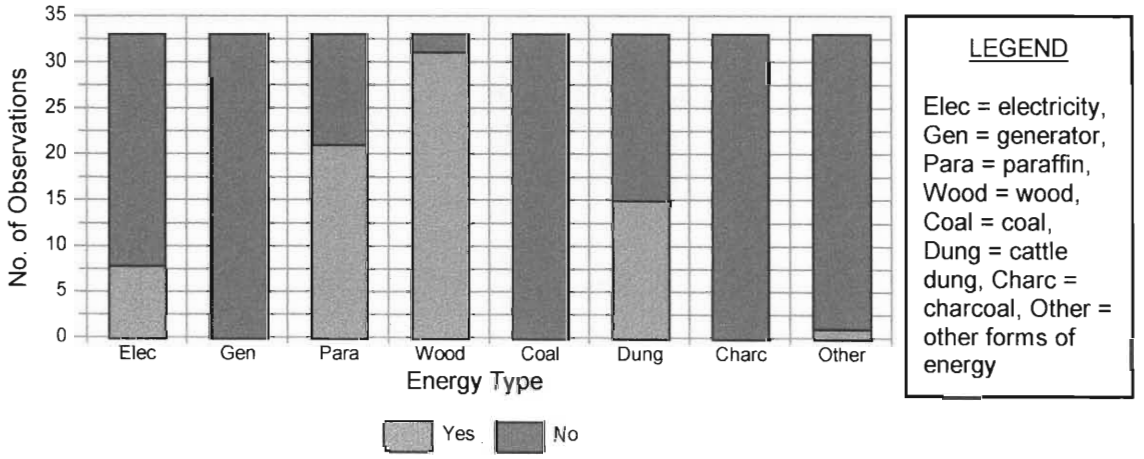

Figure 7: Histogram of energy types used by the Bulwer community

computer package MINITAB to analyse this data, the following picture of energy use by the Bulwer community is derived.

The community has a strong reliance on wood. Ninety-four percent of the respondents indicated wood as the primary energy source and this holds for the

Bulwer community (P>0.05). Sixty-four percent of respondents use paraffin as an energy source. This proportion would hold for the Bulwer population with 95% confidence for the population mean, showing a widespread use of paraffin in the Bulwer community. Substantial use is made of dung (46% of respondents), with 95% confidence for the population mean, possibly as a complimentary energy source. Almost a quarter of the sampled households use electricity, 24% of respondents with 95% confidence for the population mean.

Many households use more than one energy source. For example, 23% of the respondents use both wood and electricity, 61% of the respondents use both wood and paraffin, and 48% use both wood and dung.

The respondents unanimously agreed that no enquires concerning the use of fuel wood within the Bulwer community had been made before the WFW programme was initiated in the area. This shows that the planners of the Central Umkomaas WFW Project would have had no indication as to the impact that the clearing of alien tree species from the water courses would have had on the Bulwer community's fuel resources.

Since wood is the primary source of energy it is of interest to note which tree species are used and which is the preferred species of the Bulwer community to fulfill its energy needs.

Figure 8 shows that wattle, both black and silver wattle (*Acacia mearnsii and Acacia dealbata*), is the primary species of use by the Bulwer community (P>0.05). The next most used tree species are the indigenous species with 21% of the respondents indicating that this is used, i.e. most of the Bulwer population do not use indigenous tree species for fuelwood (P<0.05). Gum and pine species are not used to any great

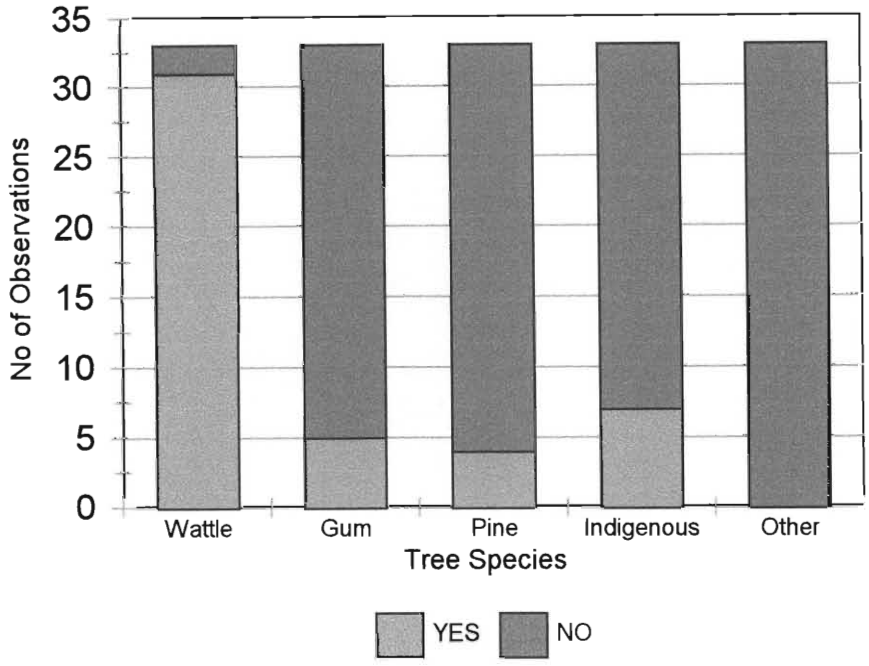

Figure 8: Histogram of tree species use by the Bulwer community

extent ($P<0.05$ in both instances), i.e. 15% and 12% of the respondents indicating that these species are used.

The above result is supported by 94% of the respondents who replied "wattle" to the question, "What is the preferred tree species for fuel wood?". The one respondent who gave an answer of none had access to electricity and did not use wood at all.

Table 5 gives a frequency table of the categories with regards the sources of household wood. Most of the respondents (67%) indicated the category "wild wattle walking distance" as the source of their wood as apposed to other sources as given in Table 5. The likelihood of the same representation of fuelwood source by the population of the Bulwer community is very strong ($P<0.05$). This is an important statement since the Working for Water programme has identified wattle as one of the most prevalent alien plants needing to be controled in catchments (DWAF 1997). It is also the most common alien plant species in the Bulwer area that is being

actively controlled (Mr P. Dlamini 1998 pers. com.[2]). It is thus evident that a conflict of interests with regards the value of wattle may occur.

Table 5: Frequency table of sources of household wood

Sources of Wood	Count	Cumulative Count	Percent	Cumulative Percent
Nearby Farm: Yes	8	8	24.24	24.24
Nearby Farm: No	25	33	75.76	100
Wild Wattle Walking Distance: Yes	22	22	66.67	66.67
Wild Wattle Walking Distance: No	11	33	33.33	100
Buy & Transport In: Yes	4	4	12.12	12.12
Buy & Transport In: No	29	33	87.88	100
Indigenous Forest: Yes	3	3	9.09	9.09
Indigenous Forest: No	30	33	90.91	100
Other: Yes	1	1	3.03	3.03
Other: No	32	33	96.97	100

Note: The categories Vendor, Shops, Garage, Plantations, KwaZulu-Natal Nature Conservation Services and Transport In have been excluded from the tables since no respondents indicated these as a source of household wood.

However, to examine this aspect further, an understanding of the use of wattle is necessary. The quantity being used by households, and the proportion of the household's wood collected from areas where the WFW programme is clearing alien plants needs to be examined. Also, the Bulwer community's perceptions regarding the availability of wood, and the question of whether the WFW programme is removing trees used for fuelwood purposes, needs to be looked at.

Households use wood (Figure 9) primarily for cooking, warmth, for heating washing

[2]. Mr P. Dlamini, Turn Table Trust, Working for Water Project, P.O. Box 67, Bulwer, South Africa.

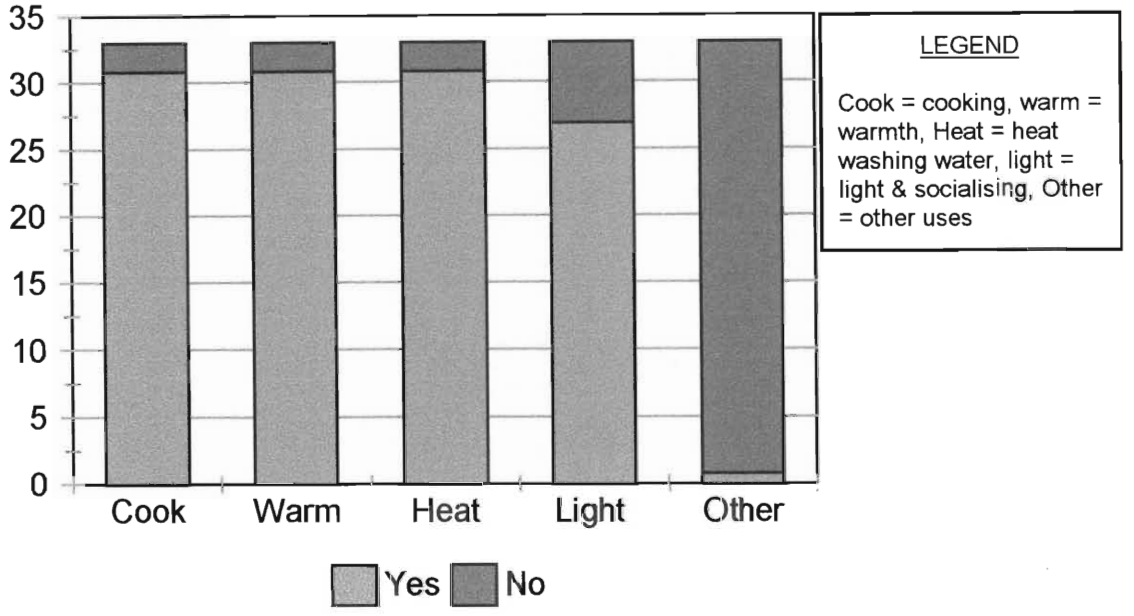

Figure 9: Histogram of household use of wood by the Bulwer community

water and for light and socialising. The respondents were not asked if the wood was used for building material although some did indicate this under the category other.

Wood used per household was defined in terms of the number of bundles of wood used per day. A bundle is defined as how much wood a person can carry under one arm. Although wood is not normally carried under the arm, this definition was an easy means to standardise the answers since a headload of wood may not be used in one day. A frequency table (Table 6) shows the number of bundles of wood used by the respondent households on a daily basis. A one sample *t*-test confirms the result that the average household use of wood by the Bulwer community is two bundles per day ($P>0.05$).

The five categories of sources of fuelwood (Appendix 1 - questionnaire question 4.14) was grouped into two categories; i.e. the first being "collect wood from areas where WFW programme clearing" which includes the categories "some, half, most & all" and, the second being "do not collect wood from areas where WFW programme clearing" which includes the category "none". The result is that on average the households collect wood from the areas where the WFW programme is clearing ($P<0.05$).

Table 6: A frequency table of amount of wood used per household per day

Bundles of Wood Used Per Household Per Day	Count	Cumulative Count	Percent	Cumulative Percent
0	2	2	6.06	6.06
1	8	10	24.24	30.3
2	13	23	39.39	69.7
3	4	27	12.12	81.82
4	3	30	9.09	90.91
5	1	31	3.03	93.94
6	1	32	3.03	96.97
7	1	33	3.03	100

Note: A bundle is defined as the amount of wood a person is capable of carrying under one arm.

With 95% confidence it can be expected that the proportion of the household fuelwood collected from areas where the WFW programme is clearing alien invasive trees is between "some" and "half". Since the population mean of bundles of fuelwood used per household per day is approximately two and that the amount of fuelwood collected from these areas is between "some" and "half" then the amount of wood collected from these areas approximates to one bundle per household per day.

The perceptions of the community with regards the availability of wood and whether the WFW programme is removing trees used for wood was tested using categorical histograms and one sample *t*-tests. Categorical histograms, often used as exploratory statistics, used the answers to the following two questions to test the perceptions of the respondents. Is there the same or less wood available for the household since the WFW programme started? Is the Working for Water programme removing trees used for wood? Figure 10 gives the results of the overall perception of wood users, which are 94% of the respondent households and with an expected population mean closely approximating that of the sample mean. Figure 10 shows that most wood users are of the perception that there is less wood available since the WFW programme began in 1995, and that the WFW programme is clearing trees

used as a source of wood. These perceptions are mirrored in Figure 11 that depicts the views of those households that use wattle. This is not surprising since the sample and expected population means are almost identical. Figure 13 shows the results of those that use paraffin, and shows the continuation of the perception as seen in Figures 10 & 11, although not as strongly, with a large proportion of households using paraffin that do not agree. Households that use dung (Figure 16) show a similar pattern as those for paraffin although more strongly in favour of the perceptions of the wood and wattle users.

Those households that have access to electricity (Figure 12), and thus do not rely on wood as the primary energy source, indicated that the WFW programme is clearing trees used for fuelwood and that there is less wood available since this programme began. This perception is stronger among the households that do not have access to electricity and who rely upon alternate sources of energy, primarily wood. Households that use gum, pine, and indigenous species were in the minority and as shown in Figures 14, 15 & 17, depict a strong disagreement with the perceptions of the wattle users. However, since most of the households that use these species also use wattle it may not be entirely correct to distinguish between these groups.

To further substantiate the above results, one sample t-tests were conducted. Indications are that strong perceptions exist among the Bulwer community that there is less wood available since the WFW programme began in 1995 ($P>0.05$), and that the population perception is that the WFW programme is clearing trees used for wood ($P>0.05$).

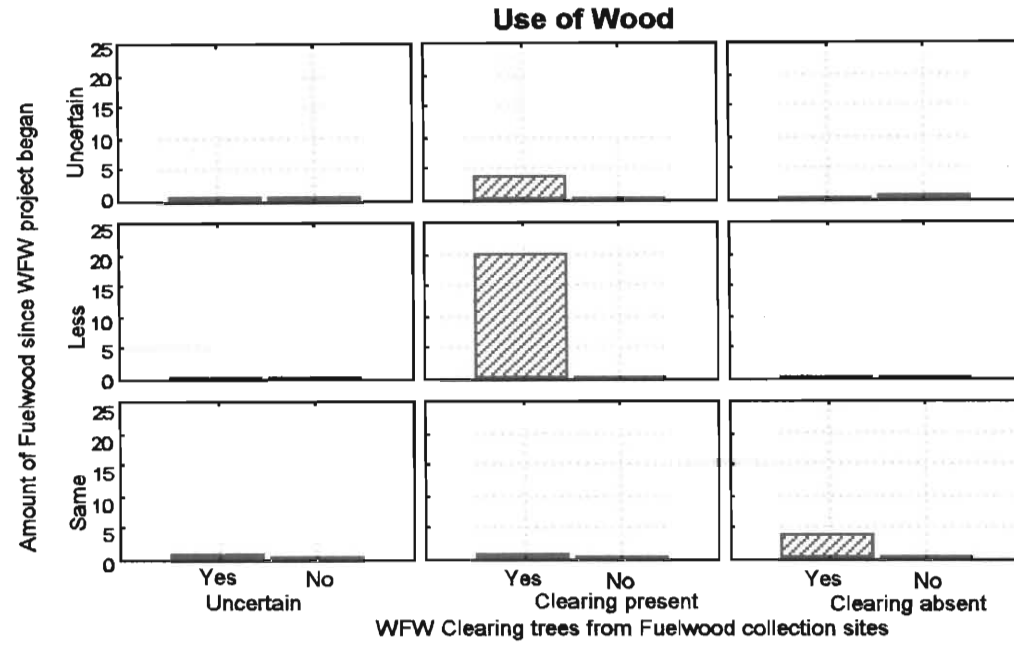

Figure 10: Categorical histogram of wood users (yes, no). Community perception of the impact of WFW tree clearing projects at the site of fuelwood collection with respect to amount of fuelwood.

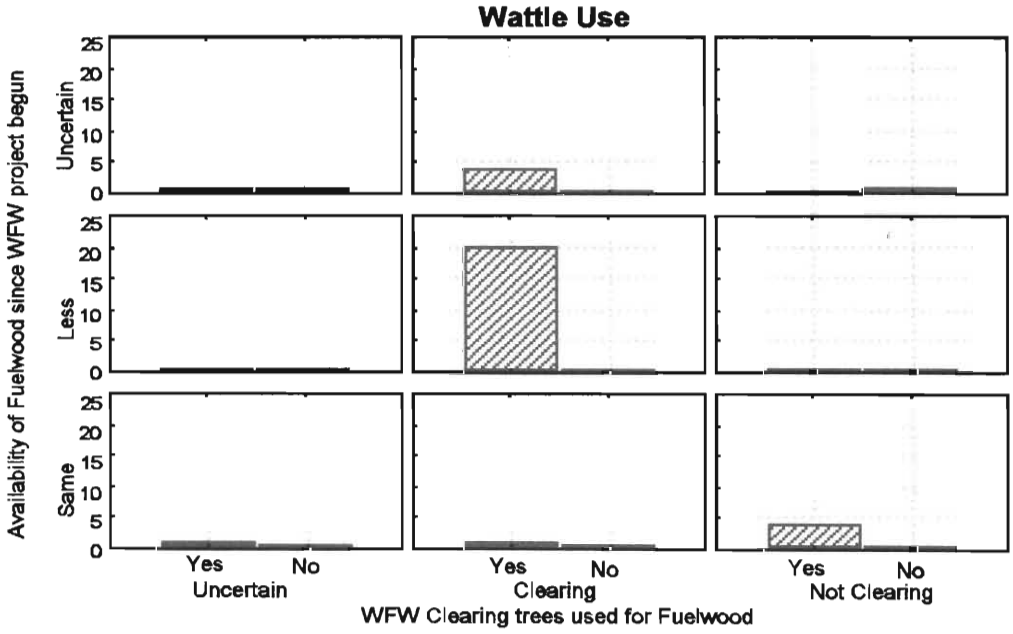

Figure 11: Categorical histogram of wattle use versus perception that WFW programme is clearing trees used for fuelwood and the availability of fuelwood since the programme began.

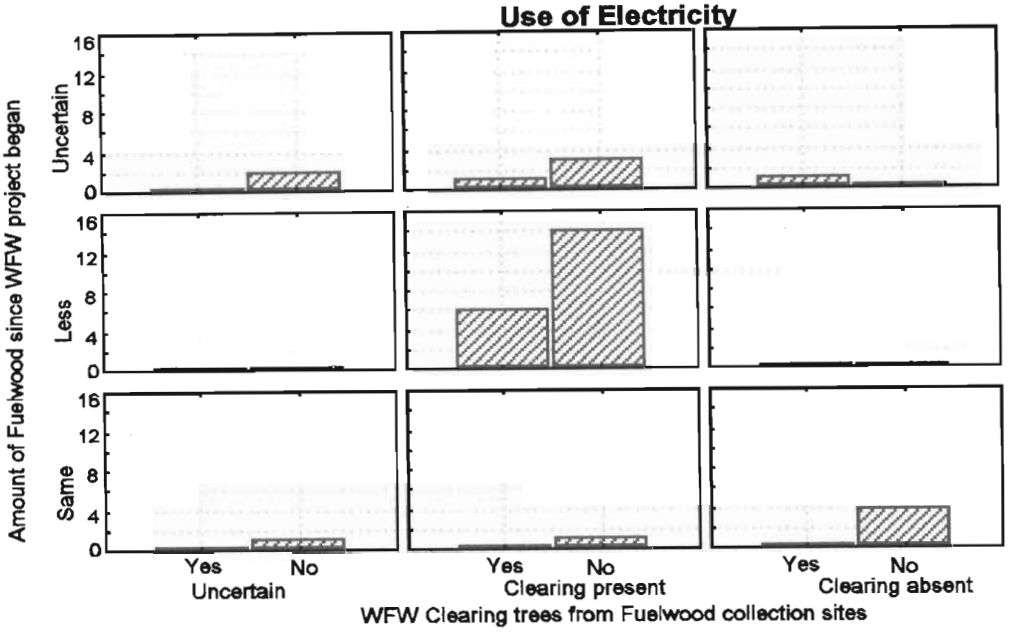

Figure 12: Categorical histogram of electricity users (yes, no). Community perception of the impact of WFW tree clearing projects at the site of fuelwood collection with respect to amount of fuelwood.

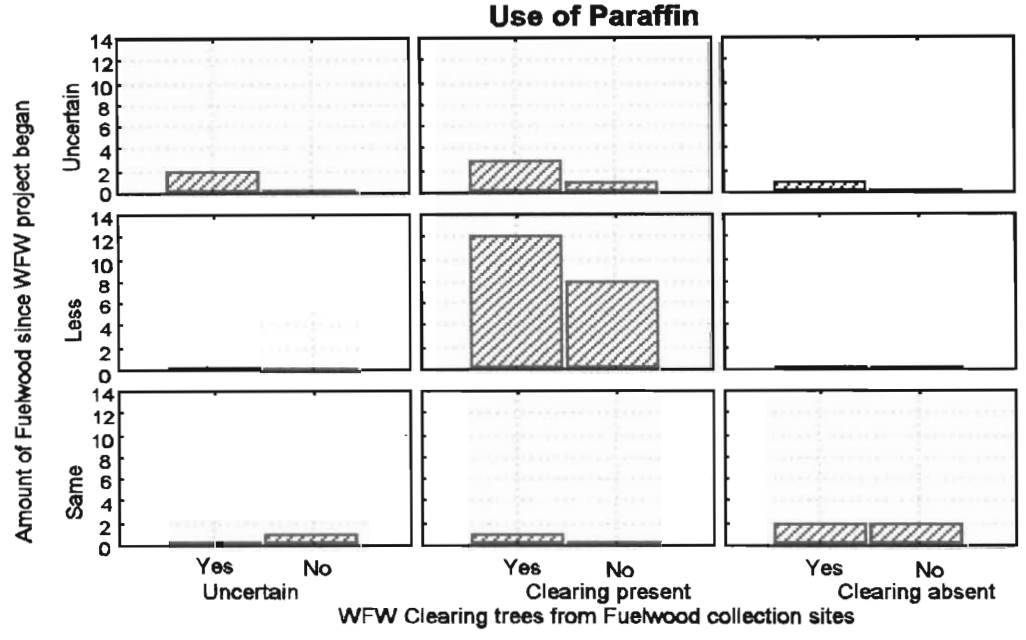

Figure 13: Categorical histogram of paraffin users (yes, no). Community perception of the impact of WFW tree clearing projects at the site of fuelwood collection with respect to amount of fuelwood.

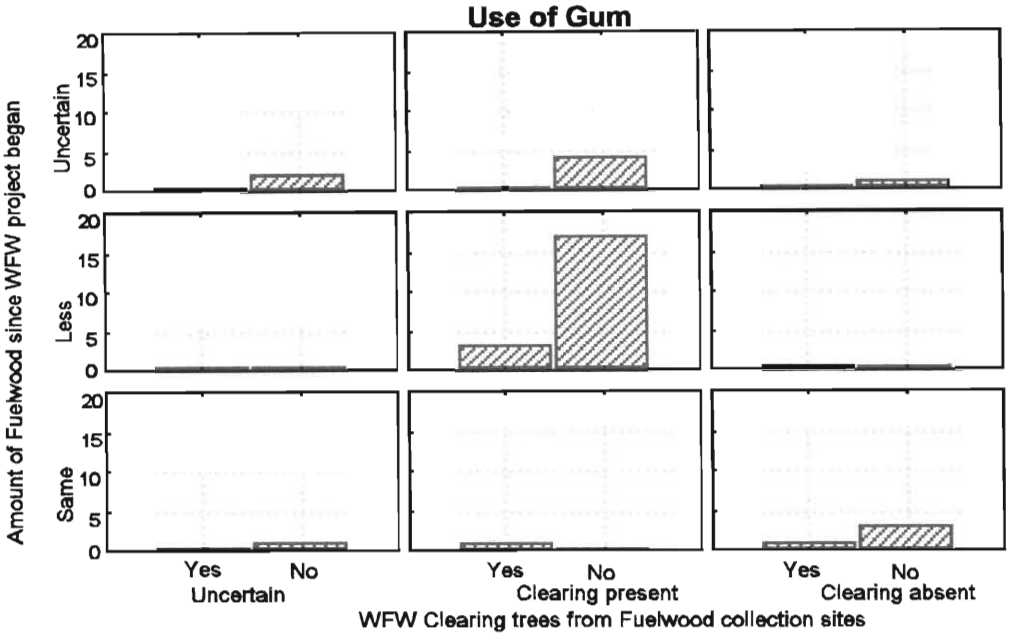

Figure 14: Categorical histogram of gum users (yes, no). Community perception of the impact of WFW tree clearing projects at the site of fuelwood collection with respect to amount of fuelwood.

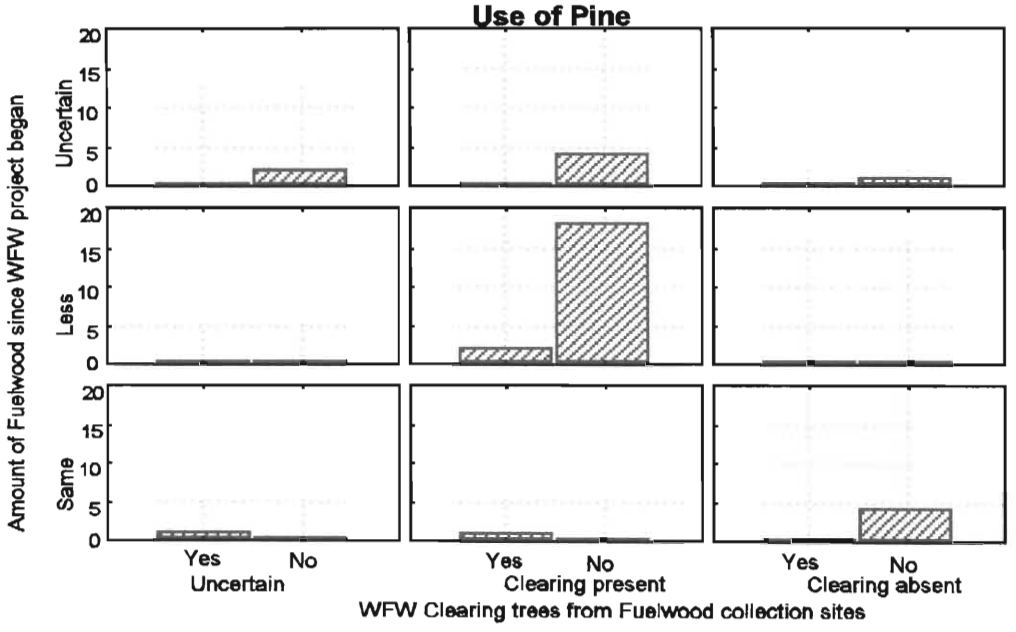

Figure 15: Categorical histogram of pine users (yes, no). Community perception of the impact of WFW tree clearing projects at the site of fuelwood collection with respect to amount of fuelwood.

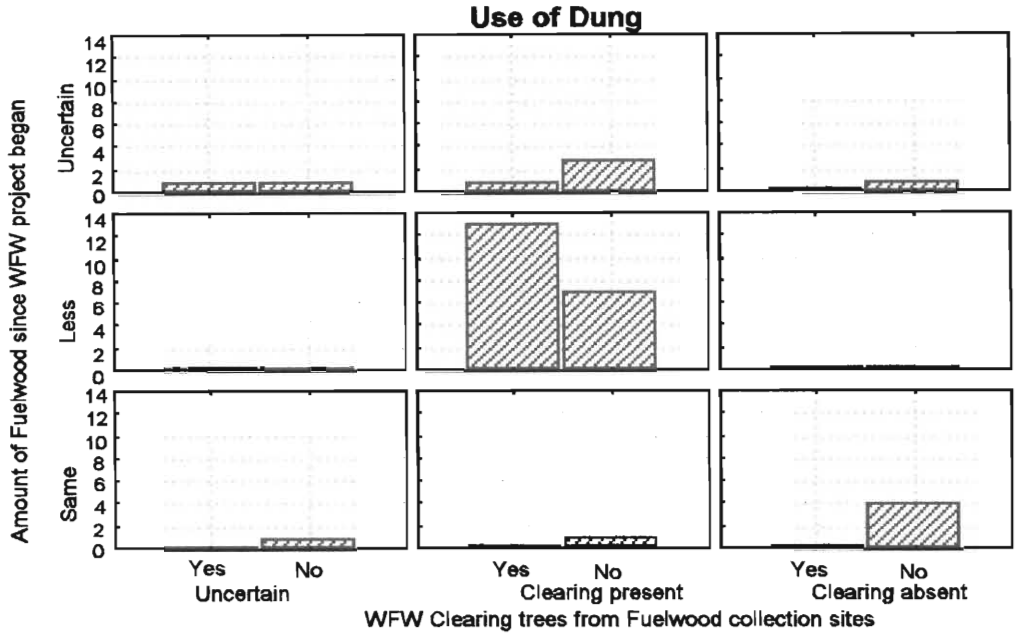

Figure 16: Categorical histogram of dung users (yes, no). Community perception of the impact of WFW tree clearing projects at the site of fuelwood collection with respect to amount of fuelwood.

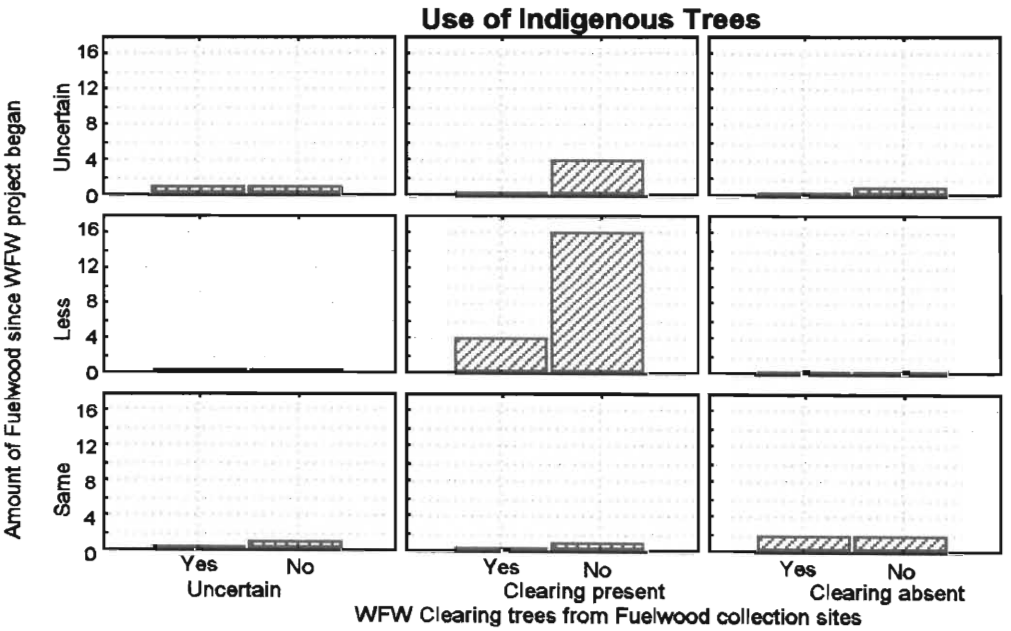

Figure 17: Categorical histogram of indigenous tree users (yes, no). Community perception of the impact of WFW tree clearing projects at the site of fuelwood collection with respect to amount of fuelwood.

Of the households questioned, 85% did not know where they would get fuelwood from if the Working for Water programme cleared all the trees in the catchment. This holds for the Bulwer community ($P>0.05$). Six percent stated that they would collect wood from the nearby indigenous forests.

Most of the households (58%) are uncertain or do not know whether they will change to other forms of fuel ($P<0.05$), with 30% stating that they would change and those remaining respondents stating that they would not change.

The fuel sources that the Bulwer community would most likely turn to are given in Figure 18. Interestingly a large portion of the respondents were uncertain what alternate source of fuel they would use, perhaps the possibility of a fuelwood shortage had never been an issue. Paraffin is the favoured source of alternate fuel, however, this will have a cost that most of the community can ill afford to pay ($P>0.05$).

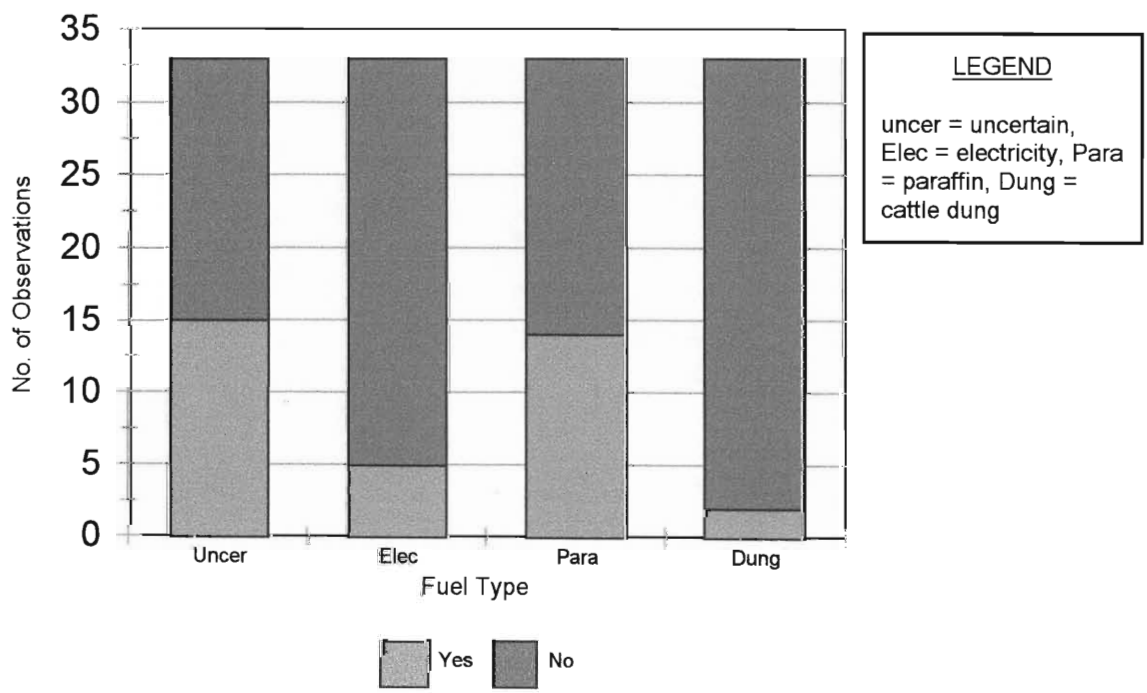

Figure 18: Histogram of alternate energy sources that would possibly be used by households of the Bulwer community

4.3.3 Qualitative Data Results

4.3.3.1 Matrices

As stated in the methods, three matrices were constructed by the participants. The first was to establish the tree species used by the Bulwer community and what those uses are. The second was to establish where the wood was collected from for the individual species. The last matrix was to determine the preferred sources of income by the Bulwer Community. Tables 7 to 10 show the results obtained from these exercises.

During these exercises it was noted that in group 1, the initiative was taken by a woman. This group was also a lot more vocal possibly due to the presence of only three men while group 2 had seven men present. The exercise to determine the source of fuelwood after the WFW programme began was dropped, since the participants stated that the WFW programme began clearing mostly in areas where the wood was collected from and the trees cleared were used by the Bulwer community.

Tables 7 and 8 give the results of the matrix exercise addressing the issue of the tree species used by the Bulwer community and there uses. From the results of both groups, it can be seen that wattle and indigenous tree species are the most important species with the widest range of uses. Both groups indicated that wattle was used for heating, fencing and building. Group 2 indicated that wattle was used for cooking, although the heating category in group 1`s matrix may include this use. Group 1 also used wattle for medicinal purposes and for cemeteries, whether this was for crosses on graves or to fence the cemetery was not clearly shown.

Indigenous species had more uses for group 1 than group 2. Group 1 showed that these tree species were used for heating, fencing, medicinal and building and both groups indicated the indigenous species as desirable for the production of crafts. Group 2 included tools (eg. axe handles) and traditional weapons as additional uses. Gum was used by group 1 for heating, fencing and building. Both groups used gum

for medicinal purposes. The remaining tree species were used for various functions as shown in the table but did not feature as prominently as the species described above. An interesting use was that of weeping willow used for divining water.

It can thus be summarised that the most important tree species to the Bulwer community (from the participant's point of view) is firstly wattle followed by indigenous species and lastly gum. Both wattle and gum are targets of the WFW programme`s clearing operation.

Tables 9 and 10 show the results of the exercise dealing with where the wood was collected from for the individual species. Group 1 indicated three sources of wood, namely buying it, cutting and collecting from wild stands and where the WFW programme was working. Wattle was bought and collected from sites where the WFW programme was working, while gum was attained from all three sources. Wood from the indigenous species was either bought or collected from wild stands.

Group 2 was more comprehensive in their species list and wood was generally collected from two sources. It was either bought as with gum and pine or cut and collected from wild stands as with wattle, blackwood, bugweed and mauritius thorn. Wood from indigenous trees was collected from forests.

The three important species were thus sourced from either buying, where the WFW programme was working or cut and collected from wild stands or forests.

Table 7: Group 1 tree species and uses

Uses	Tree Species							
	Wattle	Gum	Blackwood	Pine	Mauritius Thorn	Indigenous	Weeping Willow	Aloe
Heating	X	X		X	X	X		
Cooking								
Fencing	X	X			X	X		
Building	X	X		X		X		
Medicinal	X	X				X		
Crafts						X		
Cemeteries	X							

Table 8: Group 2 tree species and uses

Uses	Tree Species							
	Wattle	Gum	Blackwood	Pine	Mauritius Thorn	Indigenous	Weeping Willow	Aloe
Heating	X		X					
Cooking	X							
Fencing	X							
Building	X			X				
Medicinal		X	X					X
Crafts						X	X	
Tools						X		
Traditional Weapons						X		
Searching for water							X	

Table 9: Group 1 tree species used for wood and source before the Working for Water programme began.

Source	Tree Species			
	Wattle	Gum	Mauritius Thorn	Indigenous
Buy	X	X		X
Cut and Collect/Wild		X	X	X
Where working	X	X		

Table 10: Group 2 tree species used for wood and source before the Working for Water programme began.

Source	Tree Species								
	Wattle	Gum	Blackwood	Pine	Mauritius Thorn	Indigenous	Weeping Willow	Aloe	Bugweed
Buy		X		X					
Cut and Collect/Wild	X		X		X				X
Indigenous forest						X			
River banks							X		
Mountains								X	

4.4 Reliance on Income From WFW programme

4.4.1 Introduction

The question of the Bulwer communities reliance on income from the Turn Table Trust WFW Project can only be examined in the context of the economic status of the community members. Without this study becoming an economic evaluation of the Bulwer community and bearing in mind the time and resources available a few aspects have been examined such as household income and expense, the employment of community members by the Turn Table Trust WFW Project and the subsequent dependence by these households on income earned by those members employed by the project

4.4.2 Quantitative Data Results

The Bulwer community are aware of the WFW programme in the area ($P>0.05$) with most of the respondents (75%) knowing what the WFW programme is.

Eighteen percent of the respondents are employed by the WFW programme. Of those *employed* by the WFW programme 83% have been employed for more than 2 years and 17% for 1.5-2 years. The question of whether the WFW programme is providing secure and continuous work invoked a "don't know/uncertain" response from 85% of respondents. This was to be expected considering that only 18% of the respondents actually work for the WFW programme. In the light of this, the "yes" response to this question by 12% of the respondents is significant. The suggestion is that those employed by the WFW programme have positive expectations in terms of their continued employment and about guaranteed income.

In addition, 24% of respondent households had members who were employed by the WFW programme. A one proportion test for the respondents is consistent with the null hypothesis that 20% ($P=1$) of the population are employed by the WFW programme. Likewise a similar test on the results concerning other household members is consistent with the null hypothesis that 25% ($P=1$) are employed by the WFW programme.

This taken with the respondents, who are employed by the WFW programme, shows that a significant proportion of the community benefit from the WFW programme in terms of employment. The household members (not respondents) have also been in the employ of the WFW programme for lengthy periods, i.e. 38% for 1.5-2 years and 50% for more than 2 years. The earlier observation that those employed by the WFW programme have positive expectations about their continued employment and in terms of guaranteed income is thus re-enforced.

An anomaly occurs with the question of whether a person employed by the WFW programme has been retrenched. Of the respondents 15% (who indicated that they *were employed* by the WFW programme) stated that they had been retrenched. This could be a result of misunderstanding the question. However, it is more likely due to the nature of employment of the WFW programme in which employees are "retrenched" when the programme has a financial shortfall, but are re-employed once more funding is secured.

The mean monthly income per household (Figure 18) as given by the respondents, is between the categories R160-249 and R250-419, with a median category of R420-579 and the modal value being the "no income" category.

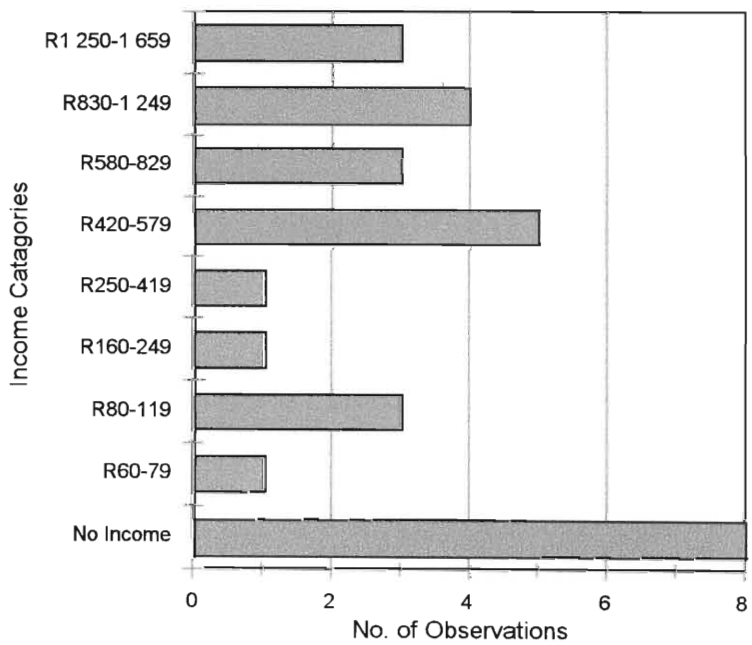

Figure 19: Frequency histogram of monthly income of respondents

The household expenses are represented by five categories, namely; food (96% of respondents), clothing (85% of respondents), taxi and/or bus fares (36% of respondents), building materials (33% of respondents) and education (82% of respondents), with a limited number of households having expenditures in other categories such as furniture, appliances, rent and accommodation.

The households average monthly expenditure is R286.70 for food (inter-quartile range = R175 - R400); and R376.70 for clothing (inter-quartile range = R70 - R400) (although this mean is influenced by outliers that may be the result of either an exceptional household expense, a misunderstanding of the question and/or may be an annual figure). A trimmed mean of R287.20 is more likely to be representative [MINITAB removes the smallest 5% and the largest 5% of the values (rounded to the nearest integer), and then averages the remaining values]. R33.33 is spent on taxi and/or bus fares (inter-quartile range = R0 - R55); and R677 (inter-quartile range = R0 - R400) and R347 (inter-quartile range = R41 - R170) for education influenced by an outlier of R8000 and has a trimmed mean of R100. The respondent households had a total mean monthly expenditure of R1818.97. The 95% confidence intervals represented in Figures 20, 21 & 22 (all falling within the inter-quartile ranges) show the population medians for the monthly expense categories.

Other expenditure categories; i.e. furniture, appliances, car and rent and/or accommodation did not make up a substantial portion of the respondents' monthly expenses.

The proportion of the above expenses covered by those that work for the WFW programme were indicated by 70% of the respondents as "none" with 21% showing more than half. This observation that the mean proportion of household expenses are not covered to some extent by the income from those employed by the WFW programme holds for the Bulwer community ($P<0.05$). It follows then that most of the households do not depend on income from the WFW programme. In answer to the question "Does the household rely on income from those employed by the WFW

programme?", 76% of the respondents answered that they did not and 24% that they did. For the Bulwer community it can be accepted that the mean answer will be "no" ($P<0.05$). The majority (55%) of the respondents did not know what the effect on the household would be if the WFW programme ceased to provide income, while 36% indicated that starvation would take place. It can be accepted that most of the Bulwer population is uncertain as to the effects on the household should the above occur ($P<0.05$).

It is important to recall that the number of households with members employed by the WFW programme is 20%. The above results become clear since 21% of the respondents indicated that more than half of the expenses are covered by the income from the WFW programme. Also, 24% of the households rely on the income earned from the programme. The 36% that said starvation would result from the termination of income from the programme are also largely accounted for by those households with members employed by the WFW programme.

4.4.3 Qualitative Data Results

4.4.3.1 Matrices

The matrix to determine the preferred sources of income by the Bulwer Community became a discussion and dealt with types of income and where these were. The outcome of this lengthy debate was that the primary sources of income for the Bulwer community were pensions and the income earned from the WFW programme in the study area.

4.5 Summary

The results showed that most of the respondents were female between the ages of 41 and 60. The males fell mainly in the 70+ age category. A large portion (46%) of households had members working away from home. Most of the respondents were committed to a partner in a formal manner or were either a widower or a widow. The average level of education for people above the age of 31 was Grade 5. Traditional dwellings dominated, with households being present in the area for between 10 and

19 years. Unemployment is prominent with few of the respondents being permanently employed. Pensions provide an important source of income for nearly a third of the households. Standards of living are modest with less than a fifth of the households possessing appliances such as fridges, TV's and Hi-Fi`s. The most common standard of living indicators was radios, pit latrines and households shopping at the local supermarket in Bulwer. The lack of facilities and services were mentioned as an important area of concern for the members of the Bulwer community. The WFW programme and its benefits and opportunities featured strongly as an important event in the lives of the Bulwer community.

Households in the Bulwer community rely heavily on fuelwood with less than a quarter having access to electricity. Paraffin and dung are also, important energy sources. The perception among the Bulwer community is that the WFW programme is clearing trees used for fuelwood and that there is less wood available since the WFW programme began. Wattle trees (*Acacia mearnsii and Acacia dealbata*) are the preferred tree species for energy requirements. Fuelwood is collected from sites where the WFW programme is working or cut and collected from wild stands or forests. Households use two bundles of wood per day on average. One of these bundles is collected from areas where the WFW programme is clearing alien invasive plants. Most of the households are uncertain or do not know where they would get wood from if the WFW programme were to remove all the alien invasive trees (wattle, gum, pine) in the catchment. Almost a third of the households said that a change to paraffin would be made, although over half where uncertain if they would change to another fuel source.

Nearly a fifth of the respondents are employed by the WFW programme with the majority having been employed for periods of between 1.5-2 years. In addition, nearly a quarter of the households had members who have been or are employed by the WFW programme. The people employed by the WFW programme have positive expectations of their continued employment and income. A significant portion of the Bulwer community thus benefits from the WFW programme.

The average monthly income per household is between R160 and R419. Household expenses consist mainly of food, clothing, transport, building materials and education. Other expenses such as furniture, appliances, rent and accommodation occur to a limited extent. Average household expenditure is in the region of R1800 per month, suggesting that many respondents did not reveal all sources of income. A fifth of the households said that half of the household expenses where covered with earnings from the WFW programme. Taken with the previous statement, approximately a quarter of the households indicated a reliance on the income earned from the WFW programme to cover household expenses. More than a third of the respondents said that "starvation" would occur if the WFW programme were to cease operating in the area, since pensions and the WFW programme were identified as the primary sources of income.

CHAPTER 5
DISCUSSION

5.1 Introduction

The focus of the state's economic policies have shifted significantly towards meeting socio-economic needs. This shift has occurred as a result of the recent history of South Africa, namely, the movement from an apartheid system to a democratic system of government, with the election of the Government of National Unity (GNU). The new government is attempting to address the inequalities caused by apartheid policies and the protection of vested interests (Spies 1998). The vehicle chosen as the means to address many of these socio-economic needs has been the Reconstruction and Development Programme (RDP). As stated earlier, five key programmes are contained within the RDP, which aim to improve the standard of living and quality of life for all South Africans. However, these programmes cannot be successfully carried out unless the economy of the country is stable and can support such initiatives as the RDP. As described in Chapter 2, the economic situation of South Africa, while being strong in comparison to its neighbours is still not good. Annual GDP growth has recently tended towards the negative which equates to a decrease in employment opportunities. At the time that the GNU introduced its macro-economic policy titled "Growth, Employment and Redistribution" (GEAR), the trend in the economy lead to employment growth of 100 000 to 130 000 jobs per annum. Unemployment was rising to 37% by the year 2000.

Among GEAR`s core strategies are those that will be to the benefit of programmes such as the RDP. Restructuring, reforming and re-prioritisation of aspects such as government expenditure programmes, infrastructure investment programmes, governing of public corporations, wage determinations and social agreements among others, will contribute to the success of the macro-economic strategy according to GEAR. A main issue of GEAR is to increase employment opportunities (GEAR 1996).

The implementation of large scale programmes involving poor rural communities will inevitably change the lives of these people. Whether or not these changes have been planned for or anticipated by the implementing agent is a matter of debate. With the Working for Water programme (WFW programme) it appears as if some effort was directed at planning the programme and this is possibly evident in the three goals towards which the WFW programme is striving, namely,

* enhancing water supply and water security;
* creating jobs, building communities and improving quality of life and;
* conserving ecological functioning and biological diversity.

Entering such a large scale programme without planning would seem naive. Indeed, many business plans were drawn up before WFW Projects were begun. However, as stated earlier, the pressure on the implementers to be operational as quickly as possible resulted in no strategic environmental assessment (SEA) being undertaken (Schreiner 1998, pers. com.[3]). This point has lead to the inception of the present study. The focus of which has been on two aspects of a project of the RDP programme, namely the Turn Table Trust Working for Water Project, a sub-project of the Working for Water programme`s Central Umkomaas Working for Water project. The Central Umkomaas WFW Project consists of some ten sub-projects. The Turn Table Trust Working for Water Project is one of three operating in and around Bulwer, the others being the Bulwer Biosphere WFW Project and the SAPPI WFW Project.

To address the aim and objectives of this study it is necessary to first, gain some understanding of the characteristics of the Bulwer community itself. This will serve as the context within which the two objectives can be described. The objectives were: 1. To determine the community's reliance on the alien plants, particularly wattle species (*A. mearnsii and A. dealbata*), being removed by the WFW Project as a source of domestic fuel, and which alternate sources would possibly be sought.

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[3]. Professor Schreiner, Department of Water Affairs and Forestry, Private Bag X313, Pretoria, South Africa.

2. To determine the possible consequences, from the community's point of view, should the project terminate.

5.2 Demographic and Socio-economic

The Bulwer community is well established with the average household having been present in the area for between 10 and 19 years. These households are in the form of traditional dwellings or huts occupied on average by five people. Although occupying many dwellings in a typical kraal is common in rural areas for a family, the figures referred to are the respondents dwelling only. The nature of the dwellings in the study area was oriented towards the urban layout with dwellings generally arranged in streets. This could thus account for the household occupancy figure. The people in the area are zulu speaking with strong traditional links as evidenced in the marital status. No examples were found among the respondents of people living together, but the people fell into one of three categories, single, married (88%) or widowed (24%). Most of those married at some time were married in terms of civil procedure. The widowed category was well represented. High numbers of widowed people could be related to the age structure of the respondents with the majority falling between the ages 41-60 years of age. Most of the respondents (70%) were female and that the majority fell within mature age categories. The high female representation and age are most likely a consequence of the observation that many households (46%) had members who slept at another residence for more than four nights a week due to work commitments. A result most likely due to the migratory labour phenomenon so common in South Africa, which is partly due to the policies of the previous government that discouraged black urbanisation.

Another dimension that could account for the above phenomenon is the problem of AIDS (Acquired Immuno-deficiency Syndrome) in the area. Mrs B. Gent (Turn Table Trust) asserts those migrant workers, who can no longer work due to the disease, return home and as a result infect many permanent residents who are not aware of the precautions they should be taking. Mrs Gent says many deaths in the area are due to AIDS. This aspect was not explored with the current study.

The levels of skills in the community can be expected to be low since the average educational qualification is between Grade 5 and 6. This will have implications for those looking for work and attempting to begin ventures of their own. The community is aware of the need for further skills, since at the workshop, the participants indicated a lack of training facilities in the time line exercise.

As is so common in most of South Africa, the major source of income for the Bulwer community is pensions with almost a third of the people relying on this form of income. Another third was unemployed and looking for work while approximately 10% of the respondents were employed full time. The people who classed themselves as housewives were anxious to find employment since they required further income. Results of the time line exercise support the quantitative results by also showing that employment opportunities in the area are not available. It can thus be concluded that work opportunities are scarce in the Bulwer area resulting in two effects: firstly, it is promoting migratory labour and secondly, it is continuing the problems of poverty associated unemployment.

To illustrate these points, a number of simple indicators were examined to determine the standard of living of the Bulwer community. These showed that the people in the community are existing at, or close to, the poverty level, when taken with the unemployment and lack of employment opportunities in the area. The two most common items that a typical household will have are a radio and a pit latrine. Only a very small portion of the respondents (15%) posses a car, which suggests a reliance on public transport such as buses or taxies. The people shop almost entirely at the local supermarket/general store in Bulwer. Electrification is on the increase in the area with nearly a quarter of the households having access to this. This has immediately caused some additions to the households as electrical appliances such as fridges and TV`s for a fifth of the households and HI-Fi`s for approximately a tenth. The Bulwer community can thus in no way be described as affluent or middle income, but falls into a low to poor income community categories.

The results of the workshop brought to light many grievances that the Bulwer community is experiencing. Among these are stock diseases coupled with the observed lack of crop planting on suitable land that suggests the need for agricultural extension, health problems due to dirty water and poor toilets with an expressed need for clinics, infrastructural requirements, such as improved roads, sport facilities and services, such as electricity. These grievances support the observations that the Bulwer community is poor and lacking many basic needs.

From the above discussion it can be concluded that the Bulwer community is poor, that many people are migrant workers due to the limited employment opportunities in the area. Any projects that are begun in the area by an outside body or organisation, which offers employment and income will affect the community. This is evident from the results of the time line exercise. In this exercise the participants indicated that in September 1998 the Turn Table Trust WFW Project came to a halt and as a result the people in the Bulwer community were now starving. In addition, a project that will affect the natural resources in the area may also impact on other aspects of the people's lives as well.

5.3 Energy

Many authors (Gandar 1994; van Horen & Eberhard 1995) agree that fuelwood is the primary source of energy for the rural people in South Africa and according to Gandar (1994) provides 80% of the total domestic energy used. The Central Umkomaas WFW Project, as one of many WFW programmes, has as one of its primary goals the eradication of alien plants (Figure 20 & 21) from along watercourses (DWAF 1997). This includes species such as wattle (*Acacia mearnsii* and *A. dealbata*), a well-known tree used for firewood and charcoal production. It is immediately apparent that a possible conflict situation could arise. To add further to the predicament, the Turn Table Trust WFW project offers employment opportunities to the Bulwer community. So not only is the project removing trees that may be used as a source of fuelwood, but it is using the very people to do it who may rely on that same fuelwood. Strong assumptions to make, however, the results of this study appears to support these assumptions to a varying extent.

An important point to note is that all the respondents were unaware of any enquiries concerning their energy needs before the Turn Table Trust WFW project began in the area. A point that ties in with the earlier observation that no strategic environmental assessment (SEA) had been undertaken (Schreiner 1998 pers. com.[4]). The importance of this point will become apparent when discussing sources of fuelwood, type and amount used by households. Fuelwood consumption is

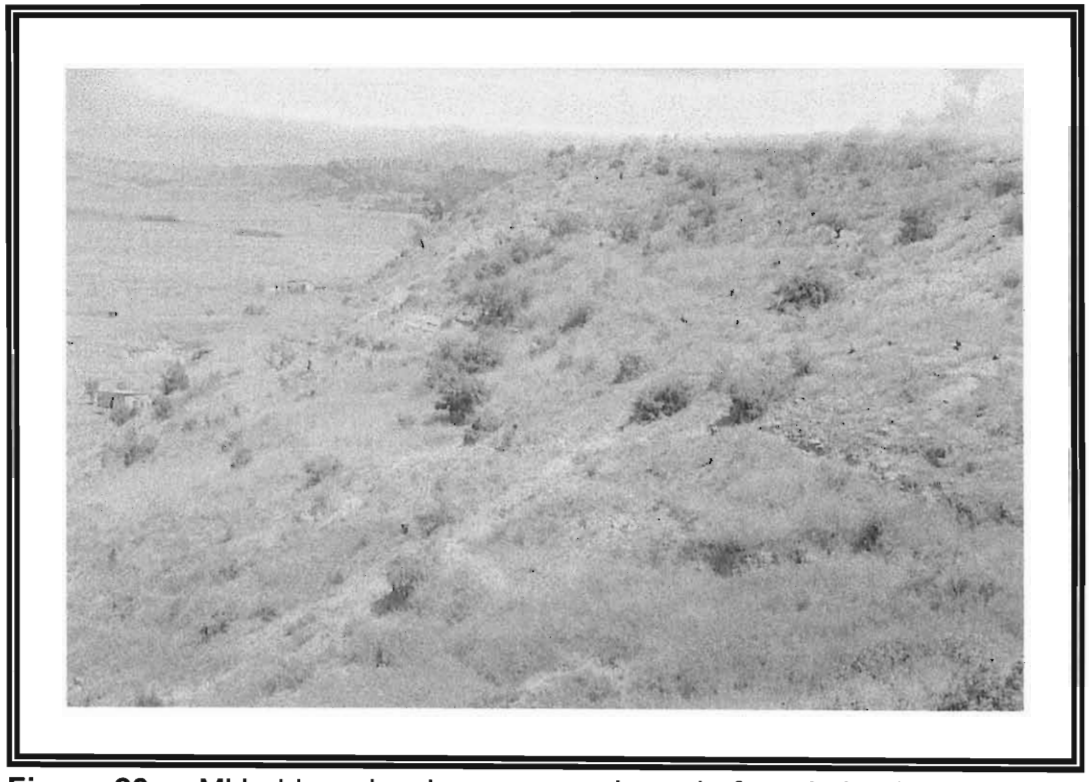

Figure 20: Mkhohlwa showing an area cleared of wattle by the WFW programme. Note the remaining stumps, some of which are producing regrowth. (Photograph: Wendy Ferraz)

influenced by many factors, namely: socio-economic status, supply, accessibility and cost of alternate sources (Shackleton 1994). The energy sources of the Bulwer community consist of four main types, namely: wood, paraffin, dung and electricity. Of these, wood is the most important with virtually every household using wood for some purpose.

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[4]. Professor Shreiner, Department of Water Affairs and Forestry, Private Bag x313, Pretoria, South Africa.

Wood is used for cooking, warmth, heating washing water, light and socialising. Wood is also used for building material, fencing and many tree species are used for medicinal purposes. This, highlights the importance of wood to the Bulwer community. Paraffin is the next most important with nearly two thirds of the households using this source. Just under half the households use dung as an energy source, often indicative of poorer households (Ward 1994). Electricity is accessible to nearly a quarter of the population in the Bulwer community. The participants of the workshop indicated the supply of electricity as one area that still needs to be addressed. The reliance on fuelwood as an energy source is firmly established in this study though most of the households use more than one energy source. For example, nearly two-thirds use both wood and paraffin, while nearly a quarter uses both electricity and wood and nearly half use wood and dung. It is interesting that nearly all the households that have access to electricity continue to use fuelwood. Mr P Dlamini (Turn Table Trust WFW project manager) suggested that this was probably due to the pay-as-you-use concept of electricity supply. Many households could not afford to pay for electricity exclusively and thus supplement the use of electricity with fuelwood.

The tree species most used (94% of respondents) for fuelwood was wattle (*Acacia mearnsii* and *A. dealbata*) followed to a much lesser extent by indigenous tree species (a fifth of the respondents) and gum (*Eucalyptus* spp.) and pine (*Pinus* spp.). Wattle, gum and pine are all species that are controlled by the Turn Table Trust WFW project as part of their watercourse clearing programme. However, it must be remembered that the Turn Table Trust WFW project is generally restricting its clearing of alien plants, such as the trees referred to above, to within a 30m band either side of a watercourse. Also, Mr P. Dlamini pointed out an area (Figure 21) where the clearing operation had left a stand of wattle that, although outside the 30m band, would normally have been cleared. This area was left unfelled in response to requests from the community that this stand of wattle was used as a woodlot for fuelwood purposes. It appears that the Turn Table Trust WFW project is prepared to accommodate the community's needs while still achieving its goals.

This brings the discussion to the source of the Bulwer community's fuelwood. The results show that two-thirds of the households collect wood from sources described as "wild wattle walking distance" (Figure 21). This implies that the wattle stands are weed wattles that have not been specifically cultivated but, have resulted from invasions by the plant. These stands of wattle are among the target infestations of the Turn Table Trust WFW project (Maps 1 & 2 in Appendices 2 & 3). It also implies that most households collect fuelwood from the most convenient and least expensive source, which is that closest to the home. However, not all households have stands of wattle or other tree species nearby. These households thus have to turn to other sources such as nearby farms (a quarter of households acquire their wood from this source), indigenous forests (a tenth of households) or they buy and transport the wood in (just over a tenth). The participants in the workshop indicated similar sources of fuelwood but separated out the areas where the Turn Table Trust WFW project was clearing as a specific source. Those that cannot afford to buy and transport fuelwood in either walk long distances and carry it, beg from neighbours or use dung.

The Bulwer community use two bundles of wood (a bundle being defined as how much wood a person can carry under one arm) per day per household. Approximately one of these bundles is collected from areas where the WFW programme is clearing. The perception among the Bulwer community is that the WFW programme is clearing trees from areas where wood is collected. Also, that since the inception of the Turn Table Trust WFW project there has been a reduction in available wood. Coupled with this, is the uncertainty among the Bulwer community as to alternate sources of fuelwood and alternate energy sources. Although a large number indicated that they would become more reliant on paraffin, there is an associated cost with this form of energy. A cost many in the Bulwer community can ill afford.

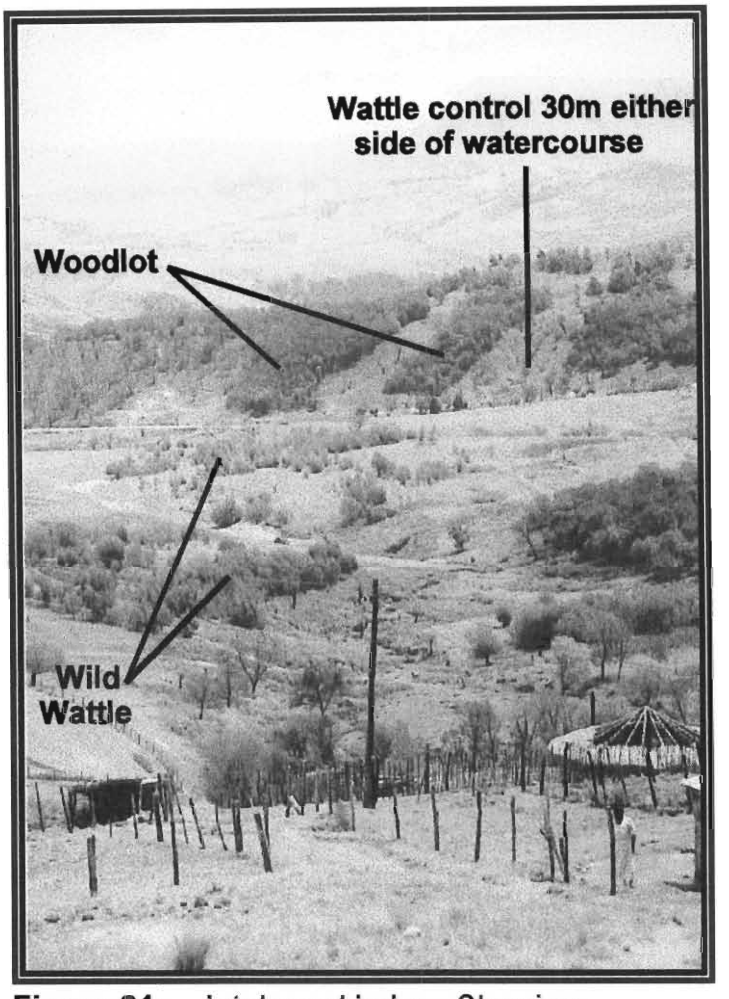

Figure 21: Intabamakhaba - Showing woodlots, wild wattle and wattle control along a tributary watercourse (Photograph: Wendy Ferraz).

Ward (1994) in her authoritative report "Biomass Assessment Review of rural household energy use research in South Africa" found that for KwaZulu, wood was the predominant source of energy for rural households after candles. Eighty-five percent of households used wood, just less than 79% used paraffin, approximately 35% used dung, and approximately 25% used electricity.

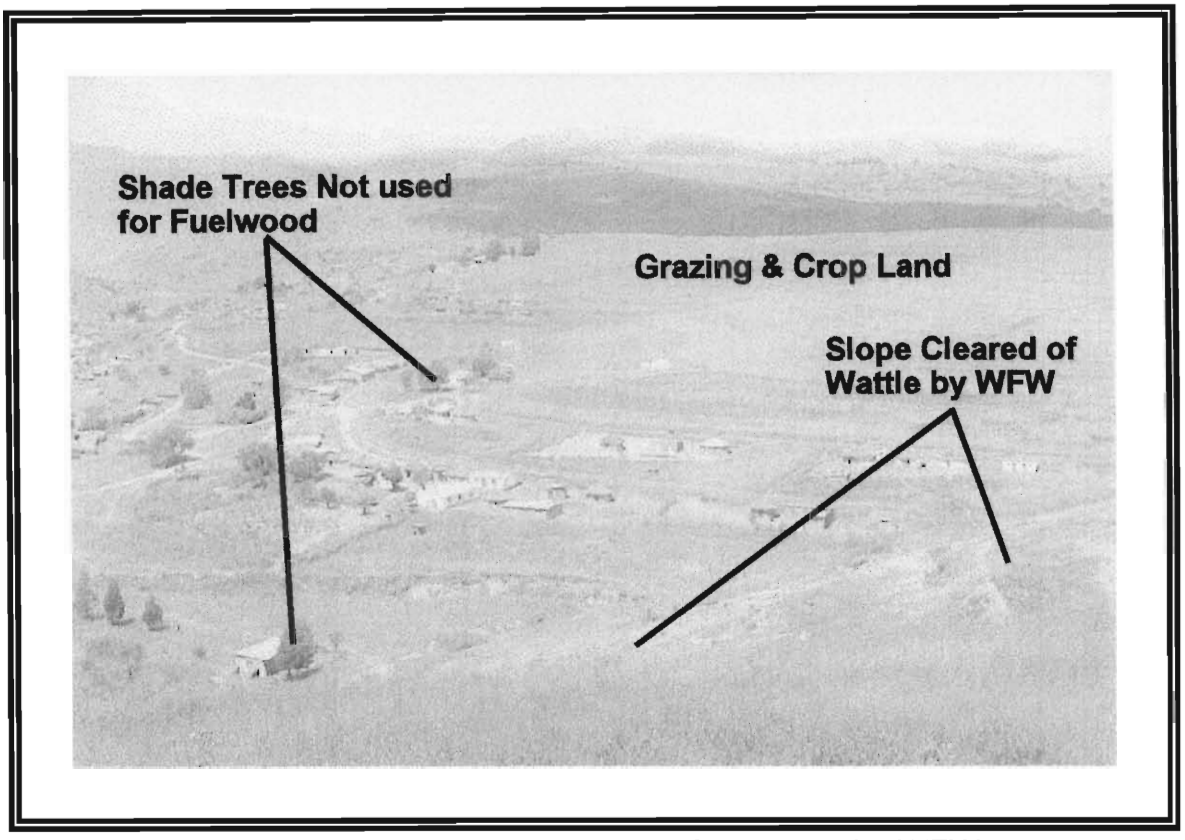

Figure 22: Mkhohlwa showing area cleared of wattle by the WFW programme and the general lack of fuelwood availability at the valley bottom. (Photograph: Wendy Ferraz)

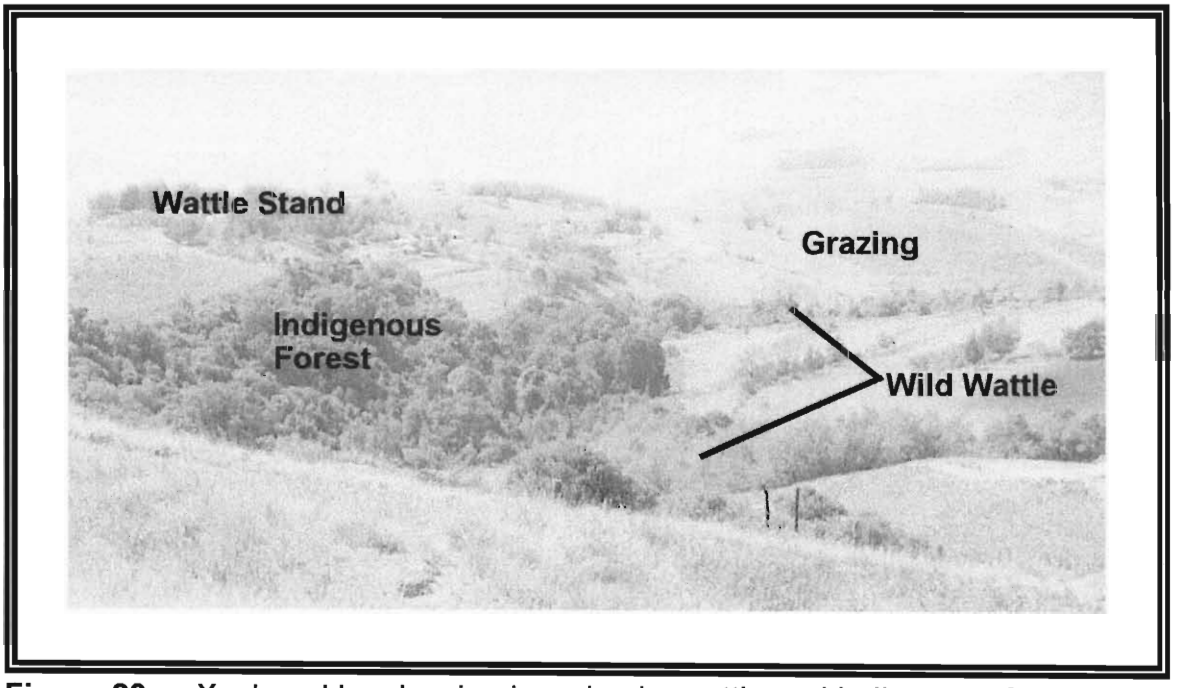

Figure 23: Xosheyakhe showing invasion by wattle and indigenous forest remnant used for medicinal, building and fuelwood. (Photograph: Wendy Ferraz)

Van Horen & Eberhard (1995) show similar energy use figures with 79% of households in KwaZulu-Natal using wood, 95% candles, 82% paraffin, 37% using dung and 10% using electricity. These results are very similar to those obtained from the Bulwer community. Other energy sources of importance were the use of candles (95% of households) and DC batteries (approximately 65%). These forms of energy were not probed in the present study although an "other" category was represented in the questionnaire that allowed for energy sources not listed. One respondent indicated gas under this category. The similarities between the results in the two studies suggest a trend in rural household energy requirements that should be taken into account when setting up projects in rural areas. Particularly if these projects impact on the primary sources of energy for the community.

A number of people interviewed, namely, Mrs B. Gent (Turn Table Trust), Mr B. Small (former project manager in Hlanganani) and Mr P. Dlamini (Turn Table Trust WFW project manager), all agree that since the WFW programme is clearing only 30m either side of the watercourses it will not affect the fuelwood supply to the communities. The area is heavily infested with wattle which is immediately apparent when moving through the area (Figures 21 & 23). Thus it will be some time before the effects of the clearing of wattle will be felt to any serious degree by the Bulwer community. However, they all suggested that some areas, where the people are located at the bottom of valleys or in areas not heavily infested by wattle and other alien plants, may feel the effects a lot sooner. In these areas people are already transporting wood in or are walking long distances to collect fuelwood. The introduction of electricity to areas beside the main road from Bulwer to Pietermaritzburg has freed the women in these areas from the hours spent collecting fuelwood, according to Mrs B. Gent. The Turntable Trust has in the past urged the community to establish woodlots. This, however, was never put into practice since there was an abundance of wattle in the area.

Charcoal is not a desired fuel source in the area. Charcoal producing enterprises have not been successful in the Bulwer area. A number of large charcoal

manufacturers have attempted to promote the idea in the area, but the return for the local people was not good enough to attract interested people. Mrs B. Gent indicated that five charcoal businesses, begun by white businessmen from Underburg and Bulwer with capital input, failed. She suggested that this was possibly due to the competition for markets and the low demand for charcoal in the area.

Van Horen & Eberhard (1995) suggest that a top-down approach and the focus of gap theory (Chapter 2) on supply and demand with efforts aimed at the reduction in the quantity of wood used, led to many failures since there was minimal understanding of the local conditions. They suggest that many interventions ignored local examples of best practice such as "simple conservation techniques employed by households in response to fuelwood scarcities such as careful fire-making and firewood loading techniques and constructing wind shelters". This may have been the case in the efforts to begin woodlots and charcoal enterprises.

Despite the comments, as described above, the perception of the Bulwer community is that the Turn Table Trust WFW project is clearing areas of trees. In addition these trees are sources of fuelwood. Also the Bulwer community perception is that there has been a decrease in the availability of fuelwood (Figure 20 & 22). It would thus appear that at present the impact of the Turn Table Trust WFW project on the fuelwood supply is small, but will become an issue in the future. Areas isolated from fuelwood sources are likely to be the first areas to feel the impact of reduced wattle infestations (Figure 22). These areas are also likely to be the areas last in line to receive electricity since the introduction of electricity is primarily along major routes in the area. It would also seem probable that the idea of woodlots will become more acceptable to people in areas where a possible shortage of fuelwood will become an issue. If the trend in the WFW programme is towards integrated catchment management, with a possible extension of clearing operations to areas other than the 30m band either side of a water course, then there is a need to consult with the Bulwer community with regards their reliance on particular fuelwood sources. It is of interest to bear in mind that in South Africa fuelwood consumption cannot be singled

out as the primary cause of fuelwood shortage in some areas. However, when considered with agriculture, veld burning, overgrazing, settlement, the WFW programme may possibly have an additive effect.

Without entering the debate on the environmental effects of wood use and removal, or the advantages and disadvantages of removing alien vegetation from large areas, discussing the social effects of wood scarcity is necessary. Traditionally, women are responsible for collecting fuelwood, among many other tasks. An economical cost was calculated by van Horen & Eberhard (1995) for fuelwood collection and resulted in a figure of approximately R1.5 billion per annum nationally. Rural households experience the effects of fuelwood in a variety of ways. Time spent collecting fuelwood increases as distances travelled or walked to collect fuelwood increases. If fuelwood collection (often requiring 2.6 - 6.2 hours per day) is included in food preparation this implies that fuelwood scarcity will increase food preparation. This leads to the situation where more time is spent preparing food than producing it. It also implies that less time is available for other important tasks such as rearing children. As distance increases, the women are likely to do fewer trips with heavier headloads resulting in possible physical problems. Coping strategies may be developed, i.e. fewer meals cooked, cooking in bulk and storage and food cooked for shorter periods resulting in possible health problems. Households may be forced to spend more on other fuels, something that few can afford to do when faced with poverty (van Horen & Eberhard 1995)

5.4 Reliance on Income from WFW programme

In keeping with the objectives of the RDP and GEAR, the Turn Table Trust WFW project has provided employment opportunities in the area. Mrs B. Gent (Turn Table Trust), Mr B. Small (former project manager in Hlanganani) and Mr P. Dlamini (Turn Table Trust WFW project manager) indicated that since there is a shortage of employment opportunities there is a lot of competition for the employment offered by WFW. This has resulted in jealousy among the people in this regard. People coming from one ward are prevented from working in another ward by the occupants of that

ward. To get around this problem the WFW management have negotiated with the community leaders and have also begun to mix the work teams to allow for continuos work down a watercourse. Thus as seen from the results of the questionnaire the people are well aware of the WFW programme in the area and this, as observed above, is having a very real impact on the communities in the area.

Approximately a fifth of the people interviewed worked for the Turn Table Trust WFW project. Another quarter of households had members who worked for the project. The minutes of the August 1998 Central Umkomaas Steering Committee show that 80 people were employed by the Turn Table Trust WFW project. Considering that approximately 260 households are in the area (Figures 1, 2 & 3) within which the project is operating, this is a substantial proportion of the population. Considering these two observations, a large number of the households in the Bulwer community benefit from the income from the WFW programme. Most of the people have been in the employ of the Turn Table Trust WFW project for more than 1.5 years and expressed positive expectations as far as continued employment and guaranteed income was concerned. It is possible to gain an understanding of the importance of the income earned from the WFW programme, by looking at household income and expenditure.

The average income of households in the Bulwer community at the time of this study was between the categories R160-R249 and R250-R419 with large representations in the "no income" and R420-R579 categories. Household expenses average R1 819 per month. There is evidently a discrepancy between household income and expenditure. This can only be accounted for by outliers such as a household indicating a monthly expenditure on education of R8000 and others indicating similarly high expenditures on building material. This is attributed to a misunderstanding of the question and an annual figure been given or a once off expenditure that occurred for that particular month. If the building materials' expenditure is removed from the equation and the one observation of R8000 for education, the average household expenditure is R899.88. This is still substantially

above the household income. This can only be explained by the tendency of rural households not to divulge all sources of income such as those that the recipients perceive as unofficial, or donations from absent relatives and friends.

The people of the Bulwer community spend much of their income on necessities such as food, clothing, taxi and/or bus fares, education and building material. Other expenses such as rent and accommodation, furniture and appliances are poorly represented. Due to the rural nature of the area dwellings are generally self built and the land has most likely been acquired through means traditional to such rural communities.

The household reliance on income earned from the Turn Table Trust WFW project is, as can be expected, closely related to whether or not the household has members employed by the project. Approximately one-fifth of the respondents and a quarter of households had members who were employed by the Turn Table Trust WFW project. Therefore, the proportion of households that covered more than half their monthly expenses, and thus rely on the income earned from the project, is comparable to the employment figures. It can be concluded from the results that households that have been receiving an income from the Turn Table Trust WFW project have come to rely heavily on this income. The end of the project or the suspension of the project for a period of time, will thus have serious implications for these households. This is evidenced in the result that 36% of respondents said that starvation would occur if the project were to cease. The participants of the workshop suggested a similar sentiment in the time line exercise, by recording in the events for 1998 "*since the end of September WFW stopped and people are starving*". The participants also concluded after a lengthy discussion that besides pensions the Turn Table Trust WFW project was the primary source of income in the Bulwer community. The importance and thus the impact of the Turn Table Trust WFW project in the Bulwer community is clear. It impacts largely on those households that have members employed by the project and this impact affects the lives of these households dramatically.

According to Mrs B. Gent (Turn Table Trust) October 1998 saw no work and has resulted in the end of many jobs with the WFW project in the Bulwer area. The core elements of the teams have been retained: i.e. the team leaders, supervisors (induna`s) and other key members possibly chainsaw operators or herbicide applicators (this was not specified). With the fluctuation in the number of people being employed by the WFW project, many less desirable workers have been "weeded out", i.e. those that continuously consume alcohol and those that do not work.

Phillips *et al.* (1995) point out that short-term public works programmes have been started to get money to the poor quickly, i.e. as many projects as possible as quickly as possible. This has resulted in the situation where many problems have arisen concerning sustainability, cost effectiveness and quality. They suggest that correctly planned long-term projects are characterised by initially a few projects that expand only once the institutional and human capacity is developed. They also emphasise the importance of the fate of workers once a programme or project ends. If expectations of permanent employment have been created by design or otherwise, resentment by the community towards the programme could well manifest itself resulting possibly in its disruption. Several options are possible, for example, establishing small enterprises, integrating work into government services and establishing maintenance teams. These issues need to be resolved before the planning of the programme is undertaken, or could lead to problems later.

From the discussion of employment and income with and from the Turn Table Trust WFW project it appears as if these factors have not been fully addressed and should be taken into account and resolved as soon as possible.

Further, Mrs B. Gent explained that many businesses in Bulwer rely on the income from people working for the WFW project to survive. Examples of this are second hand furniture shops and hardware stores where building material is bought. According to Mrs B. Gent one second hand furniture shop has already closed down

as a result of WFW project suspension in September 1998.

The WFW project income to the communities around Bulwer has resulted in many "spaza" shops coming into existence. These are likely to be affected by the suspension of the WFW project. The transport of people has become a very important industry and a large taxi rank has developed in Bulwer. This form of business is also likely to be threatened by the termination of the WFW project. The Bulwer Supply Store owned by Mr A. Muir is a major shopping venue for the community due to the reasonable prices and the credit facility offered. Mrs Gent was adamant that the end of the WFW project in the area would "kill Bulwer".

People in the Bulwer community place much store in education and will ensure that money is available to support the children in this regard. School fees are low at approximately R35 per annum at the many primary schools in the area. There is a shortage of high schools, however. A strong need for a community hall in the area exists and the Turntable Trust has suggested that these be built onto schools to serve as extra space for the school when not used by the community. The WFW project has contributed to the establishment of several creches and play schools in the area. These have continued to be maintained by the community despite the end of financial support at times from the Turn Table Trust WFW project (Mr P. Dlamini 1998 pers. com.[5]).

Møller & Jackson (1997) in their study on "Perceptions of service delivery and happiness" found a positive association between happiness and perceptions of improved service delivery. However, they concluded that it could not be taken for granted that people are more satisfied or happy when their living conditions improve. They found that government development efforts do not always attract popular support. People who have got improved services such as electricity, water, education and health do not necessarily show greater happiness and support the government

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[5]. Mr P. Dlamini, Turn Table Trust, Working for Water Project,
P.O. Box 67, Bulwer, South Africa.

or agents of development. Increased expectations and critical attitudes to agents of development may derail the best efforts of government to improve living conditions and the quality of life.

From this study it appears that the people of the Bulwer community are pleased with the opportunities that the Turn Table Trust WFW project has brought to the area, particularly concerning job opportunities. However, this development initiative was almost derailed by competition between the people for the jobs. This was fortunately rectified in time. Managers must be made aware of the many issues of concern to the Bulwer community relating to expectations of continued employment and required services. If these issues are not dealt with carefully, then it is possible that the project could face several problems in the future. Particularly since the people are already of the perception that their source of energy (fuelwood) is being affected by the clearing operations of the project. They are also, well aware of the impact on the households when the project is halted periodically.

CHAPTER 6
CONCLUSIONS

Development incorporates four interdependent dimensions, namely: human (personnel), economic, political and social development. This results in the development process that consists of three basic elements: participation, empowerment and sustainability (Liebenberg & Stewart *ed.* 1997).

The RDP has identified several basic needs to be addressed, namely: job creation, water and sanitation, energy supplies, transportation, nutrition, health care, the environment, social welfare and security. The RDP follows the traditional growth-centred approach by expressing these needs as desires or wants for particular economic goods and services. An implication of this approach is that the communities have little say in what they see as their basic needs and the manner in which these needs should be satisfied (Liebenberg & Stewart *ed.* 1997).

In a sense this study looked at two of the basic needs of the Bulwer community (as defined in Chapter 3), namely, energy supply and job creation. Although the brief of the Working for Water programme is to clear alien invasive plants, create job opportunities and increase biological diversity, from the 1997/98 annual Working for Water Programme Report it appears as if the WFW programme is rapidly expanding its goals. This becomes obvious by looking at the co-operation between different government departments, private companies and aid organisations as described in the report. The programme appears to be evolving into a large developmental programme with ever more emphasis being placed on developmental issues. In other words, the clearing of exotics has become the vehicle for the implementation of developmental efforts. The Working for Water programme has become a true environment and development programme. How a programme of this scale impacts on a local community can be deduced from the conclusions of the results and discussion of this study.

The Bulwer community is a poor community at, or close to, the poverty level with low levels of education and skills. Basic facilities and services are poor or lacking. Employment opportunities do not exist and are difficult to come by. This was evident in nearly half the households having members who lived away from home, for most of the week, due to work commitments. The income levels of households are low at between R160 - R 419 per household per month. Household expenses are high at approximately R900 per month excluding building material.

In terms of energy, the Bulwer community depend on four types, wood, paraffin, dung and electricity. Of these wood, is the primary energy source followed by paraffin, dung and electricity. Approximately half the household wood is collected from areas where the Turn Table Trust WFW project is clearing alien invasive trees, particularly wattle trees. The importance of this source of wood is thus evident. Although there is a large amount of wattle and other alien tree species in the area, many of the households perceive that there is less wood available since the Turn Table Trust WFW project began in the area in November 1995. They are also of the opinion that the project is clearing trees that they use as a source of fuelwood. Certain areas, such as those at the bottom of the valleys, have a shortage of wood and have to either walk long distances to collect wood or are forced to buy and transport it in. These areas are more likely to feel the impacts of a clearing programme than those higher up and near the main roads. Woodlots have not been high on the agenda of the community but, this appears to be changing as the clearing operation begins to impact on the wood supply. In one area the community has requested the Turn Table Trust WFW project to leave wattle trees which now serve as a woodlot. This is likely to occur more often, although with some consultation with the people areas of woodlots could be established in advance.

Although electrification is taking place, this is only occurring along the main road to Pietermaritzburg. People who have access to this form of energy still rely on fuelwood as they can not afford to use electricity exclusively. Paraffin and possibly other forms of fuel will replace wood if wood becomes scarce. However, the

additional cost of this is something few households can afford. The threat to indigenous forests seems small since only a small proportion of households indicated this as an alternate source of fuelwood in the questionnaire survey. The participants in the workshop, however, indicated a greater importance of indigenous forests as a source of fuelwood and medicinal plants. There could thus be a real threat to these forest remnants if wattle becomes unavailable for fuelwood purposes. The Turn Table Trust WFW project is thus having an impact on the fuelwood supply of the Bulwer community. Although this impact appears to be small at present, it is likely to increase as more progress is made with the clearing operation.

The impact of the employment opportunities and the associated incomes is felt in the Bulwer community. The availability of employment has lead to much jealousy and competition for these positions among members of the community. People from one ward were not allowed to clear trees in another ward. This has been mostly resolved by consultation with community leaders and by mixing people from different wards in one team. The major impact has been on those households that have members employed by the Turn Table Trust WFW project. These households rely on this income to cover over half their household expenses. It has also been suggested that if, or when, employment by the Turn Table Trust WFW project is terminated "starvation" will occur in these households. It is thus important that the managers of this project ensure an even distribution of the budget through the year to prevent temporary project closure, as happened in September 1998. During this period the project was put on hold for a few months and people, temporarily retrenched, struggled to survive. The town of Bulwer itself has also come to rely on the income earned by those employed by the Central Umkomaas WFW project. It has been stated that residents in the town suggest that the impact if the project were to terminate, would be great, possibly resulting in businesses closing down, with associated adverse effects on the town as a whole.

Although it is appreciated that a programme the scale of the Working for Water programme has a huge budget with money becoming available at odd times, it must

also be appreciated that the inconsistent supply of employment is going to affect the receiving people who are at the poverty level. Planners and managers must thus plan carefully to prevent the situation as described above. They must look past the numbers to the lives that are being affected.

The Working for Water programme has far reaching implications for a local community and its surrounds. Factors affecting a community need to be taken into account when both beginning a project in an area, and importantly when ending a project in an area. In terms of this study, a community could be left without an adequate fuelwood resource, possibly resulting in the destruction of indigenous forest remnants. The households and thus the community could be left in turmoil from loss of income and unfulfilled expectations.

Examining the environmental impacts of such a programme is thus not only important, but also the developmental impacts which need to assessed before a project is begun. Also continual monitoring and evaluation need to be implemented. The Working for Water programme is beginning to set such procedures in place.

According to Mrs T.M. Sibetha (Bulwer Biosphere WFW project Manager) and Mr R. Mthethwa (Central Umkomaas WFW project Production Manager), the Central Umkomaas WFW project has taken a further step towards empowering the people that have thus far benefited from the project. Supervisors of the 20 people strong teams have been sent on training courses at Bainesfield, Richmond, KwaZulu-Natal. These courses are an attempt to prepare these people for their new role as private contractors to the various sub-projects incorporated within the Central Umkomaas WFW project. They have restarted working, after a long break since September 1998, in February 1999 as contractors. There are bound to be new problems that will need addressing. Whether or not this has been planned for, and what these problems are, will require further examination.

Finally, this study has brought to attention several other issues that need to be examined in the Bulwer area. They include, the supply of facilities and services, AIDS and health issues, the expectations of the Bulwer community and the development of a more functional participative approach to development in the area. Participatory development management dictates that the active involvement of people must take place in the formal management process with regards developmental programmes. Involvement of the broad mass of the population should be in all phases of programmes and projects planned to increase the levels of living, namely: choice, execution and evaluation (Liebenberg & Stewart *ed.* 1997).

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APPENDIX 1: Questionnaire

QUESTIONNAIRE - 1998

MSc. (Environment & Development)

University of Natal - Pietermaritzburg

Tel: 0331 - 260 6223

Researcher: D.C. Naudé

Fieldworker`s Name

Date

Time of day

Area

I am doing a survey for a masters student from the University of Natal, Pietermaritzburg. He is doing a study of the effect of the Working For Water programme in your area. He is interested in two aspects:

1) the impact of the Working For Water Programme on the supply of firewood and

2) the impact on the people in the community if the project should end.

The information that he gathers will be used for his Masters thesis a copy of which will be provided to the Turn Table Trust

To obtain reliable, scientific information it is necessary that you answer the questions as honestly as you can. HOW YOU FEEL about these issues is important in this research.

Your household has been selected randomly for the purposes of this study, thus the fact that you have been chosen is by chance only. Your name will NOT be written anywhere on the questionnaire and you need not sign the questionnaire
or any other documents. The information that you provide will be treated as confidential. It will be processed by computer in such a way that no personal identification will be possible.
This interview will take approximately 20-40 minutes to complete

1. DEMOGRAPHIC AND SOCIO-ECONOMIC STATUS

1.1 Sex of Respondent

Male	1
Female	2

1.2 What is your age in completed years?

Actual age if available	
`15-20	1
`21-25	2
`26-30	3
`31-35	4
`36-40	5
`41-50	6
`50-60	7
`60-70	8
`70+	9

1.3 What is your current marital status?

Married	Civil (Church or magistrate)	1
	Traditional (Lobola/Bogadi)	2
	Civil and Traditional	3
Betrothed and living together		4
Live together		5
Divorced/estranged		6
Widower/widow		7
Never married		8
Other: Please specify		9

1.4 What is your highest educational qualification?

None	1
Class1 and 2/Grade 1 and 2	2
STD 1/Grade 3	3
STD 2/Grade 4	4
STD 3/Grade 5	5
STD 4/Grade 6	6
STD 5/Grade 7	7
STD 6/Grade 8	8
STD 7/Grade 9 (FORM II)	9
STD 8/ Grade 10 (FORM III, NTC 1)	10
STD 9/Grade 11 (FORM IV, NTC II)	11
STD 10/Grade 12(FORM V, NTC III)	12
STD 10/Grade 12 + COLLEGE DIPLOMA	13
TECHNIKON DIPLOMA	14
TECHNIKON HIGHER DIPLOMA	15

B. DEGREE/HONOURS DEGREE	16
MASTER`S DEGREE	17
LAUREATES IN TECHNOLOGY	18
DOCTOR`S DEGREE	19
Other: Please specify	20

1.5 What language do you speak mostly at home?

Zulu	1
Sotho	2
Swazi	3
Ndebele	4
Xhosa	5
Afrikaans	6
English	7
Other: Please specify	8

1.6 Definition of Household

All individuals who contribute to the common good of the household and who share food from a common source when they are together

Position in household NOT names; eg. Head, senior wife, mother of head

WRITE IN FROM OLDEST (TOP) TO YOUNGEST (BOTTOM) START WITH HEAD		AGE	MALE = 1, FEMALE = 2
Head of household	1		
	2		
	3		
	4		
	5		
	6		
	7		
	8		
	9		
	10		
	11		
	12		
	13		
	14		
	15		
	16		
	17		
	18		

2. HOUSEHOLD INFORMATION

2.1 Type of dwelling

Formal dwelling/house on a separate site	1
Traditional dwelling/hut	2
Formal dwelling/house/flat/room in backyard	3
Informal dwelling/shack in backyard	4
Informal dwelling/shack NOT in backyard eg. informal settlement	5
Room in hostel/compound for workers provided by an employer	6
Other: Please specify	7

2.2 How long has this household been resident in this area?

Less than 1 year	1
Over 1 - 2 years	2
3 - 4 years	3
5 - 9 years	4
10 - 14 years	5
15 - 19 years	6
20 years and more	7

2.3 Do any members of this household sleep at another residence for more than 4 nights a week because they work away from home?

Yes	1
No	2

2.4 What is your current occupation? which of the following best describes your present work situation?

Unemployed, not looking for work	1
Unemployed, looking for work	2
Work in informal sector, not looking for permanent work	3
Work in informal sector, looking for permanent work	4
Pensioner (age/retired/sick/disabled, tec.)	5
Housewife, not working for money, not looking for work	6
Housewife, looking for work	7
Student/scholar	8
Self-employed - full time	9
Self-employed - part time	10
Employed part time (if none of the above)	11
Employed full time	12
Other: Please specify	13

2.5 What is your current occupation? (Detail Please)

_____

2.6 STANDARD OF LIVING OF HOUSEHOLD

QUESTION	YES	NO
Does your household	1	2
Own a fridge or freezer?	1	2
Own a polisher or vacuum cleaner?	1	2
Own a TV set?	1	2
Own a Radio?	1	2
Own a HI-FI or music centre (radio excluded)?	1	2
Own a Microwave oven?	1	2
Own a Washing machine? (any)	1	2
Own a Sewing machine? (any)	1	2
Shop at supermarket?	1	2
Have a waterborne (flush) toilet?	1	2
Have a pit latrine (long drop) toilet?	1	2
Have refuse removed?	1	2
Have electricity in your home?	1	2
Have running water in your home? (piped water)	1	2
Have at least one car in your household?	1	2
Have a telephone or cellphone?	1	2

3. PROJECT TERMINATION

3.1 Have you heard of the DWAF Working for Water Programme?

Yes	1
No	2

3.2 Do you know what the DWAF Working for Water Programme is?

Yes	1
No	2

3.3 Do you work for the DWAF Working For Water Programme?

Yes	1
No	2

3.4 How long have you been (continuously) employed by the WFW programme?

Not applicable	0
`1-3 months	1
`3-6 months	2
`6-9 months	3
1 year	4
`1-1.5 years	5
`1.5-2 years	6
more than 2 years	7

3.5 Is the Working For Water programme providing secure and continuous work?

Don`t Know/Uncertain	0
Yes	1
No	2

3.6 Do any members of your household work for the DWAF Working For Water Programme? How many?

Yes	1
No	2

3.7 How long have they been employed by WFW programme?

Not applicable/Don`t Know	0
`1-3 months	1
`3-6 months	2
`6-9 months	3
1 year	4
`1-1.5 years	5
`1.5-2 years	6
more than 2 years	7

3.8 Have you or anyone else in the household who have been working for the WFW programme ever been retrenched and rehired again; if so how many times has this happened?

Don`t Know/Uncertain	0
Yes	1
No	2

IF YES:

3.9 If there is no more work with the WFW programme Where will you and other members of your household get work now?

3.10 Where did you work before the WFW programme started in your area?

3.11 Will it unsettle the household if members have to leave home to find work?

Don`t Know/Uncertain	0
Yes	1
No	2

3.12 What is the total income for this household per month (include persons and payments from those working elsewhere)?

No income	1
R1 - R39	2
R40 - R59	3
R60 - R79	4
R80 - R119	5
R120 - R159	6
R160 - R249	7
R250 - R 419	8
R420 - R579	9
R580 - R829	10
R830 - R1 249	11
R1 250 - R1 659	12
R1 660 - R2 499	13
R2 500 - R4 159	14
R4 160 - R5 829	15
R5 830 - R8 329	16
R8 330 - R12 499	17
R12 500 - R16 659	18
R16 660 - R24 999	19
R25 000 - R41 659	20
R41 660 +	21
Refuse to answer	22
Uncertain/don`t know	0

3.13 Does your household receive alternative income NOT in monetary terms eg. Cattle, goats, crops, food?

Don`t Know/Uncertain	0
Yes	1
No	2

If YES, What? _____

3.14 How much money does your household spend on the following?

	Fill in amount here	
Food		1
Rent/Accommodation		2
Building material		3
Clothing		4
Furniture		5
Household appliances eg. washing machine, stoves		6
Education eg. school fees, books		7
Car		8
Taxis/bus		9
Other expenses: Please specify		10

3.15 What proportion of this is derived from those employed by the WFW programme?

None	0
Less than quarter	1
Quarter to half	2
More than half	3

3.16 Does the household rely on income from those employed by the WFW programme?

Don`t Know/Uncertain	0
Yes	1
No	2

3.17 What will be the effect on the household should this income stop?

_____

4. FUELWOOD

4.1 What type of energy/fuel do you use in your household?

Electricity	1
Generator	2
Paraffin	3
Wood	4
Coal	5
Dung	6
Charcoal	7
Other: Please specify	8

4.2 Has anyone enquired about the use of fuel wood by the community?

Yes	1
No	2

If YES, Who? _____

4.3 If wood is used, What type of wood?

Wattle	1
Gum	2
Pine	3
Indigenous	4
Other: Please specify	5

4.4 What is the preferred tree species for fuel wood?

_____

4.5 If wood is used, Where is it obtained from?

A vendor	1
A shop/supermarket	2
A garage	3
A nearby farm	4
SAPPI/MONDI/Plantation	5
Wild wattle walking distance	6
Buy & Transport it in	7
Transport it in	8
Indigenous forest	9
Natal Parks Board	10
Other: Please specify	11

4.6 How much wood is used per household per day?
(a bundle of wood is what you can carry under one arm)

None	0
One bundle	1
Two bundles	2
Three bundles	3
Four bundles	4
Five bundles	5
Six Bundles	6
Other: Please specify	7

4.7 What is the wood used for in the household?

For cooking	1
For warmth	2
For heating washing water	3
For light and socialising	4
Other: Please specify	5

4.8 How much does wood cost the household?
eg. Per bundle, bakkie load or other.

_____

4.9 How do you collect the wood you use?

_____

4.10 Who in the household collects the wood?

_____

4.11 How do you or they have to go to get wood?

_____

4.12 How is the wood transported?

Bakkie	1
Truck/Lorry	2
Transport Contractor	3
Animal	4
Carried	5
Other: Please specify	6

4.13 How much do other sources of fuel cost the household?

_____

4.14 How much of the wood that you use is collected from the areas where the WFW programme is clearing?

None	1
Some	2
Half	3
Most	4
All	5

4.15 Is there the same or less wood available for the household since the WFW programme started?

Don`t Know/Uncertain	0
Less	1
Same	2

4.16 Is the Working For Water programme removing trees that are used for wood?

Don`t Know/Uncertain	0
Yes	1
No	2

4.17 If the WFW programme clears all the trees in the catchment where will the household get wood from?

4.18 Will the wood cost more?

Don`t Know/Uncertain	0
Yes	1
No	2

4.19 Can the household afford to pay more?

Don`t Know/Uncertain	0
Yes	1
No	2

4.20 Will the household change to other forms of fuel?

Don`t Know/Uncertain	0
Yes	1
No	2

4.21 What other fuels will they use?

Don`t Know/Uncertain	0
Electricity	1
Generator	2
Paraffin	3
Coal	4
Dung	5
Charcoal	6
Other: Please specify	7

Thank you very much for your time and your co-operation this is greatly appreciated!!

Appendix 2

MAP 1: Turn Table Trust Working for Water Project Area Showing Study Areas

Legend

- Turn Table Trust - Working for Water Project Boundary
- Main Road
- River
- Town
- Study Areas

N
W E
S

Scale 1:80 000

Pietermaritzburg
Intabamakhaba
Mkhohlwa
Pholela
Xosheyakhe
Bulwer
Umkomaas River
Uhane River
Underberg
Ixopo

Map Courtesy of: KwaZulu- Natal, Working for Water

Central Umkomaas -Turn Table Trust U10F1001

Clearing Programme at 31 March 1999

Annexure 1

Appendix 3

MAP 2: Turn Table Trust Working for Water Project Area Showing Alien Plant Clearing

Progress to March 1999

- Cleared
- First Follow-up
- Second Follow-up
- Third Follow-up
- Maintenance Control
- Rehabilitation
- Not Cleared
- Working Boundary
- Dams & Wetlands

N
W E
S

Scale 1:80 000

Pietermaritzburg
Intabamakhaba
Umkomaas River
Mkhohlwa
Pholela
Xosheyakhe
Xosheyakhe
Bulwer
Uhane River
Underberg
Ixopo

Turn Table Trust Clearing Statistics

Total Area	Total Area Cleared of Alien Plants
2480 Ha	676 Ha

Map Courtesy of: KwaZulu- Natal, Working for Water

Central Umkomaas -Turn Table Trust
U10F1001

Clearing Programme at 31 March 1999

Annexure 1