

**Labour-Based Rural Road Maintenance for Poverty
Alleviation: A Case Study of the Zibambele Programme in
Umbumbulu, KwaZulu-Natal**

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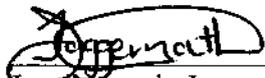
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DECLARATION

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Dear Sir/ Madam

I, Jyotikumarie Jaggernath, Registration Number 200000983, hereby declare that unless otherwise indicated, this dissertation is my work and has not been submitted in part or full for any other degree purposes at any other University.


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DEDICATION

This dissertation is dedicated to the loving memory of my late dad

Mr Sathish Tirubeni Jaggernath

whose advice, encouragement and wisdom has paved the path for my future success.

Your spirit is my guiding light and inspiration.

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ABSTRACT

This research is an evaluation of labour-based methods and techniques that are used in rural road construction and maintenance. The study places emphasis on the Zibambele rural road maintenance programme in Umbumbulu, which is based on a lengthmen (male or female) system. The research is an attempt to determine how strategies such as Zibambele can be used for the social and economic upliftment of impoverished rural areas as well as contribute to adequate road access for rural communities to address the legacy of apartheid, with special reference to the empowerment of women-headed households. Rural road networks in South Africa are underdeveloped and characterised by its poor state, lack of maintenance and lack of provision, thereby having little impact on the lives of the rural poor Black population. It is evident in the study that development and maintenance of physical infrastructure are keys to rapid economic growth and poverty reduction. The study examined the impacts of labour-based rural road maintenance on accessibility and poverty alleviation in the Umbumbulu community through the use of quantitative methods (specifically a questionnaire survey) and qualitative methods (specifically focus group discussions, ranking exercises, mental mapping and venn/ chapatti diagrams). The findings of the study indicated that the Zibambele poverty alleviation and rural road maintenance programme impacted positively on the livelihoods of many women-headed households by providing an income, facilitating skills development, and improving their social environment. It was also determined that through the introduction of new programmes such as Zibambele, the transport infrastructure within a community and the quality of life immediately improves, thus alleviating many affects of poverty.

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ABBREVIATIONS AND ACRONYMS

ADB	Asian Development Bank Institute
ADB	Asian Development Bank
ANC	African National Congress
CIDB	Construction Industry Development Board
DoT	Department of Transport
GEAR	Growth, Employment and Redistribution
HIV/AIDS	Human Immunodeficiency Virus/ Acquired Immunodeficiency Syndrome
IISD	International Institute of Sustainable Development
ILO	International Labour Organisation
IFP	Inkatha Freedom Party
IMF	International Monetary Fund
ITDG	Intermediate Technology Development Group
MSA	Moving South Africa
MRP	Minor Roads Programme
NESDA	Network for Environment and Sustainable Development in Africa
PAR	Participatory Action Research
PRA	Participatory Rural Appraisal
RDP	Reconstruction and Development Programme
RRA	Rapid Rural Appraisal
RTSSA	Rural Transport Strategy for South Africa

CHAPTER ONE

INTRODUCTION

1.1 Preamble

At the heart of rural development is the basic idea of ensuring a better quality of life for rural communities and for their future generations, since the majority of the population, and of the poor, live in rural areas (Windle and Cramb, 1997). According to the Asian Development Bank Institute (2005), a vast majority of poor people around the globe reside in rural areas which are frequently characterised by low levels of public infrastructure, particularly roads. Rural areas suffer most from poverty, combined with a highly unequal income distribution; have the most undeveloped social and economic infrastructures; and have the lowest human development indices (Natural Resource Perspectives, 1999).

Well maintained infrastructure is the underlying foundation for the development of any form of activity (Moodley et al, 2005). When roads and transport infrastructure are neglected they impose a significant burden on the poor in terms of time, costs and efforts; thereby resulting in a situation of isolation to the rural poor. The main causes of the road maintenance problems in most developing countries are insufficient funding, lack of foreign exchange, shortage of qualified staff, deficient institutional arrangements and poor management capacity. Rural roads typically suffer most as priority is given to the maintenance of national, urban and other paved roads (Mwango, 2000). Mwango (2000) states that there has been a recent shift in road planning away from major road networks towards secondary and feeder roads in a number of developing countries, including South Africa.

Rao (1995) stipulates that a road network is generally identified with travel demand, activity and socio-economic and demographic characteristics of a region. Edmonds (2002) suggests that rural roads in economic terms are important elements of a road network. Without them any proposal for improving a country's economy through the exploitation of agriculture is of little hope. According to Edmonds (2002), rural roads

have often been perceived only in terms of their economic or strategic and political role, rarely in their potential for social development. Similarly Ali and Pernia (2003), state that weak governance and institutions resulted in corruption, distorted public investment choices, and neglected maintenance thus lowering infrastructures contribution to economic growth, and benefits intended for the poor.

Touton (2003) asserts that maintenance has a strong impact on infrastructure and incomes of the poor. It is necessary to have a good transport system for the efficient functioning of the economy and investments into transport projects such as road maintenance supports both growth and development (Roads and Transport, 2003). Addressing the current backlog in maintenance and upgrading of gravel and access roads also creates economic opportunities in rural areas. A well maintained rural road and transport infrastructure is fundamental to facilitate production, productivity and poverty alleviation; especially in rural areas. Ashley and Maxwell (2001) stipulate that a good road infrastructure is vital for the mobility of people, goods, services and communication. It is also an important means of transporting goods and services to markets and linking people to urban and commercial centres and can also serve as a vital catalyst for subsistence farmers to participate in the formal economy.

Jacoby (1998) found that providing improved road access to markets would generate substantial total benefits for the poorer households since agricultural practices predominate in rural areas, thus creating an impact on poverty alleviation. The use of local markets for sale of their produce, the purchase of consumer goods and opportunities for off-farm employment that poor people can make are limited by inadequate roads (Asian Development Bank Institute, 2005).

It is important to understand that the quality of a road network depends on what, when and how maintenance was carried out (Roads and Transport, 2003). Roads and Transport (2003) indicate that roads deteriorate over time due primarily to traffic volumes, environmental influences such as floods and overloading and therefore these roads need

to be maintained throughout their life to ensure that they deliver the benefits envisaged. It is suggested in Moodley et al (2005) that rural transport facilities not only stimulate basic access and mobility but also serve as a catalyst towards the access to other essential rural requirements such as water, firewood, farms, and other communal meeting points. The significance of rural roads impacts across all aspects of economic and social development of rural communities including demand for and access to health, education, information and other community services (KwaZulu-Natal Department of Transport, 1998). Furthermore, rural roads are generally regarded as instrumental in creating opportunity, facilitating empowerment, and enhancing security (Asian Development Bank Institute, 2005).

There is a significant amount of literature that exists on the construction and maintenance of rural roads. However, there is only a handful of research conducted on women's participation and the benefits derived from these road activities or programmes. The core findings of existing evidence is that women are responsible for a disproportionate share of the households transport burden, while at the same time having more limited access to available means of transport required to carry out daily household tasks (Peters, 2002). The Department of Transport (1998) asserts that considerable attention is being paid to the role of women in labour-based rural road works for increased off-farm income.

Emphasis of this research will be placed on the KwaZulu-Natal Department of Transport's labour-based, poverty alleviation, construction and maintenance programme, Zibambele, which was initiated by the former Minister of Transport, Mr Sibusiso Ndebele. The Zibambele Road Maintenance System was initiated in October 1998 at a job summit as part of the Road to Wealth and Job Creation geared by the Department of Transport, KwaZulu-Natal (Zibambele, 2003). Zondi (2000) states that the Zibambele programme depicts how the Department of Transport is capable of creating job and entrepreneurial opportunities as well as providing upliftment and adequate road access for rural communities to address the legacy of apartheid.

In 1999, the Department of Transport (DoT) - KZN awarded 2700 Zibambele contracts as part of its Roads to Wealth and Job Creation initiative. Currently more than 24 000 contractors exist that are responsible for 11 000 kilometres of rural roads annually (Zibambele, 2005). According to former Transport Minister, Sibusiso Ndebele, Zibambele targets to issue 40 000 contracts in KZN, and estimates that poverty will be alleviated for more than 50 000 destitute families (Zondi, 2000).

1.2 Motivation and Need for the Study

This study is an evaluation of a labour-based rural road maintenance programme, referred to as “Zibambele”, which is a Zulu name meaning “doing it for ourselves”. Zibambele is an innovative road construction and maintenance programme aimed to stabilise destitute families in rural areas, in a positive and crucial attempt towards breaking their poverty cycle (Zibambele, 2003). According to Ndebele (2000), the vast majority of South African citizens are considered to be poor, of which 30% of the population is said to be ‘ultra poor’. Bridraj (2000) asserts that people living with hunger have become a way of life for greater than two-and-half million of people living in KwaZulu-Natal. According to Ndebele (2000), the eradication of poverty is the greatest challenge that is faced by the nation and that a rural solution has to be found in order to achieve success in the uprooting of poverty. In general, poor peoples’ disproportionate access to information technology, and productive assets such as road provisioning, can be recognised as one of the primary underlying causes of poverty (Moodley et al, 2005). Dercon and Krishnan (1998) and Kwon (2001) investigated the role of roads to be one of several factors contributing to changes in the incidence of poverty.

Rural road networks in South Africa are underdeveloped and characterised by its poor state, lack of maintenance and lack of provision, thereby having a diminutive impact on the lives of the rural poor Black population (Moodley et al, 2005). The disparities arising from previous patterns of spatial development are a reflection of road infrastructure in South Africa which was created by apartheid policies (Roads and Transport, 2003). Shandra (2003) attributes the current location of Blacks in rural areas as resulting from the deliberate marginalisation strategies of the apartheid government, which facilitated

the skewed distribution of the Black population into isolated areas combined with poor services and facilities, thus resulting in a poor quality of life for the Black population. However, despite the development of our new democratic government, a significant portion of the rural population still remain affected by poor accessibility and mobility.

Naude et al (2000 cited in Moodley et al, 2005) argue that due to apartheid an inflexible system of territorial, social and political segregation emerged. As a result of apartheid and racial segregation, Black people had to commute long distances with poor transportation services, poorly maintained roads and increased travel and time costs (Moodley et al, 2005). According to Beck (1994), if such a situation is left unchecked, it could result in the isolation of the rural poor Black population, thereby increasing their levels of deprivation and thus poverty.

Therefore, in an effort to create hope and positive futures for destitute families, Zibambele can be regarded as a powerful initiative towards poverty eradication. Barber (2000) states that Zibambele is an innovative economic initiative that is aimed at improving livelihoods for the impoverished that can be achieved through the maintenance of road infrastructure facilitated by labour intensive methods. It is a community driven, peace initiative that reinforces the democratic process, which improves living standards of the ultra poor, and enhances human and social dignity (Bridraj, 2000).

Zibambele is an adaptation of the Kenyan model, which is based on a "lengthmen" system (Zondi, 2000). Specified in Bridraj (2000), the term "lengthmen" is used for a person (male or female) that is contracted to maintain a length of road under the Zibambele programme. Rather than employing a single member of a household, the lengthmen system contracts an entire household. A maximum of 60 hours per month, which is approximately eight days in the month, is allocated to contractors to maintain a length of road, thus giving the contractor enough time to engage in other income-generating activities (Bridraj, 2000).

A length of road is contracted to the “poorest of the poor”. Bridraj (2000) indicates that a contractor may be allocated approximately 700m of road to maintain on a steep section of road that may be prone to extensive damage through erosion. Often 1500m of a flat section of a road may be allocated to a contractor, since minimal maintenance may be required.

It is of vital importance to evaluate the planning, provisioning, construction and maintenance strategies of rural roads on the livelihoods of poor rural communities and their links towards poverty eradication. However, it is also imperative to ascertain the benefits accrued by women from such strategies for increased off-farm income. According to Ndebele (2000), there is a strong correlation between deep poverty and women-headed households in KwaZulu-Natal and other provinces that have large rural populations.

As a result of decades of civil conflict that left thousands of women widowed and children orphaned, the number of women-headed households has increased extensively in KwaZulu-Natal (Zimbabwe, 2005). Thus, it is noted in Bridraj (2000) that Zimbabwe contracts are allocated to those households that have no source of income, particularly to those households that are headed by women.

The research will attempt to provide demographic information on the households in the study area; critically examine (using an appropriate conceptual framework) poverty in rural areas in South Africa, especially in relation to infrastructural issues; and briefly discuss past policies that have had a detrimental impact on communities in relation to road provision. Concepts of road provision and maintenance and their significant links towards poverty alleviation will also be highlighted in the research. The research will further attempt to emphasise the role of women in road development and maintenance through the participation in labour-based road maintenance. Additionally, the positive and negative impacts of rural road construction and maintenance and how labour-based methods can contribute to and encourage poverty alleviation are assessed.

1.2 Aim

This study intends to examine the impacts of the Zibambele road maintenance initiative on the livelihoods of the rural 'ultra poor' in the Umbumbulu community and how such a development strategy can be used for the social and economic upliftment of impoverished rural areas, as well as contribute to the empowerment of women-headed households, specifically.

1.4 Objectives of the research

- To investigate the socio-economic profile of the community members that are involved in the Zibambele road development initiatives.
- To determine the advantages, views and concerns of road maintenance for both Zibambele participants and non-participants in the rural community.
- To identify the extent and nature of community participation and involvement in decision-making processes that are associated with the Zibambele programme.
- To determine the impacts that Zibambele has on women-headed households in the community.

1.5 Research Methods and Data Sources

1.5.1 Methodology

This study proposes to evaluate the maintenance of roads in rural areas and their facilitation towards poverty alleviation with special reference to a case study of the Umbumbulu community of KwaZulu-Natal, known as the Zibambele road maintenance programme. Emphasis of the research is particularly placed on the contribution of labour-based, rural road maintenance and its impact on the quality of life of rural households and how the programme contributes to or impacts on poverty alleviation.

1.5.2 Primary data sources:

Standard quantitative and qualitative methods will be employed in the study to generate data relating to the research objectives. Maxwell (1998) asserts that quantitative methods result in numeric data, which is usually machine-readable and can be analysed by recognised statistical tests and models. Qualitative methods result in textual or narrative information that is either descriptive, or subject to other forms of analysis (Myers, 1997). The primary data sources used in the study includes the use of socio-economic questionnaire surveys and qualitative methods. In terms of the latter, mental mapping, direct observation, venn/chapatti diagrams and ranking exercises were undertaken.

1.5.3 Secondary data and information sources:

This research will include a review of information acquired from the Department of Transport reports, policies, and speeches; published works; a review of articles, journals and newspaper and magazine clips. Library research and desktop studies during the course of the study will also be highlighted in the literature review chapter.

1.6 Chapter Sequence

Chapter one forms the introduction to the study and provides the motivation and description of the Zibambele road maintenance programme as well as the aim and objectives to the study. In *Chapter two*, a literature review details the characteristics of rural poverty and the social and economic benefits of rural road development and maintenance on the livelihoods of rural poor communities. *Chapter three* places focus on the research methodology and description of the project environment. This chapter describes the road maintenance site, and gives a detailed description of the type of research undertaken. In *Chapter four* an analysis of the data collected from questionnaires is examined and represented in the form of graphs and tables. *Chapter five* constitutes the final chapter: the conclusion and recommendations. Key issues and findings of the research project are summarised and recommendations are proposed with concluding remarks.

1.7 Conclusion

This chapter highlights some important aspects in poverty alleviation and discusses the general impacts of road projects, such as labour-based rural road maintenance, on the lives of rural poor communities. The chapter also briefly introduces the need for the study with particular reference being made to the Zibambele labour-based rural road maintenance programme. The underlying basis of any research is the study methodology. Therefore this chapter also highlights the various secondary and primary data sources that were used to undertake the study. This chapter also entailed a chapter sequence, which is a breakdown of the subsequent chapters.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

The literature review chapter is an attempt to briefly review, discuss and summarise published information, and other secondary data sources that presently exist on rural road infrastructure, rural road maintenance and labour-based technologies and policies, as well as to determine their links to poverty eradication. It is further an attempt to create a theoretical framework and to more appropriately prepare for the research methodologies, analysis and recommendations. Additional focal points in this chapter will include the role of women in labour-based maintenance works and the socio-economic as well as environmental impacts of rural road maintenance and labour-based technologies on rural communities in South Africa and other developing countries.

2.2. Definition of Concepts relating to the Research

The concepts and terminology discussed in this section are critical to understand the key issues under investigation. The intention is not to engage in a literature review but to briefly highlight aspects relevant to this study.

2.2.1 Development

Development is a process of enlarging the range of peoples' choices by expanding their opportunities and realising their potential. Lungu and Price (not dated) assert that elements in the process of human development include creating productive employment and income, improving education and health care, establishing the conditions for participation and political freedom, and managing resources in an environmentally sustainable manner.

A starting point for international efforts directed towards poverty eradication is to support community initiatives and draw upon the community's ingenuity, energy, and commitment (DeSilva, 2001). Community initiatives, according to DeSilva (2001), can

help people to cope with crisis and to survive, but it is up to governments to create the enabling environment through which such initiatives can transform societies.

The productivity, welfare, and security of rural people are greatly influenced by the level of infrastructure development in their communities and the infrastructural links to district, provincial, and national centres of government and commerce (Wasike, 2001). In practice road maintenance and operation may occur concurrently, and redesign, rehabilitation, or repair may be conducted when necessary. The following sections and sub-sections are a brief description of the phases of infrastructure development with respect to rural roads and maintenance.

2.2.2 Sustainability and Sustainable Rural Development

Development projects should be conceived in a manner in which the living conditions of the target population undergoes a sustained improvement (Mashiri, 2000). According to Mashiri (2000), rural development processes must be competent enough so as to continue independently even after external impulses and contributions have been discontinued. Mashiri (2000) further suggests that communities that benefit from rural development initiatives must presume liability for raising a reasonable quantity of the required resources. If local communities raise and risk significant quantities of their own resources then the quality and reliability of rural investment choices and their management will thus be improved.

2.2.3 Rural Roads

Roads are the arteries for social and economic development. According to DeSilva (2001), unclassified roads are most commonly known as access roads that help rural women, men and children reach essential services such as hospitals, schools, banks and markets. Rural roads are generally used for a wide variety of purposes and modes of transport, ranging from head loads and bicycles to animal drawn carts to motorised vehicles of different sizes (Shroeder, 1997).

2.2.3.1 Unformed roads

Unformed roads, also referred to as earth roads, have a natural alignment on the terrain without any engineering input (World Bank, 2005). These roads typically evolve from local tracks. It is stated in the World Bank (2005) document that unformed roads have no drainage, cross fall, added granular material or other features that would ensure all-weather access. The World Bank (2005) suggests that unformed roads are most common when the dominating traffic is animal driven, low speed or light motorised.

2.2.2.2 Formed roads

Formed roads usually have a reasonably well defined cross section, including drainage (World Bank, 2005). The road formation reflects the desire to cater for vehicular traffic of reasonable speed in most weather conditions. The World Bank (2005) interprets these roads as usually consisting of locally available earth material with no added surfacing material.

2.2.3.3 Gravelled roads

A more appropriate name for gravel roads would be “gravelled and formed” roads as these roads should be built and designed to certain engineering principles, including the importation, where warranted, of gravel wearing surface (World Bank, 2005). Construction of these roads also involves a defined cross section, drainage and structures such as bridges and culverts.

2.2.5 Provision of rural roads

The provision of rural roads refers to the planning, management and financing of rural roads and the collective decision-making that faces a variety of provision related decisions including, whether to provide a road or not; what quantity and quality of road to provide; how to finance the construction and maintenance; how to regulate the road and what arrangements should be made to reconstruct and maintain the road (Shroeder, 1997).

2.2.6 Stakeholders of rural road development

Groups of people that have an interest in the rural road project are considered to be the stakeholders (Thevadasen, 2003). Thevadasen (2003) defines stakeholders as those people whose social and economic interests depend on the road and include rural communities, farmers, market traders and transport operators. Additional interest groups include decision-makers, District work agencies, Department of Roads as well as local and national politicians. According to Riverson et al (1991), the main stakeholders are usually considered to be the local communities. In order to achieve proper planning and provision of rural roads, it is important to identify the key stakeholders.

2.2.8 Rural Roads and the Environment

Around the world, roads networks are considered to be the vital arteries of societies. The World Bank (2005) states that the need for roads to provide safe and comfortable access and thus contribute to the economic stability and environmental protection has been increasing with time. According to Riverson et al (1991), road projects are examined in terms of their direct physical impacts on the environment (for example, effects on noise levels, air and water quality, soil erosion and flora and fauna) and their indirect impacts which are often socio-economic and/ or cultural in nature (for example, effects on settlement patterns). In the broadest sense, the environment includes ecological, economic, social, and physical aspects (World Bank, 2005).

The greatest direct environmental impact associated with rural roads is erosion and flooding of farmlands and road surfaces (Riverson et al, 1991). These adverse environmental impacts can usually be reduced through proper design and construction. Other direct environmental impacts relate to the improper location and the lack of restoration of gravel borrow pits. According to Riverson et al (1991), much of the adverse environmental impacts from rural road projects can be avoided by ensuring proper drainage and location of borrow pits.

2.2.9 Rural Communities

Rural Communities are those settlement types that are located at moderate to long distances from urban areas and often fall outside the urban growth or municipal boundaries (Sustainability Analysis of Human Settlements in South Africa, 2002). They generally have higher densities with limited employment opportunities close by resulting in extensive commuting patterns and high unemployment. According to Johannessen (1999), these communities are often constrained by poor access roads that link with each other for social cohesion and mobility. Riverson et al (1991) indicate that some projects have generally assisted local government communities by constructing simple bridges and culverts due to local government budget constraints. The communities then provide these rural access roads. Johannessen (1999) state that an argument often heard is that rural roads are built specifically for the benefit of the people and they should therefore shoulder the responsibility for maintaining the road. However, according to Johannessen (1999), it should also be remembered that roads are built to carry vehicles. Many communities recognise the benefits that will come to their village from the better access to markets, easier access to government services and better connection to the outside.

According to DeSilva (2001), there is a marked absence of community involvement in the plans to develop and maintain rural roads. Desilva (2001) states that community control over technologies used to maintain roads can be ensured through several steps:

- The introduction of low cost equipment and tools;
- Use of equipment and tools that are less heavy;
- Organising systematic community participation; and
- Establishing close ties.

2.3 Poverty

Poverty is solely a matter of lack of income or perpetual want and is most widespread in the rural areas of both developing and non-developing countries (Watkins, 1995). The main determinants of rural poverty, according to Ali and Pernia (2003), include agricultural productivity; non-agricultural employment, and non-agricultural productivity.

Deprivation of a community shall always be in reference to another community with regard to services, amenities and facilities. It is asserted by Wasike (2001) that the poor are usually associated with inadequate access to infrastructural services such as clean water, sanitation, transportation, and communication, which are considered as 'input indicators' of poverty. This limits their access to another set of input indicators, namely, health services, education facilities, food, and markets, and causes a negative impact on 'output indicators' of poverty, such as life expectancy, literacy, income and nutrition (Wasike, 2001).

Poverty may further be defined as people's inability to achieve their full potential and is also about missed opportunities and a contradiction of humanity (Barker, 2002). According to Barker (2002), poverty is hidden physically through scattered communities and hidden culturally through the national appearance of the countryside. Chambers (1983) provides a detailed overview on the geography of rural poverty and distinguishes six types of biases which are exhibited when dealing with poverty: 1) project biases; 2) person biases; 3) dry season biases; 4) spatial biases; 5) diplomatic biases; and 6) professional biases. Thus, it can be seen that it is due to these biases that people's view of poverty might not be closely linked to reality.

According to Rao (1995), there are several factors by which two communities can be compared, such as the availability of drinking water, medical facilities, level of employment, etc. Greater access to education and health services, water and sanitation, employment credit and markets for produce is needed (Ali and Pernia, 2003). Hanmer et al (2000) identify the poor as those whose basic needs, rights, assets and income are insufficient to provide either a sustainable livelihood or a sense of well being. According to Hanmer et al (2000), the poor are not a single homogenous group but it is possible to identify functional groups that experience poverty. Groups that are identified to be functional groups are those groups that share specific attribute such as gender and livelihood status. Therefore, planners need to be aware of who the poor are within each social organisation such as the individual, household, community, region, etc. The functional groups identified in Hanmer et al (2000) are shown in Table 2.1 below:

Table 2.1: The poor as functional groups

POTENTIAL POOR	ACTUAL POOR		POTENTIAL POOR
- New or cyclical poor; (ex) urban formal working or middle class, rural smallholders	- Single-parent households with high dependency ratio (esp., female and child headed) - Early widows	- Women and children in households under and close to the poverty line - The chronically sick and disabled	- Urban self-employed and informal wage workers
- Marginalised cultural categories ethnic or caste groups, - marginalised indigenous communities	- Refugees, - Internally displaced persons, undocumented aliens	- Isolated rural communities - Farmers on marginal land with few financial assets	- Landless rural workers
Source: Hanmer et al (2000)			

Table 2.1 shows the different kinds of social categories that are required to be considered when planning policies. According to Hanmer et al (2000), the actual poor (shaded in grey) have certain identifiable characteristics in common such as high vulnerability, lack of access to basic livelihood needs, weak human capabilities, and the inability to participate adequately in social life. Hanmer et al (2000) further assert that those in situations of potential poverty may be expected to fall into actual poverty under adverse conditions.

Fundamental to transformation is the eradication of poverty. Improvements in roads and paths, especially in rural areas, have the potential to improve the position of the poor, although they will have to be provided as part of a package of measures that include credit, extension services and investments in areas such as irrigation and water (Wasike, 2001).

2.3.1 Transport and Poverty

Wasike (2001) indicates that two possible avenues exist through which new or improved transport infrastructure can facilitate poverty alleviation. The first route is through the

link between infrastructure and economic growth. The second one is through the direct contribution of infrastructure to the process of pro-poor growth. Transport reduces absolute poverty mainly by increasing economic efficiency, by lowering costs and prices and enhancing opportunities (Gannan and Lui, 1997). According to the Asian Development Bank (1999), poverty reduction requires economic growth, which results in sustainable and socially inclusive development, when accompanied by sound macro-economic management and good governance.

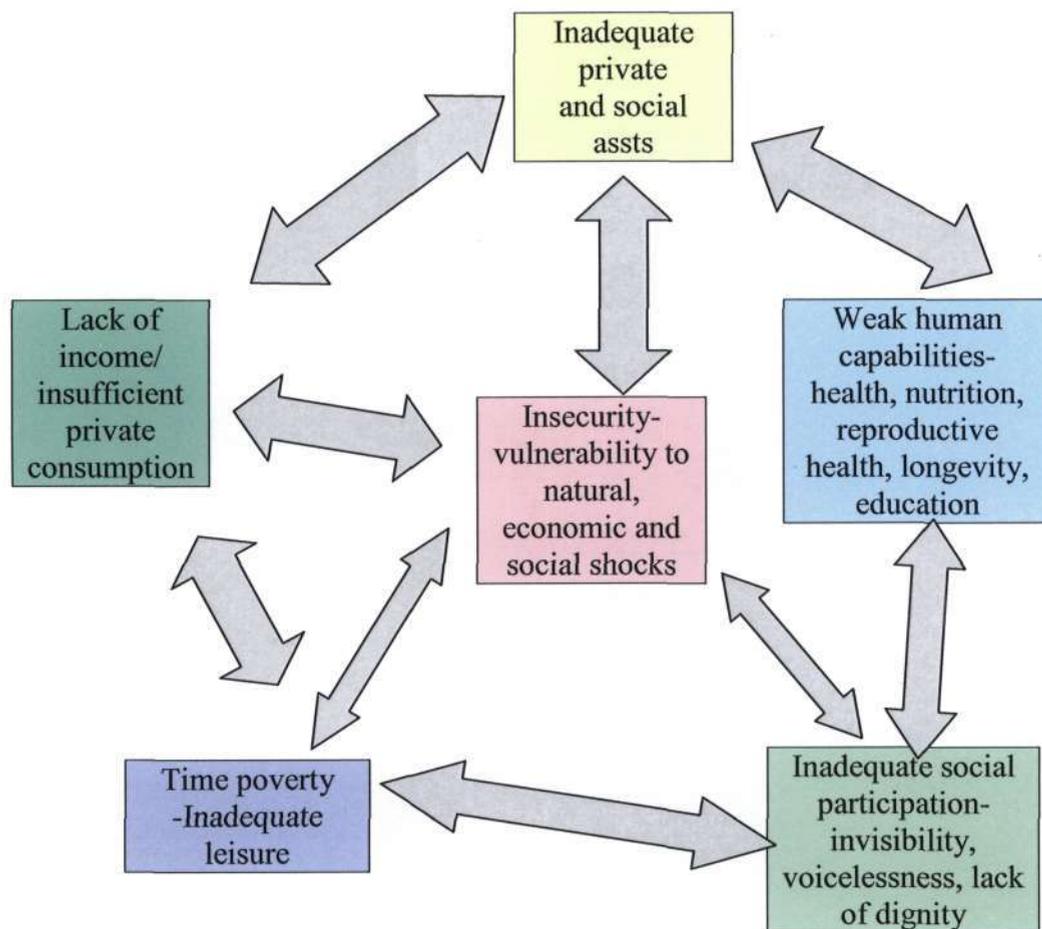
Ali and Pernia (2003) assert that rural roads, among other government infrastructure projects, have the largest impact on poverty incidence. A road investment, for example, could contribute to an increase in agricultural productivity, non-farm employment and productivity, directly raising the wages and employment of the poor, and their economic welfare. This is a direct income distribution effect. Accessibility and mobility made available to rural inhabitants will help reduce isolation and poverty (Touton, 2003). Studies conducted by Kwon (2001) in 25 Indonesian provinces between 1976 and 1996 showed that provinces with adequate road services were more likely to receive better irrigation services and produce more crops. People in these provinces seemed to have more employment opportunities in the non-farm economy. According to Kwon (2001), poverty incidence falls by 0.33% and 0.09%, respectively for every 1% growth in provincial GDP. Wages and employment are found by Kwon (2001) to be directly improved, such that a 1% increase in road investment is associated with a 0.3% drop in poverty incidence over 5 years.

Recent studies by Fan et al (2002) in rural India, China and Thailand estimate the effect of infrastructure investments on economic growth and poverty. Results show that the importance of road investment in rural roads was found to have had the longest positive impact on agricultural productivity growth. Road investments in China and Thailand were found to have contributed significantly to growth in non-farm and total economic growth as well as to agricultural growth (Fan et al, 2002).

In past years, government and donor active participation in road extension and networking in developing countries has failed to aid in poverty reduction (Asian Development Bank Institute-ADBI, 2005). Although there has been immense spending on road construction and transport services, those interventions have neglected the transport needs of rural inhabitants in areas of low demand with the poorest, least mobile segment of the population. ADBI (2005) stipulates that recently real investment has been made to construct a network with integral transport services. Furthermore, governments acknowledge the importance of rural transport and are promoting the private sector and NGOs participating in the new integrated approach to accomplish it. According to the ADBI (2005), socially inclusive development can be reached through Public Policy reforms and investment in physical infrastructure. The linkage between infrastructure and poverty reduction (Figure 2.1) can become stronger, provided that regulations and institutional frameworks are strengthened (ADBI, 2005).

Poverty is a multi-dimensional problem and needs to be addressed as such (Hanmer et al (2000). Dimensions of poverty (Figure 2.1) that has been identified in Hanmer et al (2000) include income or consumption; capabilities; private and social assets; free time; empowerment or attainment of minimal social-participation; and security in respect to risks, shocks and violence.

Figure 2.1: Dimensions of Poverty and their Interaction



Source: Hanmer (2000: 4)

Hanmer et al (2000) suggest some important links between transport infrastructure and services and the poverty dimensions that are shown in Figure 2.1 that include:

- Inadequate infrastructure is an indication of the lack of access to social assets by the poor. According to the author, inadequate transport infrastructure can contribute to the causes of lack of income and consumption and inability to accumulate private and social assets.
- The lack of transport infrastructure and services may constrain access to facilities and resources, such as schools, health centres and water for the poor, particularly in rural areas.

- Poor people's lack of access to assets and technology suggest that production for the market and for the household is time and energy intensive. Hanmer et al (2000) states that the most time consuming work is done by women. Therefore, the improvement of transport infrastructure can be an essential component towards reducing time spent in low productivity.
- The lack of individual or household ownership of transport assets such as bicycles, ox carts or motorised vehicles, is frequently one of the characteristics that the poor view as a factor differentiating poor from non-poor members of the community.
- The lack of transport infrastructure can result in the creation of an isolated environment characterised by poor communications and lack of links with other areas.
- Inadequate transport infrastructure can constrain livelihood strategy options and thus restrict poor people's capacity to cope, respond and adapt to risk.
- Poverty is the level of which public actions including different sectors, such as health, education, agricultural extension, water, roads and the environment, can be used in poverty reduction strategies to address the needs of the poor.

If poverty is to be reduced, economic growth is imperative but the distribution of wealth is as important as its creation. With the poorest section of society becoming increasingly marginalised, developments within countries have delayed the trends in the international economy (Watkins, 1995). Everatt (2003) asserts that there are limits to what governments can do for people, however, there are no limits to what people can do for themselves when they are given the opportunity to realise their potential. Government initiatives such as Zibambele provide a powerful force for change.

Poverty eradication must be achieved through strategies that can enhance the ability of local communities to adapt to stress to overcome emergencies and to improve long-term productivity (Watkins, 1995). Such strategies must be built upon an understanding of the complex livelihood structures of poor people. According to Watkins (1995), there are five

building blocks upon which any successful poverty eradication strategy should be built.

These are:

- **Increased Equity:** high levels of inequality and widespread poverty are a source of economic inefficiency. Important elements of a strategy to end poverty are the wider distribution of productive assets, secure and equitable forms of employment, as well as an end to discriminatory measures which benefit small, wealthy elites but exclude the poor from a share in the prosperity that they have helped to create.
- **Enhanced Opportunity:** in order to maintain sustainable livelihoods, poverty demands that poor people have the productivity assets they need. They can also use the opportunity to achieve independence through education, health care, service provision and infrastructure development.
- **Peace and Security:** there can be no lasting human security without development, but without peace and security, human development will remain a subtle good. Many of the poorest are subjected to harassment and physical threats, particularly women.
- **Participation:** if development is to occur it demands that local communities have a say in shaping critical decisions affecting their lives. Enhancing peoples' ability to be active participants in the process of social change is at the forefront of development.
- **A Sustainable Future:** to reduce the vulnerability of poor people and bring about lasting improvement in their lives, they need to have secure livelihoods.

2.3.1.1 Transport for Sustainable livelihoods

Transport is defined as the movement of people, goods and services by any possible means for any possible purposes (Hanmer et al, 2000). It is fundamental to attaining a livelihood and consists of two elements, transport infrastructure and transport services. Hanmer et al (2000) assert that the transport problems and needs of the poor are essentially about access. Therefore, improvements in transport infrastructure and transport services can enable poor people to meet subsistence, economic and social needs more easily. According to Hanmer et al (2000), capital assets lie at the heart of the

sustainable livelihood framework and may be defined as the common property and individually owned resources that the poor can draw on for their livelihoods.

DeSilva (2001) identifies five types of capital assets that form part of the livelihoods framework:

- **Natural Capital:** Constitutes the natural resource stocks from which resource flows and services useful for livelihoods are derived. Resources that make up natural capital range from intangible public goods, such as the atmosphere, trees, land, etc. Natural capital is pivotal to those who derive their livelihoods from resource based activities such as farming, fishing gathering in forests, etc.
- **Social Capital:** is the social resource to which people have access. It is a determinant of their ability to manage relationships and transactions in commercial markets, social institutions, and civil society and government agencies.
- **Human Capital:** Comprises a combination of ability to work and good health that enables people to pursue different livelihood strategies and achieve their livelihood objectives. Human capital is determined by the amount and quality of labour available, at both the household and enterprises level.
- **Physical Capital:** Basic infrastructure such as shelter, transport, communications, etc. and manufactured goods such as tools and equipment required to maintain livelihoods.
- **Financial Capital:** Refers to financial resources such as cash, credit or other liquid assets that people use to achieve their livelihood objectives, can include pensions, remittances, state transfers as well as savings and jewellery.

Hanmer et al (2000) suggest several links between livelihood assets and transport. These links are explained in Table 2.2 below:

Improved accessibility through rehabilitation and maintenance of the road infrastructure has several advantages for the livelihoods of a community, as explained in Table 2.2

below. Lungu and Price (not dated) assert that improved roads encourage the formation of self-help committees along the improved roads which has a positive impact on the livelihood of the community. This enhances the socio-economic status of the community as well as that of the country. Furthermore, Lungu and Price (not dated) suggest that the ease of mobility effectively improves the communication with other communities in the neighbouring areas, setting a forum for exchange of ideas and social integration.

Table 2.2: Linkages between livelihood assets and transport

CAPITAL ASSET	LINK WITH TRANSPORT IMPROVEMENT
1. Natural Capital: (natural resource stocks from which resource flows useful for livelihoods are derived)	Developments may bring environmental degradation, ranging from air and noise pollution (urban) to slope instability and soil erosion (rural). Changes in land use, improved access increases exploitation of local resources such as forests. Increased competition for land and resources.
2. Social Capital (social resources on which people draw in pursuit of livelihoods i.e. relationships, membership of networks)	Increased contact with other social groups. Access to information, technology, new services. Lowers cost of social visits. Exposure to problems such as alcohol and drugs.
3. Human Capital (skills, knowledge, ability to work, good health which enables people to pursue different livelihood strategies)	Increased risk of road accidents, incapacitation or death, loss of earnings. Formal and informal employment generation in construction, maintenance and service industries. Improved access to health care and education and extension services.
4. Physical Capital (basic infrastructure transport, shelter, water, energy and communications, production equipment)	Improved water, energy and communications (telephone, radio, and post office) service delivery. Seeds, fertiliser, machinery. Depends on quality of road versus benefits derived from improvements and affordability of transport services (especially the poorest).
5. Financial Capital (financial resources available which provide livelihood options, for example savings, credit, remittances, pensions).	Reduced transport costs, travel times and vehicle maintenance and operating costs. All of which increase labour productivity and decrease farm input costs and produce prices, Improved income and access to markets, credit and savings facilities help improve financial capital.

Source: Hanmer (2000: 12)

2.3.2 Transport and Gender

From the “cradle to the grave”, women are subjected to multiple forms of deprivation. Women play a key role in household livelihood systems in a productive and reproductive capacity (Watkins, 1995). As producers, they provide most of the food consumed by poor households. They manage common resources, and are responsible for collecting water and firewood. Watkins (1995) asserts that female labour also accounts for a growing proportion of employment in commercial agriculture and industry. However, despite this contribution women face a bewildering array of social, economic, cultural and religious barriers. Evidence from studies conducted on women and rural infrastructure services demonstrate gender differences in access to opportunities, resources and participation across a variety of community services and social and economic life chances (World Bank, 2002). Women are weakly represented in decision-making, are disproportionately burdened with task loads, have least mobility with which to access centralised services and have least access to decentralised services in both rural and urban locations. However, women in rural areas face greater disadvantages than those in urban areas (World Bank, 2002). The inclusion of women in decisions about rural infrastructure services is a precondition to ensure that scarce public resources positively affect the livelihood of poor people.

Understanding the issues pertaining to gender, social inclusion and rural infrastructure services necessitates the recognition of gender disparities in access to rural infrastructure services and the detection of the consequences of such disparities which include poor health, poverty, high task loads, agricultural impoverishment and housing insecurity. It also necessitates the identification of good project, programme and policy practice for rectifying and correcting disparities which have negative social and economic effects (World Bank, 2005).

Women are socially excluded across the full range of social, economic and political opportunities. The exclusion of women from a particular activity may have consequences for their participation in another (World Bank, 2005). For example, according to the World Bank (2005), the exclusion of women from rural road programmes may have its consequences for participation in governance and decision-making, and simultaneously

exclusion from participation in governance may have consequences for the full participation of women in the transport sector. If correctly implemented, improving rural infrastructure can free up women's time for more productive activities.

Historically, physical transport and communications were poor in rural locations as compared with their urban counterparts as a result of colonialism and apartheid (Shandra, 2003). Colonial relationships of extraction left many developing countries with inefficient and highly imbalanced transport and communication structures.

Women's transport needs are different to men's and transport responsibilities of women and men are to a certain extent separate (World Bank, 2002). The triple burden of women (reproductive, productive and community managing work) determines women's transport activities and needs. Women are time and energy impoverished from meeting transport needs and are generally less mobile than men in the same socio-economic group (Peters, 2002). Gender relations mean women are much less likely to have access to and use transport technology than men. Women have less money and face cultural constraints. Lungu and Price (not dated) assert that existing transport infrastructure, services and technology may be inappropriate for women or simply designed around men's needs. Women's transport activities are much less visible in transport planning. According to Peters (2002), infrastructure and transport planning orientated to the needs of women could drastically reduce women's workload in the reproductive sector and free up time and energy for other reproductive tasks. According to the World Bank (2002), transport planners need to consult with men and women to address intra-household division of labour, multiple and various transport needs and cultural attitudes and norms. Furthermore, planners must implement targeted schemes for providing employment opportunities and access to credit institutions and skills training centres such as the Zibambele programme.

2.4 Rural Transportation Infrastructure

Development and maintenance of physical infrastructure are keys to rapid economic growth and poverty reduction (Banjo and Robinson, 1999). Production costs,

employment creation, access to markets, and investment depend on the quality of infrastructure, especially transport. South African infrastructure development lags behind other regions. Banjo and Robinson (1999) view the lack of rural roads, telecommunications, electrification and water services as weakening poverty reduction efforts. Poor infrastructure directly affects poverty and requires urgent attention.

Transport infrastructure consists of two complementary parts: modern and traditional (Banjo and Robinson, 1999). The modern transport system is a network of roads, navigable water, railways and airways, which is used mainly by mechanical means of transport such as cars, buses, trains, airplanes, etc. According to Banjo and Robinson (1999), the traditional network consists of a dense pattern of paths and tracks and sometimes rivers and lakes, which are used by pedestrians and non-motorised means of transport. Touton (2003) suggests that rural transport infrastructure consisting of the local roads, tracks, footpaths and bridges varies in quality, usually depending on weather or construction. According to Touton (2003), development depends on transport, while transport is dependent on infrastructure and modes of transportation. Rural transport features several types of infrastructure and modes from paved roads to gravel and earth roads to tracks and footpaths (Lebo and Dieter, 2001). These infrastructures assist both motorised and non-motorised mobility.

The backlog in infrastructure in South Africa is immense and meeting this backlog requires large capital inputs from government, business and users as well as institutional development, training and technology development. Investment in infrastructure is still inconsistent, with little positive effect on poverty (Lebo and Dieter, 2001). According to Torero and Chowdhury (2005), poor infrastructure affects health, education, access to markets and investment. Transport costs for individual travel and for freight are far higher in Africa than in Asia, making products less competitive.

Torero and Chowdhury (2005) stipulate that investment in infrastructure has been characterised by:

- Unequal access with poor, rural people having the least access.

- Low levels of investment compared with population growth and compared with other regions: investment needs are high, averaging around 5.5% of GDP.
- A sector-specific approach that has failed to make important linkages between different infrastructures and other services.
- Reliance on private and user contributions that were insufficient to pay for necessary services.
- Low domestic and foreign investment, influenced by domestic difficulties, high costs of transport and unreliable utilities. Transport for trade is particularly problematic for landlocked countries.

Fundamentally, the goal in providing and improving rural transport is poverty reduction. Many rural inhabitants are left in absolute bleakness due to inaccessibility and immobility that is the result of isolation (Torero and Chowdhury, 2005). According to Ahmed and Hossain (1990), maintenance has a strong impact on infrastructure and incomes of the poor. In a study conducted by Ahmed and Hossain (1990) in China, it was estimated that infrastructure endowment increased household income by 33%, and increased income from business and industries by 17%. By introducing new programmes such as Zibambele, the transport infrastructure within a community and the quality of life immediately improves, thus alleviating many affects of poverty. The hope for a better lifestyle lies within the opportunity to access services, goods, an income, and to participate in social, political and community activities. Better infrastructure led to better agricultural output, higher incomes, better indicators of access to health services, and greater wage income opportunities (Ahmed and Hossain, 1990).

2.4.1. Planning for Transport infrastructure

Rural people in the developing world lack adequate and affordable access to transport infrastructure and services (Starkey, 2004). Their limited mobility contributes to a vicious circle of poverty by hindering economic activity and social improvement. According to Touton (2003), transportation contributes to the nation's growth in various fields such as industrial development, changes in socio-economic status and cultural changes of people.

Touton (2003) stipulates that the necessity for transport services is directly associated with population density and income in a given area.

In the past, efforts to address transport infrastructure problems have focused too narrowly on expanding road networks with little attention on how to maintain them (Touton, 2003). Transportation network planning is an important task of the planner for providing good level of service to the users in an optimum and economical way. Starkey et al (2002) make reference to three categories that illustrate this relationship:

- The first is low transport density in low-income areas, with few motorised vehicles or intermediate means of transport. A malicious circle of insufficient transport, users, and services impede development.
- The second category has higher transport density in low-to-medium-income areas and is equivalent with medium to high population density, irrigated agriculture, cash crops, efficient marketing systems, and non-agricultural employment. In such areas transport services have achieved a critical mass, making it easy to buy and maintain various means of transport.
- The third category has low to medium transport density in high-income rural areas. Transport infrastructure is mostly good, and people use motorised transport regularly to go to work, clinics and hospitals, and markets; to visit friends and relatives; and to participate in social events and religious functions.

With a considerable lack of continuity and lack of attention to sustainability and generally poor use of resources, the planning of rural roads has been driven by a multiplicity of objectives and institutions (Riverson et al, 1991). Touton (2003) suggests that governments and transportation planners can establish appropriate means of transport for a specific area once the priorities have been identified. Funding for a rural transport project and making it affordable for its users are among those financial concerns. According to Touton (2003), the following should be assessed when setting priorities for promoting rural transport:

- Household budgets and opportunities for employment.

- Cost of available transport.
- Competition in transport markets.
- Existence of a critical mass of users and service providers.
- Type and quality of infrastructure.
- Availability of various appropriate and affordable means of transport.
- Policies, regulations, and government budgets.
- Cultural and gender relations with demand and use patterns.

According to Riverson et al (1991), ideal approaches used for planning and education of rural road programmes have shown various shortcomings. The maintenance and fostering of community involvement have not been paid sufficient attention to. Studies conducted by Riverson et al (1991) in Sub-Saharan Africa found that approached uses for planning and evaluation of rural roads had no community participation.

Another shortcoming of transportation planning is the consideration of women in the development stage. Agarwal (1997) makes reference to taking women into consideration as a crucial issue, when planning development programmes. Women's roles remain pivotal to development due to the fact that women are involved in various ways with natural resources in forestry, agriculture, energy and so on. Therefore, the role of women in development strategies will remain important so as to produce development that meets the needs of the present generation without compromising future generation's ability to meet their needs (Agarwal, 1997).

2.4.2. General History of Transport Infrastructure

2.4.2.1 Roads (Modern)

The history of roads has been related to the centralising of populations in powerful cities, which the roads have served for military purposes and for trade and for the collection of supplies (Lay, 1992). Touton (2003) stipulates that roads were being constructed and networked at a much faster rate than maintenance budgets and institutional capacities in the 1960s and 1970s. Edmonds (1983) asserts that the consequences of this infrastructure

boom and lack of maintenance are road deterioration and eventual diminishing of the real size of the road network.

Like all structures, roads deteriorate over time. According to Lay (1992), deterioration is primarily due to accumulated damage from vehicles, however environmental effects such as frost heaves, thermal cracking and oxidation often contribute. Many of the problems associated with road deterioration can be prevented before it even has a chance to start deteriorating. However, prevention requires education, motivation and accountability (Touton, 2003). Harral and Faiz (1988) suggest that roads deteriorate slowly for the first half to two-thirds of their service life depending on traffic volume and the rate of use. Subsequently with escalating time, roads begin to deteriorate much more rapidly.

Virtually all roads require some form of maintenance before they come to the end of their service life (Lay, 1992). Maintenance activities can be divided into structural maintenance and functional maintenance, although there is a great deal of overlap. According to Lay (1992), structural maintenance is maintenance intended to preserve the structural integrity of the pavement, and includes patching potholes, sealing cracks and overlays. Functional maintenance is maintenance to improve the roadway's function of providing a smooth and safe surface for vehicles to drive on, and includes surface grinding and thin overlays.

Lay (1992) further states that heavier traffic and axle loadings that are greater than the design capacities of the road, contribute to the deterioration of roads. In general, the cost to consistently maintain roads is significantly lower than the cost to repair or completely reconstruct a road (Touton, 2003). According to Harral and Faiz (1988), traditionally in most African countries road building has been given a higher priority than road maintenance, with inadequate attention to the imperatives of recurrent costs of road management once the road has been constructed. In a study on road deterioration in developing countries, Harral and Faiz (1988) estimated the annual maintenance expenditure required to prevent road deterioration. On average, expenditures for 1986–1990 varied from 0.2% of GDP for countries in East Asia and the Pacific to 1% for

countries in West Africa. They estimated that the backlog of maintenance work varied from 1.6% of GDP in East Asia and the Pacific to 3.5% in South Asia.

2.4.2.1.1 Road Network Planning

A road network is identified with travel demand activity, socio-economic and demographic characteristics of a region (Agha and Siddiqui, 1995). In most rural areas the predominant land use activity is agriculture and hence the network developed should meet the demand and supply activities of an agricultural potential. According to Agha and Siddiqui (1995), the ideal network orientation is the one which connects the dominating activity orientated villages to the administrative and market centres of a sector.

The importance of rural roads extends over all aspects of development of rural communities including demand for and access to health, education, information, etc. Rural roads provide the connectivity to villages so that the needs of the people are satisfied and daily activities can be carried out efficiently. The provision of a road link to an area increases its accessibility and further helps in catalysing its development (Agha and Siddiqui, 1995).

As a result of governments' efforts to improve rural road infrastructure, the mobility of the rural poor will increase and a more healthy and literate rural population are becoming involved in a wide range of off-farm employment opportunities (Du, 2005). Riverson et al (1991) argue that the need for a better rural transport infrastructure in South Africa is pressing and obvious as the structural transformation from subsistence to market economy is dependent on transport, and rapid expansion of rural road networks would not be feasible unless adequate financial and institutional arrangements for planning for construction and maintenance can be put into place.

It is imperative to understand that critical to addressing low rural productivity and low off-farm employment is the improvement of rural roads (Du, 2005). A good transportation system is essential at production stage in carrying the raw materials such as

seeds, coals, minerals, manure, and cotton as well as to transport commodities/goods to marketing centres (Riverson et al, 1991). Therefore, it is suggested by Touton (2003) that good transport infrastructure such as roads are essential for such long distance transportation and the connection of the entire transport system from the urban market hubs to the remote rural villages. Improved interconnecting routes will promote the establishment of rural markets. Subsequently, Starkey (2004) argues that markets tend to bring people and goods together, therefore, planning a road network around market centres would be most beneficial for the rural inhabitants using the roads.

2.4.2.1.2 Roads and the Economy

Economy means both getting the best overall value for money from the maintenance, management and construction of a road system and providing and managing transport so as to support economic activities in appropriate locations (Wasike, 2001). According to Wasike (2001), the quantity and quality of road transport infrastructure are some of the major determinants of price and non-price competitiveness in both domestic and international markets, and new or improved infrastructure activities can facilitate alleviation of poverty.

A pivotal role is played by roads in the economy of any society. Economic potential reflects population density, agricultural potential, and the number of social and economic facilities, human capital and a number of other development programmes (Van de Walle, 2002). Chand and Reddy (1995) stipulate that the benefits derived from roads are evident throughout the economy and its fruits are derived in every sector of development. Roads are forerunners of any development activity and integrate the production, marketing and consumption components of the economy. Roads are often referred to as the highway of ideas, and thus roads can be regarded as the life line of a nation (Chand and Reddy, 1995). According to the Construction Industry Development Board-CIDB (2004), employment intensive programmes (labour and resource-based) have aimed to influence infrastructure investments policies in order to maximise employment income generation, the creation of productive assets and poverty alleviation. With regards to rural roads in South Africa, employment intensive methods have been employed on construction

projects which include rural gravel roads, residential township roads (surfaced and gravel), bituminous surfacing of roads, storm water drainage systems re-gravelling and routine road maintenance (Du, 2005).

2.4.2.1.3 Socio-economic Impact of Roads

Rural roads contribute both directly and indirectly to the livelihoods of rural societies (Shroeder, 1997). There are substantial benefits in roads in developing countries, particularly in the reductions in travel time from farm to market. Work conducted by Shroeder (1997) in Indonesia, for example, has shown that upgrading a rural road reduced the duration of trips from residence to market from one and a half hours to forty five minutes. With regards to the agricultural sector, it is asserted in Lal (1995) that the various benefits accrued such as ready access for the transportation of goods, leads to improved agricultural practices. The Intermediate Technological Development Group (2005) indicates that transport usually constitutes two categories in rural areas, that is, on-farm and off-farm. Most non-economic travel takes place on foot by women and children, although generally men, women and children travel on foot and either carry goods on their heads or use animal footpaths.

According to the Intermediate Technological Development Group (2005), on-farm tasks are generally for domestic subsistence purposes, such as the gathering of firewood and collecting water with some activities, such as transporting farm implements, seeds and fertilisers to the fields, being indirectly related to economic purposes. Off-farm tasks are usually activities such as gaining access to schools, health centres, shops and other public offices and for socially related travel. Economic related travel, such as going to the markets, falls into the off-farm category.

The extent and timing of road maintenance is determined by the rate of utilisation (Road and Transport, 2003). The Asian Development Bank Institute (2005) envisaged the improvements in road networks as being necessary to reduce vehicle operating costs and travel time requirements. In Mekong Delta, Vietnam, Edmonds (1983) found that reductions in travel and transport costs due to road improvements led to changes in market conditions (for both outputs and inputs), that in turn affected the land use and

production decisions of farm households. Jacoby (1998) similarly noted that crop prices as well as land values decrease with distance from markets, as measured by travel time. Jacoby (1998) indicates that low construction standards limit mobility and marketing activity. Improved roads and markets help to lower marketing and vehicle operating costs and improves overall access to public services (health, education and agricultural) and economic opportunities. According to ADBI (2005), improved roads will benefit the poor, as they are vulnerable to high prices and irregular availability of goods and services. Upgraded roads will also encourage private sector investments especially in local trade and agro-processing (ADBI, 2005).

Roads in rural areas offer the much needed employment opportunities to villagers in the industrial sector and also contribute to the development of their skills. Songo (2002) conducted a field survey in two provinces of the central highlands region in Vietnam to assess how poor household perceived benefits from upgrading low grade roads to year round access. Benefits were numerous in the price of goods and in the removal of health hazards from dusty roads.

Khandker et al (1994) assessed the impacts of a road project in Morocco and found increases in agricultural production and land productivity as well as in the use of agricultural inputs and extension services. The road project also assisted in the production of high value crops and an increase in off-farm employment opportunities. Other benefits also included improvements in access to health services and increased school attendance.

Fan et al (2002) found that public investment in rural roads in China, together with investments in education and agricultural research, helped to reduce poverty and inequality. Also of vital importance is the role that rural roads play in providing ready access to various facilities in the areas of education, health and recreation (Khandker et al, 1994). Thus, it is therefore understandable why roads rank so high in the list of priorities of rural masses for various rural developments schemes.

An evaluation of socio-economic impacts is also needed for identifying the potential areas for rural road construction. Socio-economic impacts are also a major factor in

deciding upon the design and construction standard for rural roads in a given area. Bakht (2000) asserts that improvements of rural roads and trading infrastructures are expected to have wide-ranging social and economic impacts. These are as follows:

- **Transport sector**

The immediate effect of road improvement is felt on the transport sector since the development of earthen roads into paved roads improves pliability, particularly during the rainy seasons. This reduces transport costs of existing modes. Better pliability also facilitates use of mechanised means of transport, which further contributes towards reduction in transport cost.

- **Trade sector**

Improvements in trade and transport infrastructure are likely to induce mutually reinforcing changes in the trade sector. The development of roads is likely to lead to setting up of new shops and markets along roadsides and in the vicinity of the improved roads.

- **Institutional service**

Road improvements and the consequent changes in the transport sector are likely to facilitate improvements in the institutional service sector. Major components of this sector are (i) health and family planning institutions, (ii) educational institutions, (iii) financial institutions, and (iv) extension services. Apart from the likely impact of increase in the number of these institutions, both the volume and quality of service are likely to go up as a result of improvements in roads and transportation. In the case of educational institutions, favourable effects are expected with respect to the level of enrolment, attendance and dropouts.

- **Agricultural and non-agricultural production sectors**

Improvement in transportation facilities and the concomitant reduction in transport costs transmit positive impacts all around the rural economy. The following are the main

channels through which these impacts are transmitted to the agricultural and non-agricultural production sectors of the rural economy:

- ***Better availability and lower cost of inputs***

Improved roads and markets will improve the availability and access to inputs at lower costs. This will raise the level of input use and thereby raise production. For example, fertiliser used by farmers in the remote areas in Bangladesh is often sub-optimal due to high price and procurement difficulties. Improvements of trade and transport infrastructure are likely to facilitate higher use of fertiliser in these cases.

- ***Easier access to credit and extension services***

Access to financial institutions and extension services are often restricted due to poor road communication facilities. Relaxation of these restrictions through improvements in road infrastructure is likely to encourage producers to raise investments and adopt better technology, thereby raising the level of productivity.

- ***Better scope of output marketing***

Road improvements help reduce wastage of perishable output by providing quicker means of transport to markets and permanent storage facilities. Lower cost of transportation and better market infrastructure also provides the producers with higher returns on output (Bakht, 2002).

2.4.2.1.4 Non- Farm Employment and Income Diversification

One of the most important ways that road investments can assist in helping the poor is through impacts on the rural non-farm economy. Rural road investments can promote the development of small non-farm enterprises, which in turn can increase the demand for rural labour. Malmberg et al (1994) found that infrastructure investments contribute to economic growth in farm and non-farm sectors, generating economic opportunities for the rural poor population. The rural economy is also likely to get more diversified through improvements in trade and transport infrastructure. Apart from the direct effects

through cost and price incentives, the rural non-farm sector is also likely to get more advanced from increased agricultural production (Bakth, 2000).

Escobal (2001) established the link between roads and income diversification by analysing the determinants of rural household decisions to undertake off-farm activities in rural Peru. The outcome showed that access to roads, together with other public assets such as rural electrification and education, is a major determinant of income diversification and that access to roads and public assets increases profitability of non-farm activities.

The contribution of an adequate road system is undoubtedly most significant towards the overall development of rural areas (Lal, 1995). As determined in the previous section, one of the most effective ways of promoting economic development is the construction or improvement of rural road networks. Rural roads, according to Gupta (1995), provide significant contribution towards removing the sense of isolation that prevails in the rural community due to the lack of convenient means of interaction with the outside world. Rural roads direct the rural majority towards the mainstream of development and ensure better political cohesion and national integration.

2.4.2.3 Intermediate transport (Traditional)

Transport devices that came between walking and conventional motor vehicles and help people to move loads or use animals move effectively for load carrying are referred to as intermediate means of transport (Intermediate Transport Development Group, 2005). Touton (2003) stipulates that most rural transport simply involves walking and carrying between villages and to main roads for long distances. Intermediate transport is, therefore, popular amongst people who need a quicker, cheaper means of travelling over longer distances. Transport interventions that promote the use of intermediate means of transport contribute directly to those people who cannot afford motorised transport.

Intermediate transport is most frequently used by the poor, both in urban and rural areas, and includes walking, bicycles, rickshaws, handcarts, wheelbarrows and animal drawn carts. However, many rural poor women are unable to afford bicycles or carts and consequently rely on head portage to carry their produce to the market (World Bank,

2002). According to Touton (2003), the insufficiency of consolidated demand for transportation, however, has constrained the development of affordable, more efficient services. Another problem with rural transport in many developing countries is that it is time-consuming. Therefore, much transport is not far from villages and any external trip must be of high economic or social importance (Touton, 2003).

It is evident that for rural transport to be effective a variety of means of transport should be available to mobilise people and their goods. Intermediate means of transport are ideal for such rural transport and should be promoted and supported by transportation planners. Financing the rehabilitation and maintenance of the non-motorised tracks is a viable option to provide access to the people of isolated regions. The improvement of rural transport access often requires non-motorised transport vehicles to complement rural road investment (Intermediate Technological Development Group, 2005). With such modes, out-of-village travel would be more common and will impact on the socio-economic statuses of rural inhabitants. Educational and employment opportunities, health facilities, markets, and friends and relatives are all more likely to involve intermediate or motorised transport services. Motorised public and private transport services concentrate on routes from villages to market towns and from towns to cities, where there is greater demand and better infrastructure (Starkey, 2004).

2.5 South African Poverty and Transport

Until 1960 the African continent was essentially a colonial continent (Makhanya, 1999), with little or no projects implemented for the development of the colonies. Africa is the most underprivileged continent in terms of poverty, political unrest, quality of life and human suffering (Griffiths, 1997 cited in Thevadasen, 2003). The plight of the African continent was revealed in 1960 when many of the colonial powers granted independence to their African colonies (Makhanya, 1999). With regards to South Africa, Aliber (2001) states that experiences of colonialism and apartheid can be seen as the single most important factor that distinguished South Africa from other African continents.

In KwaZulu-Natal, the Locations Act of 1846 was the first legislation to formalise territorial segregation on racial lines. The significance of the colonial and apartheid

policy and legislation was in the creation of a false spatial distribution of the population along racial lines (Makhanya and Ngidi, 1999). The Natives Land Act of 1913 and the Natives Trust and Land Act of 1936 consolidated territorial segregation on racial lines. The combined effect of land dispossession and legislation resulted in great disparities in landholdings between the White settler community and the indigenous Zulus (Makhanya, 1994). Black-owned rural land constitutes about 3.2 million hectares or 36% of the total land area of KwaZulu-Natal (about 8.61 million hectares), while the White-owned farms constitute about 50% of the total land area. The great disparity in land distribution is one of the limiting factors to sustainable rural development.

According to Makhanya (1994), the apartheid era was established between the period of the union of South Africa and the end of World War 2 in 1945 and was further reformulated during the 1960's in order to develop separate homelands and Bantustans for the Black population. Much of the poverty in the country is a direct result of apartheid policies that denied equal access to education, employment, services, and resources to the Black population of the country. Poverty has a very strong racial dimension with poverty concentrated among the African population (Klasen, 1997). Hindson (2003) asserts that as a result of discriminatory planning, spatial isolation and underdevelopment of townships and former homelands, have left the poor with limited access to productive resources such as infrastructure, land, capital and effectively prevented their exploitation of economic opportunities.

In addition, poverty is much higher in rural areas, and particularly high in the former homelands (Hindson, 2003). Poverty among female-headed households and among children is also higher than average. Moreover, poverty is closely related to poor education and lack of employment. Klasen (1997) suggests that the poor suffer from lack of access to education, quality health care, basic infrastructure, transport, are heavily indebted, have little access to productive resources, and are heavily dependent on remittances and social transfers, particularly social pensions and disability grants.

With regards to transport, Thevadasen (2003) stipulate that the segregation of Blacks into homelands and Bantustans that lacked proper transport infrastructure such as roads meant that poor Black people had to commute long distances to industrial areas and employment centres. Poor transport services and neglected roads meant that there were increases in travelling time and costs. Much of the transport problems and non-existence of infrastructure resulted in the isolation of poor rural Black people.

In South Africa colonialism and Apartheid have had such an unforgettable impact on the prevailing socio-economic conditions that it is conventional to refer to the historical events that shaped the prevailing socio-economic inequality and poverty (Makhanya, 1999). According to Aliber (2001), land dispossession, followed by race-based separate development policies, together with influx controls, have left a legacy of unequal distribution of wealth and marketable skills, spatially divided households and inferior living conditions for the poor Black majority.

The spatial dimension of apartheid meant that millions of South Africans were deliberately located miles away from urban centres where employment opportunities were located (Lewis, 2001). This fostered the emergence of complex migrant worker systems and transport patterns that remain in place today, despite the demise of apartheid.

2.5.1 Poverty in South Africa (Structural Legacy of the Economy)

South Africa can be regarded as one of the richest and economically most important countries on the African continent, having over 42 million people, a GDP of US\$ 127 billion, a rich natural resource base, and a total area of 1.2 million square kilometres (Lewis, 2001). According to May (1998), South Africa is characterised by a sound market economy, with a well-developed private sector and the most advanced industrial capacity on the continent. In per capita terms South Africa is an upper-middle-income country, but despite this relative wealth, the experience of most of South African households is of outright poverty or of continuing vulnerability to being poor. In addition, the distribution of income and wealth in South Africa is among the most unequal in the

world, and many households still have unsatisfactory access to education, health care, energy and clean water (May, 1998).

Accordingly Hindson (2003), South Africa remains plagued with widespread poverty and high levels of inequality despite its relative wealth and a well-developed, modern economy. Coetzee (1995) states that such a situation is the result of a skewed income and wealth distribution in the country, and as such South Africa is among the top countries with the most skewed income distribution (0.54) in the world. The benefits of economic growth have not led yet to the economic and social upliftment of the majority of the South Africans and remains one of the most socially unequal countries in the world.

May (1998) states that South Africa compares adversely with several other middle-income countries in measures of human development such as life expectancy, infant mortality and adult illiteracy. These indicators, as perceived by May (1998), also vary widely by race group, gender and geographical location within the country. Such comparisons are supported by use of the Human Development Index (HDI), an indicator constructed to determine the extent to which people live long, informed and comfortable lives, and which combines measures of life expectancy at birth, education levels, and standard of living (May, 1998).

Poverty is not restricted to any racial group or area, however the realities of South Africa reveal that poverty is concentrated among Blacks (May, 1998), particularly Africans (61%), Coloured (38%) with Indians (5%) and Whites (1%). According to May (1998), these statistics demonstrate the extent of poverty among the formally disadvantaged groups and it also indicates the heterogeneity of the problem. Poverty is most persistent in rural areas (71% of households living below the poverty line of \$1 per day) and it seems to target the elderly, Black, female or those living in female-headed households.

May (1998) suggests the following issues to be major factors contributing to the issue of poverty in South Africa:

- The influence of apartheid which stripped people of their assets, led to violence, insecurities, destabilisation, market distortions, land expropriation, etc.
- Undermining the asset-base of individuals, households and communities through ill-health, overcrowding, environmental degradation, gender discrimination and social isolation.
- The impact of a disabling State, including the behaviour/ attitude of government officials, the absence of information concerning rights, roles and responsibilities, and the lack of accountability by all levels of government.

Hindson (2003) further argues that the legacy of apartheid counts heavily for the high incidence and persistence of poverty in South Africa. As a result, discriminatory planning, spatial isolation and underdevelopment of townships and former homelands have efficiently left the poor with limited access to productive resources such as land and capital and effectively prevented their exploitation of economic opportunities.

Women and children experience higher vulnerability to poverty, with an increasing number of them finding themselves as heads of households, especially in rural areas (Lewis, 2001). According to Lewis (2001), women's economic and social status in South Africa has been largely determined in relation to men. Overall, women tend to have less access to resources than men and it is estimated that between 57% and 75% of children are living in varying degrees of poverty. Lewis (2001) argues that African women have struggled under the dual oppression of racism and sexism. In addition, women and children are also often discriminated against regarding allocation of resources within households (Hindson, 2003).

2.5.2 Current Situation of South Africa's Roads

South Africa currently boasts a comprehensive road network that encompasses national, provincial and local roads in all nine provinces. According to Du (2005), the paved

networks cover below 60 000km, however, could decline if exposed to deferred maintenance. Only 18% of national roads are rated in very good condition. Du (2005) states that the backlog in provision is due to insufficient funds, which leads to additional user costs, because the deferred maintenance worsens the roads, increasing vehicle maintenance costs and extending transit times, which will eventually lead to road maintenance cost increases. Historically, many of the unclassified community access roads have been neglected (Du, 2005).

With regard to the role of roads in South Africa (National Department of Transport, 1998), the road infrastructure framework:

- Is developed within the context of South Africa as a developmental state but without neglecting the need to reduce transport costs;
- Devotes detailed attention to assessing and understanding the needs of the significant user segments;
- Promotes rural development;
- Promotes the access of historically disadvantaged citizens to economic and social opportunities;
- Is developmental in nature and not exclusively orientated to financial efficiency;
- Supports government macro-economic objectives by removing constraints in latent demand in accepted development corridors and areas;
- Acknowledges the role of roads in promoting economic growth and social development within overall government policy and its role in encouraging growth potential in:
 - Minerals and their beneficiation;
 - Agriculture;
 - Agri-business, and
 - Tourism.

Transport plays an important dual role in the economy, both as a direct provider of services and as a catalyst for economic integration, redistribution and development

(National Department of Transport, 1998). As such, it is a sector that cannot be allowed to lag behind, despite the historical contradictions and the present constraints with which South Africa is faced.

2.5.3 Transport Policy

In the previous sections it was determined that transport plays a significant role in the social and economic development of any country and is regarded as the most important catalyst for development (Banjo and Robinson, 1999). The first priority intervention that is needed to improve rural transportation is the development of national rural transport policy and strategy. According to Banjo and Robinson (1999), the effectiveness of the role played by transport is to a large extent dictated by the soundness of transport policy and the strategy utilised in implementing the policy.

In 1995, following the victory of the ANC government, the Department of Transport embarked on a project to review and re-examine transport policy and formulate new policy. This policy making process embraces and encourages an approach which, as far as possible, involves all role players and the public at large in determining issues, generating policy options and discussing and accepting policy proposals (Department of Transport, 1996).

Key issues, according to the World Bank (2002), that the rural transport policy and strategy need to address include: (i) the explanation of ownership of rural transport infrastructure, (ii) local capacity building (through public-private partnership), (iii) financing of maintenance (through cost-share arrangements with local governments and communities/road associations), (iv) the provision of rural transport services, including both motorised and non-motorised means of transport, and (v) use of least cost methods and appropriate standards.

With regards to poverty reduction, a good transport policy should contribute to poverty reduction by enhancing both equity and efficiency. Transport policies and strategies need to pursue a combination of interventions to meet national poverty reduction goals.

According to the World Bank and International Monetary Fund (2005), improving the management of road agencies and investing maintenance financing on a sustainable basis hold huge benefits for poor people, both in terms of improved access and employment opportunities.

In an attempt towards understanding transport policies, it is important to outline the macro-economic policies in South Africa and how they influence or facilitate the countries transport policies.

2.5.3.1 The Reconstruction and Development Programme (RDP)

The Reconstruction and Development Programme (RDP) was a policy framework document that was released in 1994 by the ANC government and its alliance partners in consultation with a broad spectrum of organisations, private sector and civil society (RDP, 1994). According to the RDP document (1994), the document is decisive in serving the broader well-being of the South African social society although it has received numerous comments and criticism from the public since its inception. The ANC-led government has developed a broad legislative programme within this framework.

The Reconstruction and Development Programme (RDP, 1994) is an integrated, coherent, socio-economic policy framework that seeks to mobilise South Africans and the country's resources towards the final eradication of apartheid and the building of a democratic, non-racial and non-sexist future. In the RDP, it is stated that:

South Africa's history has been dominated by colonialism, racism, apartheid, sexism and repressive labour policies. The result is that poverty and degradation exist side by side with modern cities and a developed mining, industrial and commercial infrastructure. Our income distribution is racially distorted and ranks as one of the most unequal in the world – lavish wealth and abject poverty characterise our society.

(RDP, 1994: 7)

The RDP (1994) sets out 6 basic principles that form the corner stones of the programme:

- A people driven process
- Peace and security for all
- Nation-building
- Link reconstruction and development
- Democratisation of South Africa

The RDP (1994) consists of 5 major policy programmes:

- Meeting basic needs
- Developing human resources
- Building the economy
- Democratising the state and society
- Implementing the RDP

In order for any development to occur in a rural community, the basic needs of the community require to be met. Properly maintained transport and road infrastructure can thus be regarded as being a vital catalyst towards ensuring that basic services are accessible to the rural communities. The RDP (1994) not only views transport as a means of providing access, it also acknowledges that transport is significant towards providing affirmative action employment creation that can be achieved through labour-based methods such as that of road construction and maintenance.

2.5.3.2 Growth, Employment and Redistribution (GEAR)

Subsequent to the Reconstruction and Development Programme, the government introduced the Growth, Employment and Redistribution Strategy in 1996 (GEAR, 1996). According to the GEAR strategy (1996: 1), "...the programme was created on the government's vision of creating a fast-growing economy that created sufficient jobs; a redistribution of income and opportunities in favour of the poor; equitable access to all citizens to health, education, and other services; and security and worker productivity." GEAR was a repeat of government's commitment to the existing economic policy framework. In addition the GEAR strategy identified many of the structural weaknesses

restraining economic growth and employment and also focused on market-based policies to address them (May, 1998). May (1998) stipulates that the strategy recognises a sustained reduction in inequality and requires accelerated job creation. According to May (1998), GEAR focuses its strategy for higher growth rates on several related elements, which are:

- re-prioritisation of the government budget towards social spending;
- acceleration of the fiscal reform process;
- gradual relaxation of exchange controls;
- consolidation of trade and industrial reforms;
- public sector restructuring;
- structured labour market flexibility with collective bargaining; and
- a social agreement to facilitate wage and price moderation.

In order to improve the performance of the economy, government has adopted a fiscal policy perspective compatible with lower inflation and interest rates (May, 1998). Key elements of this include a reduction in government dis-saving, a revision of the tax structure to increase its efficiency, to reduce consumption expenditure by government relative to the GDP, and to strengthen the government's contribution to gross domestic fixed investments.

According to the GEAR Policy (1996), a tighter fiscal policy is necessary to increase domestic savings from the expansive impact of the stronger investment and export performance. GEAR (1996) suggests that inflationary pressures will be kept in check and domestic resources will be released for financing capital formation. May (1998) asserts that domestic savings are crucial for the financing of investment, and government saving can make an important contribution to the overall domestic savings level. It is stipulated in May (1998) that fiscal constraints have already encouraged government to moderate its redistributive approach in the education, health and land reform sectors. Since poor people are already marginalised and have little power to influence government to provide adequate level of services, the country becomes at risk of social instability and also has the potential to weaken economic growth.

The main objective of the monetary policy in South Africa is to maintain a reduction in inflation rates, to gradually reduce exchange controls and to ensure that the real exchange rate is at a competitive level (GEAR, 1996). May (1998) states that the last two objectives have the potential to contribute to reduction of poverty and inequality, particularly if labour-intensive exports are boosted and the balance of payments is strengthened.

According to May (1998), persistent high real interest rates have a negative impact on investment, economic growth, development of the SMME sector, and encouragement of home ownership. May (1998) further suggests that higher interest rates can strengthen the value of the currency and undermine export competitiveness. The main issue is for government to evaluate issues of policy timing and flexibility, in order to facilitate both economic growth and reduction of poverty and inequality through the maintenance of a strong level of effective demand in the economy.

GEAR's trade and industry reform strategy consists of elements intended to help South African industry become internationally competitive, support the development of small and medium firms, reinforce competition policy, and develop an industrial cluster programme (May, 1998). May (1998) asserts that an international competitiveness strategy to help the poor people, the use of labour-intensive technologies should be encouraged, and suitable safety measures taken to deal with the possibility of short-term adverse impacts of globalisation on poor people such as shedding of unskilled labour or lowering of the social wage in certain industries. Programmes such as Zibambele are important in this regard.

May (1998) stipulates that an aim of current fiscal policy is to increase the efficiency of public spending through the restructuring of the public sector. The public sector restructuring programme includes mechanisms for transforming public corporations, the sale of non-strategic assets, the creation of public-private partnerships in transport and telecommunications, and the restructuring of the public service. According to May (1998), the overall thrust of public sector restructuring is to reduce government spending by ensuring that government moves out of providing services that can be provided more

efficiently by the private sector; that public-private partnerships are established to increase access to capital and new technologies and to increase efficiency; and that the funds raised from privatisation are used to reduce the national debt.

The framework for increasing employment provided in GEAR focuses on supporting a competitive and more labour-intensive growth path through wage moderation and increasing employment flexibility (May, 1998). According to May (1998), employment flexibility, for example, the use of casual and contract labour is increasing in South African industry.

According to the GEAR Policy (1996), investments in social and economic infrastructure will play an important role in increasing the productivity of labour and business. The strategy envisages a substantial acceleration in government spending together with improved maintenance and operation of public assets. The GEAR Policy (1996) states that public infrastructure needs consist of components domestic and industrial grid electricity; domestic, industrial and agricultural water supplies; sanitation; waste water and storm water; roads and other transport networks; telecommunications and postal services; rural development; hospitals and clinics; and educational facilities.

The participation of the rural community in the Zibambele rural road maintenance programme facilitated much of the goals of the GEAR policy. Labour-intensive methods in road programmes provide a sustainable source of supplementary employment for the poor in rural communities. Labour-based methods in road projects have the ability to meet the objectives created by GEAR for employment creation and poverty alleviation. The GEAR Policy provides a framework that government should follow and use in development projects.

2.5.3.3 The White Paper on National Transport

The National Department of Transport embarked on a project in September 1996 to review transport policy in South Africa, which at the time was outdated and grossly inequitable. All key-role players and stakeholders were assembled in order to discuss

policy issues and they formed six working groups to address different aspects of transportation policy. Their conclusions were documented in a working document, that is, the Green Paper for Transport Policy, which formed the basis for discussion and formation of the White Paper (Department of Transport, 1996).

The vision articulated by the White Paper on Transport is to:

Provide safe, reliable, effective, efficient, and fully integrated transport operations and infrastructure which will best meet the needs of freight and passenger customers at improving levels of service and cost, in a fashion which supports government strategies for economic and social development whilst being environmentally and economically sustainable.

(Department of Transport, 1996: 4)

In addition, the Department of Transport (1996) states that the White Paper (1996), set an array of strategic objectives for the individual modes of transport and for the system as a whole. These objectives include enhancing the quality of freight transport services by providing transport customers with a safe, secure, reliable, and cost-competitive system; establish sound intermodal co-ordinating structures; and ensuring that public transport is affordable, with commuters spending less than 10% of disposable income on transport. (Department of Transport, 1996) In addition to the strategic objectives, the White Paper sets out ten key thrusts for any future policy and strategy formulation. The White Paper suggests two types of key thrusts: those that are means to achieving goals, and those that are goals themselves.

Means to achieving goals consist of the following:

- **Skill and Technology Building:** Building the skills and technology available to the industry is a key requirement of the transport industry.
- **Broaden Participation in the Economy:** Create wider and broader representative ownership of South Africa's transport assets.
- **Ensure Competition:** To ensure the highest levels of service at the lowest level of costs, the transport strategy should build competition within the industry.

The goals themselves stipulated in the White Paper on Transport, according to the Department of Transport (1996), are:

- **Customer needs:** The transport strategy must focus on a data-driven understanding of the different customer segments and include their service levels and cost requirements.
- **Investment objectives:** National investments in infrastructure and operations should provide economic returns to the country, financial returns to the investors and social returns to the people of South Africa.
- **Policy requirements:** The transport strategy should allow for the achievement of national and regional policy objectives.
- **Integration:** The strategy should identify areas where regional, modal and institutional integration can be enhanced and facilitated.
- **Safety:** The safety of people and the security of goods are an essential requirement of the strategy.
- **Environmental sustainability:** The impacts of various modes and transport alternatives should be measured for their environmental impacts.
- **Low cost for Designed Level of Service:** The transport strategy must realise the different needs of customers and must strive to meet those needs at the lowest possible costs.
- **Meeting Basic Needs:** Transport has an impact on the key goals of the Reconstruction and Development Programme of meeting basic needs of the people of South Africa.

The National Department of Transport was cognisant of the limitations of the White Paper and hence set out the ten Thrusts (Department of Transport, 1999). The White Paper (1996) Policy Framework was established to achieve goals on a short-term to medium-term basis for government in response to the dramatic changes in the country. It was set up to be a consultative process and did not depend on data driven conclusions nor did it look over the long-term horizon for its work.

The National Department of Transport (1996) acknowledged in the White Paper (1996: 44) that:

In the longer term, specific goals, strategies, and action plans to proactively lead the South African transport system into the desired vision of the future will be developed through the Department of Transport's 'Vision 2020' project.

The Vision 2020 project evolved into the 'Moving South Africa' document in June 1997 with a mandate to develop a strategy to ensure that the transport system in South Africa contributes to the country's growth and economic development and meets the needs of South Africa in the 21st Century. The White Paper concluded in 1996 after having taken the first steps towards an agenda referred to as the unwind agenda. In addition it reoriented transport priorities to be consistent with the Reconstruction and Development Programme and the Growth Employment and Redistribution policy document and it articulated new principles and objectives for transport (Department of Transport, 1996).

2.5.3.4 Moving South Africa (MSA, 1999)

The Moving South Africa (MSA) project was embarked upon by the National Department of Transport in June 1997. This project entailed a 14 month process to take the vision outlined in the 1996 White Paper and develop a twenty-year strategy to achieve it, describing both the process and the prescribed strategy for the South African transport sector (MSA, 1999). The concluding strategies of the document were derived through a combination of an intensely consultative and data driven process. The strategy is required:

- To examine the White Paper's objectives on the basis of hard data, and to reconcile or choose amongst some of the competing objectives of the White Paper.
- To create a context for action within which to achieve the White Papers objectives through making difficult choices based on data on how to meet the

objectives and by considering delivery mechanisms through which those choices are translated into reality by government, customers, and service providers.

- To articulate systems and institutions that can interpret the environmental signals and respond to them in a coherent fashion within the context of the strategic vision of the White Paper.

Therefore, according to the Department of Transport (1998), the strategy must accomplish three things:

- Examine the White Paper's objectives against hard data to validate their feasibility;
- Reconcile and select amongst any of the conflicting objectives; and
- Reconcile the objectives against the constraints of time and resources, especially money scarcity.

The strategy must further take into cognisance a third constraint, that of human capacity (which in the short term can limit the ability to deliver on the strategy).

One of the critical challenges of the MSA programme is changing the legacy of the transport system in South Africa which is inadequate to meet the growing needs of the country. According to MSA (1999), the legacy of the apartheid era can be seen clearly in the transport system and in most cases the current allocation of infrastructure and resources reflects a set of social and economic choices that have been superseded. MSA (1999) states that the facts show that the current infrastructure, subsidies and a host of services are a direct outcome of decisions instigated by the previous government.

According to the MSA (1999), transport decisions are long-term in nature due to the heavy fixed costs involved, the spatial nature of allocation decisions and the complexity of moving property based assets. Consequently, a transport system that mirrors the old strategy carries powerful momentum into the future, even though it no longer reflects the current government's priorities because of the difficulty and expense entailed in transforming it (MSA, 1999).

In the context of rural infrastructure, the existing road network at the inception of the MSA only periodically serves the former homeland areas and the road network in rural areas is set up to provide access for White commercial farmers while bypassing most other rural communities (MSA, 1999). The MSA (1999) document further asserts that viewed holistically, the former government created a transport system that catered for and served national goals that were designed to attain goals of job creation for a privileged class of citizens and was engineered to support a spatial dispensation with no national, social or economic basis. According to the MSA (1999) document, the system is one that perpetuates itself into the democratic dispensation and the system that the National Department of Transport has begun to address, commencing with the White Paper. The fundamental strategic challenge that emerged therefore was the need for more or improved rural roads than the country currently has and that provision should be made in a sustainable way according to development needs, development, and potential or social impact measures (MSA, 1999).

2.5.3.5 Integrated Sustainable Rural Development Strategy (ISRDS)

The Integrated Sustainable Rural Development Strategy (ISRDS) was introduced in November 2000 by the South African Government in an effort to improve opportunities and well-being for the rural poor. The stated vision of the Integrated Sustainable Rural Development Strategy is:

To attain socially cohesive and stable communities with viable, sustainable economic and universal access to social amenities that is able to attract skilled and knowledgeable people, equipped to contribute to their own and the nations growth and development.

(ISRDS, 2000: 19)

The strategic objective of the Integrated Sustainable Rural Development Strategy (2000) is to transform rural South Africa into an economically stable and harmonious sector that makes a significant contribution to the nation's Gross Domestic Product. The strategy was designed to provide opportunities to the rural sector of South Africa by facilitating

them towards identifying their own potential and therefore contributing to the economy and the country's future, while using existing institutional, planning, management and funding mechanisms. Particular efforts of the strategy are geared towards targeting the rural poor, specifically women, children and the disabled (ISRDS, 2000).

The ISRDS (2000) strategy consists of three key elements:

- **Integration:** Integration is regarded as a goal of rural development programmes. According to the ISRDS (2000), an effective method for integration specifies who does what and how the integration will be accomplished at the various levels.
- **Sustainable:** The strategy will be sustainable if it contributes to increased local growth and if rural people care about its success, and are able to access the resources to keep generating.
- **Rural Development:** Rural development places emphasis on enabling poor people to earn more, invest in themselves and their communities, contribute towards maintenance of the infrastructure essential to their livelihoods, and to identify opportunities and act on them. A successful strategy will make people less poor, complemented by measures to assist the poor and relieve the burdens of poverty.

The ISRDS (2000) further outlined several constraints that are presently hampering rural development in South Africa such as budget constraints, backlogs, spatial dispersion, a limited tax base and political marginalisation. Other important elements of the ISRDS are: human resource and capacity building, land reform (implement revised programme), community-based income generation projects, social assistance and safety nets, and rural development finance (ISRDS, 2000).

With regards to transport, the objectives of the ISRDS can be achieved through the participation of rural communities in labour-based works. Labour-based works creates employment opportunities and enable people's skills and knowledge to grow. Thus, labour-based maintenance contributes to poverty alleviation and maintenance of good

infrastructure that are required for sustainable livelihoods, as outlined in the ISRDS (2000).

2.5.3.6 Rural Transport Strategy for South African (RTSSA)

The Rural Transport Strategy was particularly created to provide rural people who have little access to the basic social services and economic mainstream with efficient rural transport infrastructure and services which serve as a catalyst for sustainable economic development, improved social access and the alleviation of poverty in all rural areas of South Africa. According to the RTSSA (2003), short, medium and long-term sustainable programmes of action are outlined in the strategy that should be aligned with other relevant Acts, policies, strategies framework and programmes. These include the Integrated Sustainable Rural Development framework, the Integrated Development Plan, the Community-Based Public Works programme (CBPWP), the Local Economic Development plan (LED), the White Paper on National Transport Policy (1996) and the Road Infrastructure Strategic Framework.

Strategic challenges outlined in the RTSSA (2003) are as follows:

- To overcome economic access, as well as access to education and social services from the village to the nearest town or centre, which requires a co-coordinated set of needed and linkage development initiatives.
- Given the backlogs and needs, the second challenge is to increase the level and transform the pattern of investment in rural transport infrastructure and services. This should also incorporate linkage infrastructure and services as well as include scholar transport and various other sector specific services that address special needs such as those of HIV/AIDS patients. Non-motorised transport infrastructure and services as well as rural freight and postal services, rural logistical services and the comprehensive range of information and communication technology-based services should also be included.
- The third task is the need to re-evaluate and develop appropriate regulatory mechanisms for light delivery vehicles and freight services.

- Institutional arrangement, particularly to address the overly complex and uncoordinated rural planning and procurement process.
- The final strategic challenge encompasses capacity building and monitoring, since maintaining a sustainable development agenda depends on the capacity of people, institutions and resources.

According to the RTSSA (2003), the development of a balanced rural transport system requires investment in access roads and improvements in the other forms of rural transport infrastructure such as local or district roads, paths, tracks, etc. The main operational aims and rationale of the National Rural Transport Strategy are to achieve improved strategic guidance and coordination and to facilitate accelerated service delivery in neglected geographical and functional areas (RTSSA, 2003). The need for a sustainable rural transport system relates mainly to the need to establish sustainable funding channels and procurement systems, address neglected road maintenance requirements, and develop improved structures for the management of storm water, which is regarded as the major cause of deteriorating road conditions in most deep rural areas (RTSSA, 2003).

The policies reviewed have common goals of community participation and poverty alleviation through programmes such as the Zibambele programme. It is evident that addressing the backlog in rural road maintenance and targeting poverty alleviation in poor rural areas requires the use of labour-based methods and community participation. The labour-based methods and their impacts on maintenance activities and poverty alleviation are therefore discussed in the proceeding sections, in relation to rural roads.

2.6 Labour-Based Methods for Road Maintenance in Transport Programmes

The term “labour-based” is used to describe works where although mechanical means are possible, primarily labour is used, for example, the construction of culverts, gravelling and surface and formation construction (Gannon and Lui, 1997). Cook et al (1985) state that rural road maintenance typically suffers most as priority is given to maintenance of national, urban, and other paved roads. Maintenance responsibilities require the

development of community capabilities complemented by effective technical and financial support from the central government. Labour-based road maintenance is usually accepted as the method of choice for roads carrying low traffic volumes and for routine maintenance tasks on paved roads (Wet and Luttig, 1992).

The case for labour-based methods is strengthened by widespread unemployment and lack of alternative income opportunities in rural areas. Thus, labour-based projects and programmes are applicable where there are large percentages of poor people who are unemployed and where large amounts of infrastructure construction, rehabilitation and maintenance work are needed (Beenhakker et al, 1987). Since rural road development and maintenance activities provide the much needed employment opportunities to the rural masses, Lal (1995) suggests that it is not only desirable but necessary that the methods of development employed should be labour intensive.

Rural roads, which include roads, bridges and culvert, are important to economic development and serve as the main entrance for farmers to reach and access socio-economic and other services available in other areas (Johannesan, 1999). The purpose of road maintenance is to ensure that the road remains serviceable until the end of its design life. According to Anderson et al (1996), the main reasons and need for road maintenance are:

- Increasing the life of the road and thereby postponing renewal of the road by reducing the rate of deterioration.
- Reducing the vehicle operating costs and hence promoting public mobility by providing a smooth running surface.
- Keeping the road open on a continuous basis by preventing it from becoming impassable, reducing travel times and promotes safety.

It is suggested in Zibambele (2005) that roads are built where people reside and therefore construction and maintenance creates work opportunities for those who are least mobile.

Johannesson (1999) states that road maintenance can be divided into three distinct categories, which are clearly defined according to their timing and nature of work:

- Routine maintenance;
- Periodic maintenance; and
- Emergency maintenance.

Routine road maintenance is usually small-scale operations with little or limited requirements which mainly consist of unskilled activities, with the exception of grading (Beenhaker et al, 1987). Most road agencies frequently contract out routine maintenance as it is difficult to do the work economically using direct labour or force account.

For the purposes of the Zibambele study, priority will be given to discussions over routine maintenance. Routine maintenance of low traffic rural roads is a widely dispersed activity, requiring small resource inputs over a large number of widely separated points (Johannesson, 1999). For this reason, this operation is very well suited for labour-based work methods, thereby relying to a high extent only on locally available resources. According to Johannesson (1999), routine maintenance tasks include:

- Repair, fill and compact pot holes and ruts;
- Erosion control of shoulders and slopes;
- Clear side and mitre drains to allow for free passage of water;
- Clear culverts and other water ways;
- Cut grass and bushes;
- Maintain road signs in place;
- Perform minor repairs to culverts and retaining structures; and
- Repair and replace scour checks.

The main advantages of using labour-based methods in rural road maintenance, according to Beenhaker et al (1987) and Anderson et al (1996), are:

- Low overall cost
- Low capital costs
- Less foreign exchange requirements

- More local employment
- Improved income distribution
- Flexibility to operate on many sites
- Development of local skills
- Appropriate use of local resources
- Local participation
- Large percentage of maintenance cost flows into the hands of the community
- Multiplier effects on the other social and economic factors

Road maintenance offers considerable capacity for increasing efficiency by adopting different operational and organisational approaches (Johannesen, 1999). Some of these approaches include:

- Use of equipment
- Use of labour
- Use of contractors

The lack of availability of needed equipment is one of the biggest constraints in the development of rural road networks and their appropriate maintenance (Agha and Siddiqui, 1995). Based on past experiences in several developing countries, the technologies that are most suited to rural road development work out to be somewhere in between the labour-intensive and equipment-intensive technologies. Agha and Siddiqui (1995) assert that these are known as intermediate technologies. For the purpose of this research, labour-based/ intensive methods of road maintenance will be emphasised on.

Labour-based technology is defined as a technology that attempts to apply a labour/ equipment mix that gives priority to labour, with appropriate equipment, where necessary, for reasons of quality or cost (Rural Infrastructure Strategic Framework for South Africa, not dated). The Green Paper on Public Sector Procurement Reform in South Africa (1997) suggests that the generation of jobs in South Africa should be facilitated by procurement in the following two ways:

- Encouraging the substitution of labour for capital by minimising foreign content in contracts involving goods, services and works.

- By supporting the use of 'labour friendly' technologies that require a high labour input that are well suited to implement small scale enterprises.

Many policy makers in developing countries have been experimenting with labour-based technologies since the 1980s to improve the standard of living of rural communities through infrastructure provision; generate employment for rural, unskilled people; and conserve scarce foreign currency (Rural Infrastructure Strategic framework for South Africa, not dated). By contrast, labour is practically always readily available and can be employed at a low cost. In addition, labour-based techniques are very well suited to a large range of maintenance activities, particularly when labour is well managed on a performance-based payment system (Johannesen, 1999). However, labour-based approaches demand intensive and good quality planning and skilled supervision.

The choice of the most suitable equipment/ tools should depend on such factors as specification requirements, physical energy of workers, size of work and restricted site conditions (Lal, 1995). Labour-based technologies and methods can create the employment opportunities that should be able to address the issues to allow community resources to build up and grow from within (Construction Industry Development Board, 2004).

According to the Construction Industry Development Board (2004), the following issues should be addressed in labour-based projects:

- promote community development and promote community involvement;
- impart technical skills to the unskilled and semi-skilled members of the community;
- transfer administrative, commercial and management skills to the community;
- retain funds expended on the project within the community; and
- develop contractors from within the community in which roads are to be constructed.

With regards to the Zibambele rural road maintenance Programme, the use of labour-based technologies address a broad array of other problems (Zibambele, 2005):

- It creates employment opportunities for those least able to compete on the job market.
- Labour-based methods are supervision intensive and creates significant local administrative and management opportunities for both the educated and unemployed.
- Work can be timed to absorb labour during the agricultural off season, thus resulting in the strengthening of safety nets of rural households.
- Emphasis is placed strongly on local labour, local expertise and locally available resources. This results in considerable savings in foreign exchange associated with important machine, fuel, materials and expertise.
- Training on the technical aspects of road construction and maintenance, as well as the administrative aspects of the project management is provided.

2.6.1 Women's Participation and Labour-Based Methods

Participation refers to the involvement of people at a local level in organisations and political parties concerned with decision-making about and the implementation of development either directly or indirectly, however, women's participation is seen to be less encountered if not encountered at all (Greenberg, 1999). Women are often not included in decision-making and participation although they contribute significantly to development. According to Soya (1992), women are most often regarded as being inert and lack participating skills during planning and development. According to Soya (1992), this is due mainly to the notion that males are the intellectuals of any or all societies, therefore, resulting in a situation where women are not given the opportunity to voice out their opinions in respect to their male counterparts.

Grieco (2002) states that "poor transport intensifies the task burdens of women and the impact of poor transport in a context of centralised resources further intensifies task burdens and time poverty." This is particularly the case where women are themselves forms of transport, for example, head loading, fuel, water, agricultural produce and household goods in the absence of access to other forms of transport (Grieco, 2002). Considerable attention is being paid to the role of women in labour-based rural road

works for increased off-farm income. According to Grieco (2002), the percentage of female road workers is generally a fraction of that of males, although it has been shown through road projects in Kenya and Tanzania that road works can become an important targeted income generator. According to an evaluation of women's participation in Tanzania in Wet and Luttig (1991), it was established that women's low participation in road projects could be attributed to the following factors:

- Priority given to the demands of domestic activities such as collection of wood, water, etc.
- Lack of information related to women's eligibility for employment.
- Scarcity of forewomen.
- Lack of transport to work sites.
- Lack of pilot projects using labour-based methods with special emphasis on women's participation.

Figure 2.2: Women and Labour-Based Rural Road Maintenance



Source: Taylor (2000: 1)

Figure 2.2 above illustrates women's participation in labour-based rural road maintenance. According to Taylor (2000), the participation of women in labour-based rural road maintenance activities has the potential to increase women's off-farm needs;

strengthen technical and leadership skills; disseminate labour saving equipment; and support woman enterprises development. Ndimande (2006) asserts that the participation of women in formal or informal employment plays an important role in economic growth and supplements family income. According to Ndimande (2006), women should not be seen as passive receivers of development assistance, but should be given an opportunity to take part in development. Measures to facilitate the participation of women at all levels including supervisors and constructors should also include provision of childcare services and flexible hours.

2.6.2 Labour-Based Methods using Lengthmen and Petty Contractors (Male or Female)

Labour-based methods facilitate in acquiring construction skills that generates an increase in the availability of small contractors for maintenance activities (Wet and Luttig, 1992). Established contractors or small-scale contractors according to Gannon and Lui (1997) can either/ or appropriately be used to implement labour-based methods. The advantages of using existing contractors are that they can pay labourers on time, do not require a long development horizon, require few institutional changes and have low performance risks.

The quality standards to be achieved when maintaining roads are basically the same as for road construction works. For the implementation of labour-based routine maintenance, Johannessen (1999) identifies different organisational methods, such as:

- *The lengthmen system:* a worker (male or female) is assigned to carry out all routine maintenance activities over a specific length of the road and throughout the year. He/she is responsible for his/her section and carries out all work as instructed.
- *Petty contractors:* a number of workers employed by a local "contractor" carry out all activities as a group, covering a longer road section. Each petty contractor is responsible for a specific road section. The manager of the petty contractor is responsible for hiring and supervising its workers according to the instruction issued by the client.

- Another possibility is to have the lengthmen or petty contractors working only once or twice a year (for example, before and after the rainy season) to carry out all necessary activities in one go. After maintenance work have been completed their employment is terminated, and they must be re-employed before the next period.

South Africa has seen an increase in the number of labour-based projects and programmes since the mid 1980s. McCutcheon (1994) identifies three types of programmes that can be identified for labour-based works, viz. poverty relief, employment generation, and asset creation. Labour-based methods, according to Gannon and Lui (1997), are cheaper and more reliable than capital intensive works and promote the potential to generate income-earning opportunities for the poor. Therefore, this method for roadwork, as stipulated by Lal (1995), not only rehabilitates roads in a cost-effective manner but they can be used to achieve poverty reduction benefits as well. Other benefits include savings on foreign exchange, injection of cash into the local economy and transfer of knowledge or road work to local communities (Gannon and Lui, 1997). For the purpose of this research, emphasis is placed on labour-based rural road maintenance through using the “lengthmen system”. The lengthmen system will be discussed in detail in the following section.

2.6.2.1 The Lengthmen System

The lengthmen system is best described as a form of routine road maintenance that involves the allocation of a particular length of road to specific individuals or small-scale contractors for regular maintenance (Taylor, 1993). According to Taylor (1993), it is a contract that is established between a government agency that is responsible for rural roads and a local individual or small-scale contractor that usually resides close to the road, to carry out all routine maintenance over a fixed length of the road using hand tools, which is either provided by government or the contractor depending on the agreement. Taylor (1993) also asserts that the system is suitable for rural roads of low traffic volumes (<50 vehicles per day) and in well populated areas where contractors are in close proximity to the road.

Contracts are awarded up to 2km for single-person contractors and 40km for small-scale contractors (Anderson et al, 1996). The agency responsible normally appoints supervisors who monitor the condition of the road, direct operations, make reports and authorise payment upon satisfactory performance. The amount of work needed to keep a length of road in good condition depends on several factors, such as type of road surface, traffic volume (number, type and size of vehicles), the severity of climatic conditions (especially rainfall) and type of soil, the susceptibility of the terrain and road gradients to erosion, and the presence of bush and vegetation (Johannesen, 1999).

According to Taylor (1992), studies conducted to date show that management factors such as planning, supervision, and motivation has had more influence on the effectiveness of routine maintenance by lengthmen than any technical, climatic or other factors. The lengthmen system requires extensive supervision and there is a low demand for the training of staff and for the introduction of more effective planning, monitoring and reporting procedures for the project to succeed (McCutcheon, 1994).

The advantage of the lengthmen system is that continuous maintenance of the entire road can be guaranteed at all times and it is cheap, requires little training of workers and little equipment (Howe and Bantje, 1995). About 85% of the costs are local, therefore, the money remains in the country. However, Howe and Banje (1995) assert that like any other system of maintenance, the lengthmen system has limitations. It needs an abundance of commitment in terms of supervision and timely payment. Howe and Banje (1995) suggest that despite these drawbacks, the lengthmen system remains one of the most admired methods of rural road maintenance using labour-based methods in some developing countries such as in Kenya and Lesotho.

2.6.2.1.1 The Original Concept of the Lengthmen System

According to Taylor (1993), the original concept was that the lengthmen should serve the following functions:

- Be recruited from the original construction group
- Be responsible for a fixed section of the road

- Reside adjacent or close to the road
- Work three days of their choice per week
- Choose what work to do themselves
- Be paid if the standard of the work of the section of road was satisfactory

However, due to experiences over time these fundamental principles have changed (Taylor, 1993). In Kenya the lengthmen were concentrating less on important tasks and there were no prioritisation of activities. This led to the introduction of headmen and overseers. The lengthmen also needed specific training and supervision for different activities.

2.6.2.1.2 The Lengthmen System and its Key Features

A lengthmen, according to the Minor Roads Programme (1986), can either refer to a man or a woman that is appointed on a contract basis for each section of road, usually 1.5km to 2.0km in length. He/ she is provided with hand tools and supervised regularly by a headman/ headwoman and an overseer who monitors the condition of the road, directs operations, makes reports and authorises payments for satisfactory work. The payment is based on the contractor carrying out work for three days a week and the contract can be terminated if the lengthmen perform poorly. The Minor Roads Programme (1986) states that a contractor generally resides adjacent to the road and therefore, does not require government accommodation or transport, which consume considerable resources in a traditional equipment-based maintenance system.

The lengthmen system also create productive paid employment in rural areas where there are few or limited opportunities for such work opportunities (Minor Roads Programme, 1986). The contractor is able to live at home with his/ her family and the part-time terms gives him/ her the opportunity to work on other activities as well as start other businesses. It is estimated that 75% of the direct cost of the system are paid directly to the lengthmen contractors. According to the Minor Roads Programme (1986), the system also enables maintenance to be achieved throughout the year on each portion of the road.

The Minor Roads Programme Road Maintenance Manual (1986) lists the following key features of the lengthmen routine maintenance system:

- One person is responsible for all manual routine maintenance activities on a section of road
- Lengthmen work on three specified days per week
- Lengthmen are provided with necessary hand tools
- Road section is assigned to the lengthmen according to maintenance needs due to surface type, traffic, topography and rainfall
- Lengthmen's sections are sub-divided with marker posts to aid work setting and monitoring
- Lengthmen works through his/her section completing one selected activity at a time, using task-based system to simplify supervision and control
- Priorities for the maintenance work set according to the section
- Headman/ headwoman setting tasks and supervising length-person at least once per workday
- Routine maintenance supervisor supervising lengthmen at least once per a fourth night to direct, control and report on work done
- Lengthmen paid at monthly intervals subject to work output
- Terms and service for lengthmen and headman/headwoman are contract-based and renewed annually
- An objective method of routine maintenance assessment and performance is incorporated in an annual inspection system
- Initial and on-going training and tuition of lengthmen and headman/ headwoman by their overseers

2.6.2.1.3 Maintenance Responsibilities of the Lengthmen System

The roles and responsibilities of all personnel within the maintenance system and the details of duties to be carried out on a regular basis according to the Minor Roads Programme Maintenance Manual (1986) are:

- **Lengthmen Contractor**

The lengthmen contractor is a person that has been or is working on the construction and maintenance of the road. To facilitate supervision and control the lengthmen is supposed to work on specified days each week, arranged by the overseer and recorded in the inventory maintenance book. The lengthmen is directed to carry out specific activities each week and task rates are laid down.

- **Headman/ Headwoman**

By setting up appropriate arrangements for a headman, the supervision workload of the routine maintenance overseer is lightened. In this way the daily site supervision is possible in between visits of the overseer. The headman/ headwoman is responsible for the daily supervision and monitoring of the lengthmen.

- **Routine Maintenance Overseer**

The routine maintenance overseer is responsible for the organisation and control of all routine maintenance activities within his maintenance section. He/ she is further responsible for identifying the need for urgent maintenance work. His/ her duties include:

- **Routine inspection:**

Visiting all roads under his responsibility at least twice per month to direct, control and monitor the routine and urgent maintenance work with the assistance of the headmen.

- Directing the headmen and contractors in the priority activities and setting productivity rates.
- Instructing the headmen and contractors in the correct maintenance techniques for each activity.
- Monitoring the quantity and quality of work achieved since the previous inspection.
- Identifying the need for important work.

The overseer is accompanied by the headmen during inspection.

- **Officer-in-Charge of Maintenance**

This is the key position within the maintenance organisation. The officer-in-charge is responsible for the daily running and functioning of the road network in the district.

His/ her duties include:

- The preparation of work programmes for each maintenance overseer, and monitoring the work progress to ensure that they are implemented correctly.
- To ensure that the overseers maintain their equipment correctly and have adequate transport, fuel, construction materials and any other resource required.
- To ensure that overseer supervises the work correctly and completes the necessary reports accurately on the progress of the work.
- To ensure the prompt, correct and full payment of all casual labourers and contractors engaged on the maintenance work.

- **District Maintenance and Improvement Engineer**

The district maintenance and improvement engineer is responsible for all maintenance activities in the district (Minor Roads Programme Maintenance Manual, 1986).

2.6.2.1.4 Lengthmen Systems in operation in Sub-Saharan Africa

There are a number of countries in Sub-Saharan Africa that has gained experiences with using labour-based methods in road maintenance. Many of these programmes initially started as pilot projects and have since developed into well sustained national programmes (International Labour Organisation, 2003). Some country specific examples will be discussed below:

- **Kenya's Rural Access Road Programme (RARP)**

The rural access road programme in Kenya offers relatively successful and important lessons. The road selection process was started by each District Development Community

before 1980, whereby approximately 150 to 200km of roads were selected for improvement by following a set of criteria set by the rural road branch of the Ministry (Riverson et al, 1991). According to Riverson et al (1991), the criteria used for the successful rural access road programme in Kenya included road length (5–10km) present state (non-motorised), type and state of connecting roads, degree of connection to markets and social services, population density and small farmer holdings, availability of appropriately priced labour for road construction, the degree to which development constraints would hinder road impacts, cost of road and technical feasibility.

Through the use of equipment provided for the cleaning of gravel, each unit was expected to undertake labour based road construction. Each unit was directed by an inspector and employed 250 casual labourers. The district engineer, assisted by inspectors and overseers are responsible for road maintenance depending in the length of roads in a district. Using the lengthmen system that uses local people that live close to the road, routine maintenance is achieved. The equivalent of 3 days a week of casual labour is paid to each contractor (Taylor, 1992).

The lengthmen system was found to compare well to the traditional equipment-based system in terms of physical output because of its continuous nature. Studies carried out by Taylor (1992) showed that the overseers in Kenya spent more time travelling than supervising. The lengthmen were also not utilised properly. However, according to Petts and Jones (1989), improvements were noted in specific research studies.

- **Botswana**

Based on the Kenya RARP, a district project of labour-intensive road construction and maintenance was carried out in Botswana between 1980 and 1992 (Howe and Bantjie, 1995). The lengthmen system was used to maintain roads at an average standard that proved to be higher than that of roads maintained by the Roads Department with equipment. Various substitute routine maintenance organisations were tested such as lengthmen programmes supervised by technical assistants and through using gang leaders on bicycles. Currently most of the districts in Botswana operate in groups of maintenance

workers and only a handful work on single person lengthmen system since most people prefer to work in groups of five supervised by a team leader. Each group is assigned about 7km road length to maintain at an annual cost of US\$ 483/km (Howe and Bantje, 1995). According to research conducted in Botswana by Howe and Bantje (1995), the major problems experienced in using the lengthmen system were weak and inconsistent management of trained staff, which led to strong negative impacts on productivity, and problematic payment of funds from district bank accounts.

- **Lesotho**

According to Howe and Bantje (1995), the lengthmen system was started in Lesotho in 1984 under a force account. The force account system uses an approach that pays labourers on time (Stock and De Veen, 1996). The force account system requires few institutional changes and has a low performance risk. According to Stock and De Veen (1996), in the force account approach, public agencies supervise, manage and control their machines and labour directly. Howe and Bantje (1995) assert that a lengthmen was selected to maintain 1-2km of road, supervised by the regional engineer's supervisor that would visit the site once a week, depending on the terrain. The lengthmen was paid on a monthly basis as a full-time worker. The cost which also included supervision and overheads was about US\$ 1450/km per annum.

In 1994, the single-person system under force account was abandoned in preference for the small-scale contractor system (Howe and Bantje, 1995). A contractor under this system is allocated 30-40km of road to maintain on a monthly basis by the contracts supervisor, who monitors the improvement on a monthly basis. This programme is based on task rates that are set by the client (Government of Lesotho Labour Construction Unit) and the number of worker-days per month. A contractor, for example, maintains 40km of road and the average number of worker days he/ she has available per month is based on 26.6 workers that are working 22 days or 587 worker days per month. The payment of the contractor will be done based on the actual work performed that is measured by the contract supervisor at the end of the month. The annual cost is about US\$ 1300/km (Howe and Bantje, 1995).

- **Malawi**

During the early 1980s, Malawi established road improvement and maintenance units at a number of district councils as the inability to maintain rural roads were recognised. The roads selected were mainly village roads carrying 5-50 vehicles per a day and by using strict economic criteria. The maintenance techniques used were similar to those used in Kenya, whereby the lengthmen system was adopted and routine and periodic maintenance was carried out by groups of 5-6 labourers controlled by a foreman/forewoman (Hagen and Relf, 1988). According to Hagen and Relf (1988), the lengthmen system adopted in Malawi was being carried out by groups of 5-6 labourers under a foreman. The main divergence from the Kenyan system is the prominence given to the groups.

- **Mozambique**

In Mozambique labour-based construction and maintenance of roads started in 1981 with the assistance of the International Labour Organisation (Geddes, 1987). Workers were removed from the main labour force from roads that had already been developed and assigned regular maintenance as lengthmen. Workers were employed as full-time labourers and were responsible for 1.6 km road length. Geddes (1987) states that the lengthmen system operated well in some sections, however, major problems due to heavy rainfall in the wet seasons were experienced. As the system progressed, the lengthmen were working five days per week maintaining a length of 2.5km each of gravelled roads.

Geddes (1987) asserts that the major problems experienced in Mozambique were heavy rains, which made work difficult for the lengthmen and political instability which greatly contributed to the lack of consistency in the programme. However, according to Geddes (1987), by 1990 the programme was so successful that the lengthmen were working for five days a week covering a length of 2.5km each for the maintenance of gravelled roads.

According to Geddes (1987), the attainment of the RARP in Kenya has paved the "road" for other countries such as South Africa to implement rural road programmes with

labour-based methods. Some major problems experienced in many of the countries discussed are the weak and inconsistent management of trained staff, political instability and high costs involved in sustaining the programmes. However, despite these drawbacks, the maintenance system has proved to be effective in most countries compared to alternative methods of road maintenance.

2.6.2.2 Basic Causes of Deterioration of Rural Road and Maintenance using Lengthmen

This section deals principally with the maintenance activities that affect the performance of the road surface and includes the maintenance of drainage structures and bridges. The World Bank (2005) states that the broad objective of maintenance activities is to preserve the road in a condition close to its intended or as-constructed state, and to ensure an acceptable level of service through control of the various deterioration modes such as gravel loss, dust, and quality.

Deterioration may be defined as the worsening of the road over a long period of time due to various causes that leads to defects. The major causes of deterioration are rainfall, steep gradient, flat gradients, traffic and vegetation (Anderson et al, 1996).

It is not easy to control routine maintenance of rural roads as it has to be carried out along the entire road network and is a widely distributed activity (Anderson et al, 1996). Therefore, according to Anderson et al (1996), it is important that the organisation structure for the road agency is in line with the particular needs of routine maintenance so that work can be carried out anywhere on the entire network at anytime. Furthermore, it is important that priorities be established at particular times.

Anderson et al (1996) suggests the following activities in routine maintenance priorities:

- **Before the rainy season**
 - a. clean culverts/splashes/bridges and drifts
 - b. clean mitre drains
 - c. clean side drains
 - d. repair side drains, erosion and scour checks

- **During the rainy season**
 - a. Inspect and remove obstructions
 - b. Clean culverts
 - c. Clean side drains
 - d. Repair side drain erosion and scour checks
- **End of the rainy season**
 - a. Fill potholes and rut in carriageway
 - b. Reshape carriageway
 - c. Repair erosion on shoulders, backslopes and in drains
 - d. Reinstate scour checks
 - e. Cut grass
- **Dry season**
 - a. Clear bushes
 - b. Repair structures
 - c. Repair carriageway

According to Anderson et al (2006), the three most important deterioration modes are the degradation of the carriageway; erosion of the drainage system; and the silting of the drainage system. The deterioration modes of roads and their maintenance procedures are discussed below.

2.6.2.2.1 Drainage

The provision of sufficient drainage – surface and scale drainage is one of the key elements of rural gravel and earth road construction and maintenance (Riverson et al, 1991). Poor drainage is responsible for most of the structural deficiencies of rural roads because the wearing courses become waterlogged and soften, or because unrestrained or uncontrollable water flows cause erosion or scouring. Johannesen (1999) asserts that

most damages to rural roads are caused by a failing drainage system. In most climates, the most important maintenance function is to keep the drainage system operational as a routine activity to minimise deterioration of the road surface/ structure (World Bank, 2005).

According to the World Bank (2005), drainage consists of:

- Surface crossfall
- Side drains
- Mitre or turn out drains
- Relief drains
- Cut-off/ interceptor drains
- Culverts, drifts and structures

Drainage is undoubtedly the most important feature of any road. If this component of the road fails, serious damage will occur on the remaining parts of the road. Indicators for the drainage condition can be defined as follows: to ease inspection works, the degree of silting/ blockage can be described using simple measurements such as: fully blocked, half silted, correct size and eroded (World Bank, 2005). Such assessments allow the repair work required to be efficiently quantified and costed.

A common denominator for an effective drainage system, according to the Johannessen (1999), is to keep it free from all obstructions such as rocks, branches, silt and other debris. In addition, it is important that the drainage system for a newly constructed road is closely monitored during heavy rains to establish that its capacity is sufficient to cater for the prevailing volumes of water movement adjacent to the road. Riverson et al (1991) mentions that the sloping of unpaved road surfaces, to remove standing water and to prevent softening and surface slipperiness after rains, is often rejected or compromised with during construction and maintenance. Both hand and machine labour methods have been successfully used to construct good drains for rural roads. According to Riverson et al (1991), the consistency of maintaining the road bend specifications and to keep the drains clean of debris results in the continued good performance of drainage structures.

2.6.2.2.2 Clear Debris from Culverts and Bridges

These drainage structures are critical to carry the natural flow of water under the road so that it may continue on its natural course. Small pipes and box culverts can easily become plugged from eroded soil and debris (Johannessen, 1999). It becomes part of road maintenance to inspect them at reasonable intervals and clean them so that drainage is unobstructed. Eventually, they will have to be replaced. According to Johannessen (1999), a good maintenance and replacement programme is lacking for gravel roads.

The maintenance of debris from bridges consists of clearing of all silt, debris and other foreign matter from the structure and its abutments and for a minimum distance of 25m both upstream and downstream thereby allowing water to flow freely and unhindered (Johannessen, 1999). According to Johannessen (1999), all debris and other materials are removed well clear of the river and the drainage system to prevent it from being washed back and once again obstructing the river flow.

2.6.2.2.3 Clean Side Drains

Where the side drains are established to the correct depth and profile with grass cover and no erosion, only grass cutting is required to be carried out (Johannessen, 1999). Where the ditch has silted more than 10cm in depth, the vegetation and silt is removed to the original depth and profile (with the exception of the areas close to scour checks where silting is normal). According to Johannessen (1999), a ditch template is used as an additional tool to confirm that the drain is excavated to its original depth and profile. All debris and other materials from the side drain must be removed well clear of the road and drainage system to prevent it being washed back (Johannessen, 1999).

2.6.2.2.4 Patch Potholes in Carriageway

Potholes are caused by road surfaces that are flat that are combined with water and traffic (Lanoie, 2006). Johannessen (1999) indicates that potholes collect rainwater on the road surface and restrict it from draining off to the side of the road. Combined with traffic, this stagnant water accelerates the wear of the road surface and finally if this water penetrates the road surface layer, it reduces the bearing strength of the road base. According to

Lanoie (2006), potholes should be reshaped or regraded to cut out the potholes and restore crown. Although potholes can also be caused by weak spots in the road base due to pockets of organic matter, rotting stumps or other base defects, the most common cause is lack of pitch causing water to puddle on the road. Restoring crown through regrading or smoothing the surface is generally required for repair. Patching is the common cure, but long-term remedy includes resolving drainage deficiencies and in particular restoration of cross-falls to 4-6% (World Bank, 2005).

2.6.2.2.5 Ruts in Carriageway

Ruts are caused by vehicles that keep on passing in the same tracks made by vehicles before them (Johannesen, 1999). According to the World Bank (2005), dry season rutting is related to the use of non-cohesive materials, such as some gravels and sands. Wet season rutting is found in materials sensitive to water. The weight of the vehicles and their speed push surface material to the sides of the road. This process eventually deforms the cross section and the camber of the road surface. The ruts obstruct the water from exiting the surface. The stagnant water accelerates the wear of the surface when subject to passing traffic (Johannesen, 1999).

Maintenance of ruts in the carriageway comprises of raking excess materials from the road shoulder back on to the carriageway where ruts have been formed. In cases of more severe rutting, it may be necessary to bring in additional laterite gravel to compensate for the gravel loss (Johannesen, 1999). In such cases the ruts should be treated using the same work methods as when filling potholes.

2.6.2.2.6 Vegetation-Grass Cutting and Bush Clearing

In most climates the control of grass, shrubs, bushes and trees is a routine maintenance requirement (World Bank, 2005). This control relates to the road margins to ensure safe visibility by road users, and the effective operation of the drainage system. According to Johannesen (1999), the following tasks should be employed in cutting grass and bush clearing:

- Clearing consists of the removal of grass, bushes, other vegetation, rubbish and all other superfluous material including the disposal of all material resulting from the road maintenance. The work must comprise of the cutting of all grass and bush on both sides of the roadway and for the entire width between the pavement edge and the top of the road side drain back-slope.
- Where road side drainage exists on one side of the roadway only, grass and bush cutting on the fill slope shall extend for a minimum distance of 2.5m from the pavement edge adjacent to the embankment slope. Where no road side drains exist such as on road embankments, cutting shall extend from the pavement edge to the foot of the embankment or to the paddy water level on both sides of the roadway.
- All bushes and branches hanging over the road, shoulders, side drains, mitre drains and traffic signs shall be cut down and disposed of safely. When tree seedlings have newly been planted, it is important that they are not damaged when clearing grass and bush around the seedlings. Furthermore, when the seedlings are young, vegetation close to the trees shall be removed to allow the trees good growing conditions.
- Finally, trimming of planted trees shall be included in this activity on a regular basis to ensure that they develop into healthy shapes and which do not interfere with the road traffic.

2.6.2.2.7 Grub Edge of Carriageway

Johannessen (1999) asserts that grass growing on the edge of the carriageway can prevent rainwater from draining off the road surface. It can also start growing into the carriageway. Grass and roots must be removed from the carriageway. Debris should be removed well away from the road to avoid the removed material being washed into the drainage system (Johannesen, 1999).

2.7 Adverse Impacts of Road Improvements or Maintenance

Road improvements can bring significant economic and social benefits to rural communities and national economies. However, according to Tsunokawa and Hoban

(1997) they may also have significant adverse, long-term environmental impacts. Some of the most significant adverse impacts of road activities (Tsunokawa and Hoban, 1997) include:

- **Soil erosion.** Adverse impacts from soil erosion can occur when water is not kept off road surfaces. However, roads that develop multiple tracks to avoid water and ruts may also contribute to soil erosion problems.
- **Degraded water quality.** Effects from indirect siltation are primarily caused by agricultural development, which tends to increase significantly when new roads expand into previously inaccessible areas and when existing roads are rehabilitated, improved, or upgraded. Water quality may be adversely affected when fuel and lubricants at road camps, vehicle maintenance depots, and fuelling areas are poorly managed.
- **Ecosystem and habitat damage.** Inadequate attention to biodiversity issues in road improvement can lead to the loss of local species, un-degraded forests and adverse effects on threatened species. Road access can also contribute to poaching and trapping of exotic species, and high-speed roads can significantly contribute to animal mortality.
- **Declines in scenic quality.** Constructing new roads or realigning existing roads may adversely affect scenic and aesthetic values, which under some circumstances can lead to lost tourism revenues. The cumulative effects of poorly located and managed quarries and borrow pits over time may also cause significant losses in scenic values.

According to Tsunokawa and Hoban (1997), the following health and safety concerns are caused by rural road maintenance:

- **Dust and noise.** Depending on local conditions and the vicinity of houses and communities, dust and noise may be detrimental to health during construction and once the road is in use.
- **Communicable diseases.** Road improvements increase communication among rural and urban populations which in turn increases the potential for

exposure to sexually transmitted and other communicable diseases, including HIV/AIDS and tuberculosis.

- **Water-borne diseases.** Poor road design and maintenance results in poor drainage and areas of standing water, the risk of water-borne diseases such as cholera and malaria increases.
- **Traffic hazards.** Road improvements, especially those that lead to increased vehicular speed, can increase accident rates for both humans and animals.
- **Roadwork hazards.** The operation of roadwork machinery can pose a threat to the safety of workers during road construction and maintenance. In addition, the creation of borrow pits and quarries for roadwork, if not well planned, can pose threats ranging from drowning in quarry pits to falling from quarry faces or less serious injuries.

However, Tsunokawa and Hoban (1997) state that despite these potential impacts, developing new roads or rehabilitating existing roads often improve personal well-being. Access to educational opportunities and social services, including healthcare, is often a rationale for road improvements.

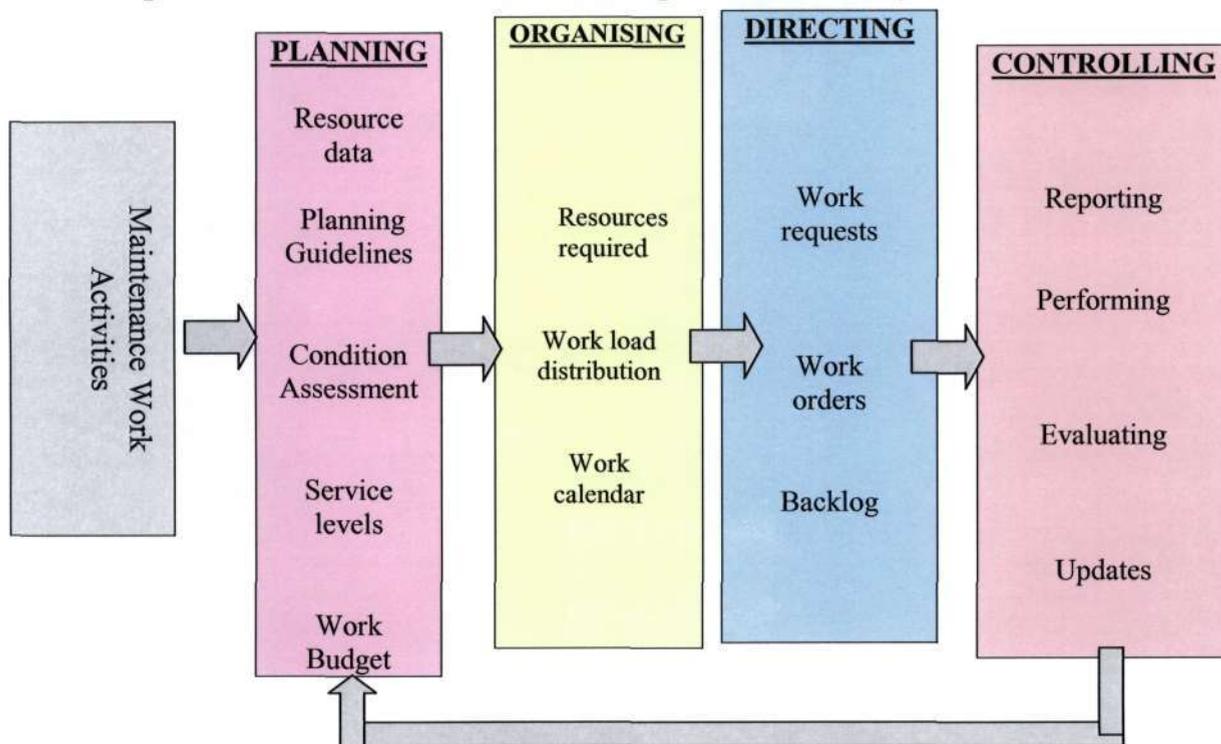
2.8 Maintenance Management

An orderly and systematic approach towards planning, organising, monitoring and evaluating maintenance activities and their costs is referred to as Maintenance Management (Abudayyeh et al, 2005). Similarly, Johannessen (1999) states that road maintenance operations require careful planning, supervision and control. According to Johannessen (1999), proper monitoring of outputs and the resources required to achieve these outputs provide the basic information needed for planning and estimating of future maintenance works.

However, before these planning and implementation activities can commence there is a need for proper and regular road condition inspection and defect assessments, which form the basis for all consecutive engineering inputs (Johannessen, 1999). The absence of a functional maintenance system and lack of resources are the attributes of the deteriorating

conditions of rural roads. Johannessen (1999) further states that the main parameters of a maintenance management system as indicated in Figure 2.3 are planning, organising, controlling and directing.

Figure 2.3: Formal Maintenance Management Process Cycle



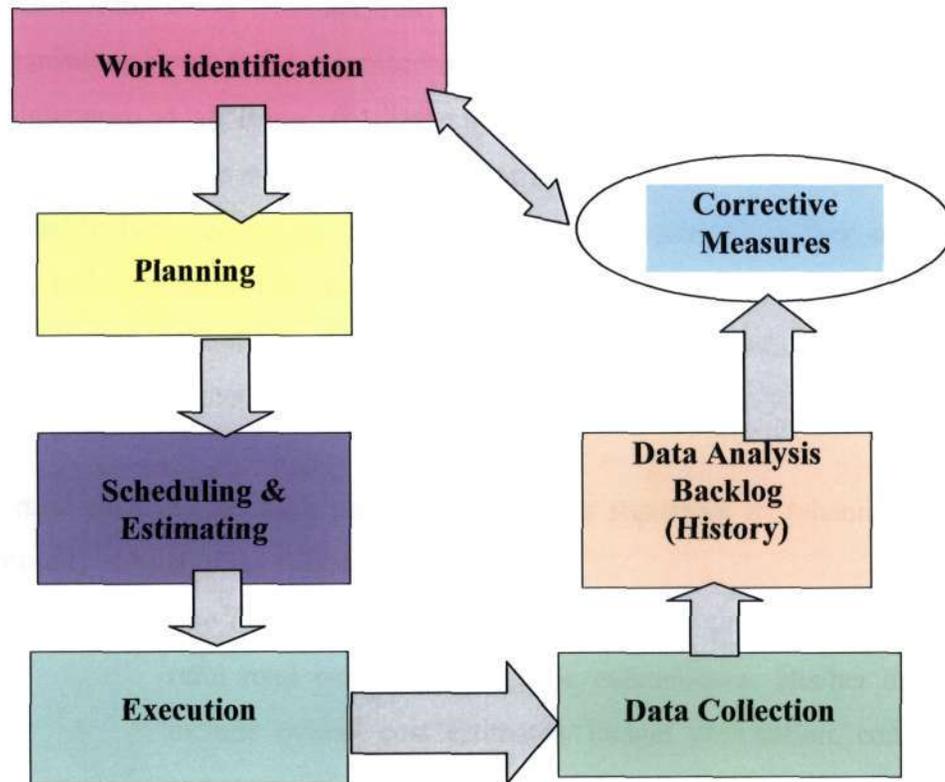
Source: Johannessen (1999: 3)

Maintenance management systems (Figure 2.3), according to Johannesens (1999), that are based on the utilisation of local resources have as their key characteristic that they relate to the maximum extent possible to the local environment, involving local people in the planning and execution of maintenance work. Abudayyeh et al (2005) stipulate that the maintenance management system has been designed to incorporate these essential management functions into maintenance operations.

The first three elements in Figure 2.3 are related to planning and budgeting, the fourth element is related to organising, the fifth element is related to directing and the sixth element is related to controlling. Maintenance management provides a framework for

accomplishing and preparing reports that compare the planned and actual performance as indicated in the Figure 2.4 below (Abudayyeh et al, 2005).

Figure 2.4: Maintenance Management System Cycle



Source: Johannesen (1999: 4)

Johannesen (1999) asserts that an ideal road maintenance system making optimum use of local resources would most likely comprise of several of the maintenance alternatives indicated in the figure above. The optimum maintenance approach for a particular road would be determined by factors such as:

- Level of maintenance service required, which in turn depends on the function and purpose of the road;
- The local interest in the road; and
- The availability of local labour, equipment, finance and technical supervision.

According to Johannesen (1999), a common management road maintenance system for rural areas includes: asset, inspection, inventory, activities, labour, material, equipment

and work orders. Rural areas, however, have not come to grips with the importance of a formal maintenance management system. An effective road works organisation needs to cater for all categories of works covering routine, periodic and emergency maintenance (Johannesen, 1999). Abbudayyeh et al (2005) suggest that an effective road works organisation needs to be organised in a manner so that it (i) is able to cope with routine maintenance at all times, (ii) has enough capacity to carry out periodic maintenance (including contracts award and supervision), and (iii) has sufficient extra capacity to cater for suddenly appearing emergency works. Rural communities lack sufficient resources and technical staff to handle complex maintenance processes. A maintenance management system is designed to facilitate the maintenance process for rural municipalities to meet their basic needs (Abbudayyeh et al, 2005).

A rural road maintenance management unit as stipulated in Johannesen (1999) would normally consist of the following staff:

- The *Provincial Engineer* is in charge of planning and supervision of all rural road works including the maintenance. His/her duties would also include overall cost estimates, budget preparation, contract preparation and management and occasional field inspections.
- An *Assistant Engineer* would be responsible for the detailed programming and implementation of road maintenance. These tasks should be combined with preparing and maintaining the road condition inventories.
- A *Routine Maintenance Overseer* would be assigned to the regular inspection and supervision of petty contractors engaged on routine road maintenance works.
- *Inspectors* would need to be assigned to periodic maintenance works carried out by small-scale road contractors, providing supervision of works as well as work measurements, quality control, etc.
- *Technicians and Supervisors* need to be assigned to periodic maintenance works carried out through force account. This staff is directly responsible for instruction of workers, sub-contractors, work progress reporting and monitoring.

2.8.1 Tasks of the Maintenance Unit

The following tasks of a maintenance management system have been identified in Johannesen (1999):

- **Inventory:** recording the list of roads and basic characteristics of each section of the road network.
- **Inspection:** examining the road network and measuring and recording its condition.
- **Determination of maintenance requirements:** analysing effects, their causes; and specifying what maintenance activities are needed to rectify them and delay any further deterioration.
- **Resource estimation:** Costing the needed maintenance activities in order to define an overall budget and detailed cost estimates for bill of quantities.
- **Identification of priorities:** deciding the work that has to take precedence if resources are limited.
- **Work scheduling and implementation:** timing and controlling the works implementation, preparation of contract documents, award and supervision of maintenance contracts.
- **Monitoring:** checking the quality, its progress and effectiveness of the works.

2.8.2 Routine Road Maintenance Policies

From the household to the international level, livelihoods are shaped by policies, institutions and processes (DeSilva, 2001). These policies and institutions determine access to various types of capital, options for livelihood strategies, access to decision-making bodies and external sources of influence. DeSilva (2001) asserts that organisations in both the public and private sectors decide and implement policies and legislation. Anderson (1996) asserts that in order to streamline and standardise the various stages of the road maintenance management system, a set of standard documents have been developed to establish uniform practices for all routine road maintenance works. According to Anderson (1996), contract documents for routine road maintenance work comprise of planning, supervision and monitoring and different types of contracts involving labour-based rural road maintenance.

2.8.2.1 Planning, Supervision and Monitoring

In order to develop a good work plan, Anderson et al (1996) mentions the following data requirements:

- The quantity of work to be carried out over a specific period
- The work standards to be achieved
- The resources of the contractor available
- The productivity rates for each activity
- Supervisors and leaders of contractors only
- Labourers (contractors)
- Hand tools and measuring aids for leaders
- Simple equipment necessary
- Transport, bicycle, pickup for material and supervision

Past research, according to Taylor (1992), has clearly shown that supervision and monitoring labour-based routine maintenance is more important than any technical aspects. Hence, supervision and monitoring is pivotal and has the following purposes:

- To ensure that work is carried out in accordance with the contract specification and standards
- To control the productivity at the site
- To correct and instruct where and when necessary
- To be able to arrange for the operational inputs
- To control costs
- To receive sufficient feedback in order to prepare further bids

It is also recommended by Anderson et al (1996) that the site is visited weekly in order to:

- Collect reports from contractors
- Check the quality of work and discuss problems arising
- Carry out job training on site
- Issue instructions and work plans for subsequent weeks

2.8.2.2 Type of Contracts and Labour-based Rural Road Maintenance

According to Anderson et al (1996) the type of contracts involving labour-based rural road maintenance includes:

- Single length person contracts for a road (1-2kms)
- Petty contract or labour group where a contract is given to a very small-scale contractor who in turn employs a small team (5-10kms)
- Small-scale contract for a particular road (20-100kms)
- Small-scale contract for a specified road network (100-300kms)

These contracts, according to Anderson et al (1996), can be specified in different ways:

- **Standard-based:** The contract defines the standards of the specified road features that have to be maintained over a certain period. The contractor has the responsibility of continuously assessing the road conditions and maintenance work that needs to be done.
- **Quantity-based:** The contract defines the exact quantity of work for each feature of the road to be maintained over a specified period.
- **Lump sum-based:** The contract defines the standards of the specified road features that have to be maintained and the total amount of money (lump-sum) the contract covers over a specified period of time. This kind of contract is based on cost assumptions made by the client.

2.9. Costs related to Maintenance

Funding or lack of it has been the major stumbling block for an effective maintenance system for the road network (Johannes, 1999). Maintenance of existing roads is expensive and must not be underestimated in importance. Rural roads increase the need for continual maintenance coupled with other factors such as the extent of historical degradation on provincial roads (Jaarsma and Dijk, 2001). Unsurfaced roads increase the need for continued maintenance, which means recurrent expenditure. The extent of the potential utilisation of roads is another important indicator for future development, since the rate of utilisation determines the extent and timing of road maintenance (Roads and Transport, 2003).

Conditions of roads have deteriorated to the extent that it has become a threat to economic development in rural areas as a result of financial constraints, organisational problems and inappropriate methods. Adequate maintenance is essential for good asset management, to maximise the quality of services for users and contributing to environmental quality (Organisation for Economic Cooperation and Development-OECD, 1994).

Maintenance is still vulnerable to budgetary cuts, despite the importance of retaining the value of existing infrastructure. A good infrastructure system can be good for the economy. However, it is important to note that the costs of this system can often be larger than the available government budget (OECD, 1994). Nakagawa et al (1998) observed that most advanced countries still continue to suffer from a lack of funding. According to Taylor (1992), governments and development agencies are steadily awarding maintenance the recognition envisaged. Direct benefits provided to road users and the costs of road building and maintenance are the focus of a majority of analyses (Shroeder, 1997).

Van de Walle (2002) found that road investments in World Bank financed projects have been selected based on benefit indicators derived from consumer surplus calculations of road user savings, comprising both of vehicle operating cost savings and journey time

savings. However, according to Van de Walle (2002), conventional appraisal methods, even when combining consumer and producer surpluses, are still likely to result in the under-funding of rural roads.

If there are construction and maintenance costs that are not reflected in the budgetary costs, road improvement can be socially inefficient. According to Shroeder (1997), labour-based methods can be technically feasible and economically justifiable in many civil construction projects, especially road projects.

A basic rule for any road works programme, according to Johanessen (1999), is to protect previous investments and therefore to allocate available funds according to the following order:

- First, provide routine maintenance to the sections of the network which are in a good and maintainable condition. Good condition is regarded as when the road section requires a minimum of routine maintenance, consisting of preventive work measures which can be carried out utilising local labour, tools and materials.
- Secondly, provide spot improvements and periodic maintenance to halt the deterioration of road sections in fair condition, thereby upgrading them to a maintainable condition.
- Thirdly, rehabilitate existing roads which have fallen into total disrepair.
- Finally, once the three activities above have been secured, including regular maintenance for the newly upgraded road sections, one can start looking into new construction and expanding the road network.

2.9.1 Road Maintenance Funding and Institutions

Many countries in Africa and Asia have invested heavily in road construction. However, raising funds for road maintenance is a widespread problem (Jaarsma and Dijk, 2001). In most developing countries the perceived need for rural improvement exceeds the ability of provision units to supply them. Provision issues in these countries concern the allocation of funds to maintenance as opposed to construction of new or reconstruction of deteriorated roads (Shroeder, 1997). Literature available on road maintenance spending

strongly suggests that there can be substantial pay-offs. The shortage of funds is the single most important constraint to rural road development and maintenance. Connerly and Shroeder (1996) state that limited budgets for rural roads give rise to important questions as to what proportion should be spent on the road sector, how the funds planned for rural roads should be allocated across localities and how it should be spent on maintenance, rehabilitation and new construction, which evolve as a result of institutional problems.

During the 1990s weak governance and institutions resulted in corruption, distorted public investment choices, and neglected maintenance, thus lowering infrastructures' contribution to economic growth, and directing benefits intended for the poor (Ali and Perina, 2003). Kumar et al (1995) assert that concerted efforts need to be made for mobilisation of additional funds for rural road development. Rural road development is a joint effort between the government and the local community.

Credit availability to even the poorest rural dwellers is important to encourage adoption of the system (Kumar et al, 1995). Different countries have different credit access plans which help to maintain the transport services. For example, in Pakistan credit from the freight business helps maintain the efficiency of motorised transport services (Kumar et al, 1995). Evidence given by Galenson and Calvo (1994) illustrates that rural roads in Nigeria were funded by Federal and State money and local government had the task of maintaining the roads. However, poor institutional arrangements, lack of institutional capacity, poor communication and lack of planning and monitoring systems have resulted in less than 15% of the rural networks being maintained. Similarly, it was identified by Gaviria (1991) that poor network classification and an overlapping of responsibilities have led to expensive and inadequate maintenance.

Calvo (2003) suggests five factors which influence rural road developments in Africa:

- **Unclear Responsibilities** - In many African countries, changes in central government structures has caused confusion about the allocation of resources and delegation of responsibilities towards the construction of roads. For

example, multiple offices with overlapping duties can create a situation in which confusion may arise as to who holds the authority concerning road construction projects.

- **Disintegration of Planning Systems** - Local governments are often reluctant to implement road plans because they are created by central government but are not included in the planning process. In Nigeria, rural roads were constructed by higher-level agencies but were to be maintained by local agencies. This resulted in the roads being poorly maintained for the reason that roads did not correspond to local needs.
- **Insufficient Funding** - Most government allocations for rural road maintenance falls short of the amount required. Local governments receive 5-10% on average of the funds required for a given project. Funding shortages in many countries barely cover staff wages and emergency repairs.
- **Inadequate Local Capacity** - Funding shortages have led to a lack of incentives for workers in road development programmes, with wages being much lower than in the private sector. Many road networks are maintained by indifferent staff working in an unskilled environment.
- **Inappropriate Design Standards and Methods** - When designing road projects, foreign engineers do not consider cultural differences. Many projects are designed according to Westernised standards of travel (motorised vehicles) and do not take African road needs and conditions into consideration.

In addition, Calvo (2003) further states that local rural dwellers as well as transport suppliers alike need to understand the potential benefits of rural transport and thus have a sense of ownership of it. Other than the cost of implementing rural transport, there are costs to sustain it as well. According to Calvo (2003), the cost of operating transport services, fuel, vehicle maintenance, as well as taxes of these items can hinder adoption of rural transport.

Touton (2003) asserts that regulating the quality of services provided through licensing and requiring proper maintenance will ensure the safety of passengers. Furthermore, rural transport can be sustained through appropriate planning and infrastructure. Road engineers and planners along with the communities involved should be aware of the importance as well as the consequences of improved rural transport (Touton, 2003). These concerns should revolve around activities that will unavoidably develop because of its presence, making sure that the people who need it most are able to use it, and considering other cheaper ways to bring users and services closer together.

2.10 Conclusion

After having reviewed the origin of the rural transport situation in developing countries, it was concluded that more than one element of the system needs improvement. The neglect of rural road maintenance in South Africa can be regarded as stemming from the old system of colonialism which was further compounded by apartheid that resulted in the inadequate delivery of services and employment opportunities. Through an integrated approach of interventions, rural transport can be improved in both transport services and infrastructure. By viewing the local communities as potential users of rural transport, planners should assess their needs for mobility and access to goods and services. Also the promotion of intermediate means of transport such as bicycles and animal drawn carts would make rural transport more viable between villages. Although rural transport may already be in existence, it has not been adequately sustained.

When road maintenance is not consistently practiced the majority of rural transport was left in ruins (Touton, 2003). Therefore, in order to achieve a sustainable transport system, road maintenance has to be a high priority. In addition Ali and Pernia (2003) state that the holistic method of promoting rural transport incorporates stakeholders, users, operators, regulators, as well as the quality and quantity of services and infrastructure provided. Through this approach, transportation planners and governments can begin to implement a more sustainable rural transport system. The major obstacles to most of the maintenance programmes in other developing countries that were reviewed are the high costs involved in its sustainability. Developing countries in Sub-Saharan countries are

still battling to finance maintenance programmes even when using the economic lengthmen system (Geddes, 1988). In South Africa, the inception of new policies, strategies and legislation after the 1994 democratic elections, have laid the foundation to transform socio-economic potentials and for rural development as a whole. Transport plays a major role in facilitating rural development in South Africa. Therefore, these policies need to target transport infrastructure and interventions at the forefront in order to provide basic services such as water and electricity infrastructure, clinic, schools, and libraries. The literature reviewed provides evidence of the socio-economic benefits of rural road maintenance. Fundamentally, the goal in providing and improving rural transport is poverty reduction.

CHAPTER THREE

STUDY METHODOLOGY AND BACKGROUND TO STUDY AREA

3.1 Introduction

This study proposes to evaluate the maintenance of roads in rural areas and their facilitation towards poverty alleviation with special reference to a case study of the Umbumbulu community in KwaZulu-Natal, where the Zibambele road maintenance programme is being implemented. Emphasis of the research is particularly placed on the contribution of labour-based, rural road maintenance and its impact on the quality of life of rural households as well as how the programme contributes to or impacts on poverty alleviation.

It is important to comprehend that an array of methodological tools is of importance to researchers in any field of study, and the choice of tools to adopt is pivotal to determining the situation within which they are to be employed, since different methodologies lend themselves more naturally to certain circumstances (Myers, 1997). Oakley (1999 cited in Thevadasen, 2003) states that the method employed and used in the study is highly influenced by the research questions or problem. Consequently, the research questions employed in this study identifies the importance of road maintenance in KwaZulu-Natal and the impacts of such a labour-based programme on sustainable development and the social and economic upliftment of disadvantaged rural households and communities.

Accordingly, this section examines the practice of different data collection methods and factors that influence the choice of suitable data collection methods. Laiho et al (2005) refer to both the selection of sampled units such as households, and the way data is collected from them since various methods have been used to gather, document and analyse data and information. With regard to this research, the data and information collected on road maintenance and poverty alleviation tends to identify with similar projects in other developing countries.

The research methodology chapter thus is an attempt to identify and explain the research methods used in the case study of the Zibambele rural road maintenance programme. The chapter also gives a descriptive background of the study area and is followed by a review of research theories, paradigms and methods and their effect on the research data interpretation. The chapter then highlights fieldwork experiences and finally concludes.

3.2 Background to the case study

KwaZulu-Natal is a geographically small area, however it is by far the most populous province with a large economically underprivileged rural population scattered throughout the province (McCord, 2004). Ndebele (2000) asserts that not only are these rural people numerous, but arguably they, as a socio-economic group, have the least access per capita to development resources such as infrastructure and access to information.

Women in the rural areas of KwaZulu-Natal face a number of underdevelopment issues including a high level of unemployment, high poverty rate, low educational qualifications, insufficient and inadequate provision of basic needs services and are limited in most decision and policy-making structures (Ndimande, 2006). According to Ndimande (2006), women carry a heavier burden of poverty in the area because they are mainly responsible for domestic services.

Ndimande (2006) further states that most of the rural access roads in KwaZulu-Natal are heavily eroded in places, are slippery and prone to flood damage. May (1998) asserts that there is limited access to certain areas, especially for emergency police, ambulance and delivery vehicles. According to Du (2005), road infrastructure in rural areas has been neglected for decades, making the use of travelling impossible in many communities, and distances are considerably high, making access to neighbouring areas very difficult. Therefore, the researcher found that research on rural road maintenance in the KwaZulu-Natal region is justified and appropriate under the prevailing conditions. Emphasis of the research is placed on the Zibambele rural road maintenance for poverty alleviation programme in Umbumbulu, KwaZulu-Natal.

3.2.1 The Zibambele Programme

Zibambele, which is a Zulu name meaning “doing it for ourselves” is an innovative road construction and maintenance programme aimed to stabilise impoverished families in rural areas, in a positive and crucial attempt towards breaking their poverty cycle (Zibambele, 2003)). In an effort to create hope and positive futures for destitute families, Zibambele can be regarded as a powerful initiative towards poverty eradication. Barber (2000) states that Zibambele is an innovative economic initiative that is aimed at improving livelihoods for the impoverished that can be achieved through the maintenance of road infrastructure facilitated by labour intensive methods. It is a community-driven, peace initiative that reinforces the democratic process, which improves living standards of the ultra poor, and enhances human and social dignity (Bridraj, 2000).

The Zibambele Road Maintenance System was initiated in October 1998 at a job summit as part of the Road to Wealth and Job Creation geared by the Department of Transport, KwaZulu-Natal (Zibambele, 2003). The Zibambele project as intended to depict how the Department of Transport is capable of creating job and entrepreneurial opportunities as well as provide upliftment and adequate road access for rural communities to address the legacy of apartheid (Zondi, 2000).

In 1999, the Department of Transport (DoT) - KZN awarded 2 700 Zibambele contracts as part of its Roads to Wealth and Job Creation initiative. Currently more than 24 000 contractors exist throughout the province that are responsible for 11 000kms of rural roads annually (Zibambele, 2005). According to former Transport Minister, Sibusiso Ndebele, Zibambele targets to issue 40 000 contracts in KZN, and estimates that poverty will be alleviated for more than 50 000 destitute families (Zondi, 2000).

As a result of decades of civil conflict that left thousands of women widowed and children orphaned, the number of women-headed households has increased extensively (Zibambele, 2005). Thus, Bridraj (2000) notes that Zibambele contracts are allocated to those households that have no source of income, particularly to those households that are headed by women.

3.2.1.1 Policy for Zibambele Road Maintenance Programme

The purpose of the Zibambele road maintenance programme policy is:

To ensure that the Zibambele maintenance programme is administered in an effective and uniform manner throughout the province of KwaZulu-Natal as this programme not only addresses the challenges of poverty alleviation but also plays a vital role in the routine maintenance of the provincial network

(Zibambele Policy, 2003: 1).

Objectives of the Policy as stipulated in the Zibambele Policy (2003) are:

- To provide ongoing and sustainable work for destitute households in an effort to break their poverty cycles.
- To provide cost effective, labour intensive methods of routine maintenance of the KwaZulu-Natal provincial road network.
- To empower rural women by providing training on road maintenance and other life skills programmes.

The Zibambele policy (2003) contains the following set of procedures:

- **Road Selection:** Candidate roads for routine maintenance shall be identified by the Rural Road Transport Forum in consultation with the departmental staff. A candidate road shall be deemed suitable if the road is a type 5, 6, 7A or 7B and has been constructed to departmental standards. Zibambele workers may only be placed on a road that has traffic composition of less than 4000 vehicles per day.
- **Road Setting Out:** The road shall be demarcated into manageable sections as indicated in table 3.1 below:

Table 3.1: Manageable sections

Vehicles per day (v.p.d)	Work Position	Setting Out
0 – 400	Road and verges	Between 500m and 800m depending on the terrain
0 – 400 more than 15% heavy vehicles	Verges only	500m each side
400 – 1 000	One side verge only	Total of 1km
More than 1 000	No Zibambele contractors are to work on that road	

The manageable section table above indicates that on roads that have between 0 – 400 vehicles travelling per day, road and verges are required to be maintained between 500m and 800m depending on the terrain. Verges are required to be maintained, 500m each side of the road on roads that carry 0 - 400 vehicles per day with more than 15% heavy vehicles. On roads that carry 400 – 1 000 vehicles per day, one side verge of the road must be maintained for a total of 1km. The Table 4.1 further indicates that no Zibambele contractors are to work on roads that carry more than 1 000 vehicles per a day.

- **Zibambele contractor selection:** The Zibambele area manager shall brief the local Induna, who will then invite the community to a roadside meeting. The manager shall then explain the principles of the programme and the community shall nominate the neediest households. Preference shall be given to women-headed households.
- **Handover of sections to contractors:** The department of transport will be responsible for the official handing over of road sections to the contractors at a separate handover meeting. The Zibambele supervisor shall explain the obligations of the contractor, the seven clauses in the contract agreement, the method of monitoring, and the method of payment as well as safety issues. The contract shall be signed by the contractor and shall then receive the

necessary tools that include a wheelbarrow, shovel, bush knife, slasher, safety cones, a pick, hoe and a safety vest.

Other procedures contained in the Zibambele Policy (2003) document relate to the safety of the Zibambele contractor, claims against the Department of Transport (DoT), approval of the Zibambele contract, procedure for payment and the procedure for the termination of the contract.

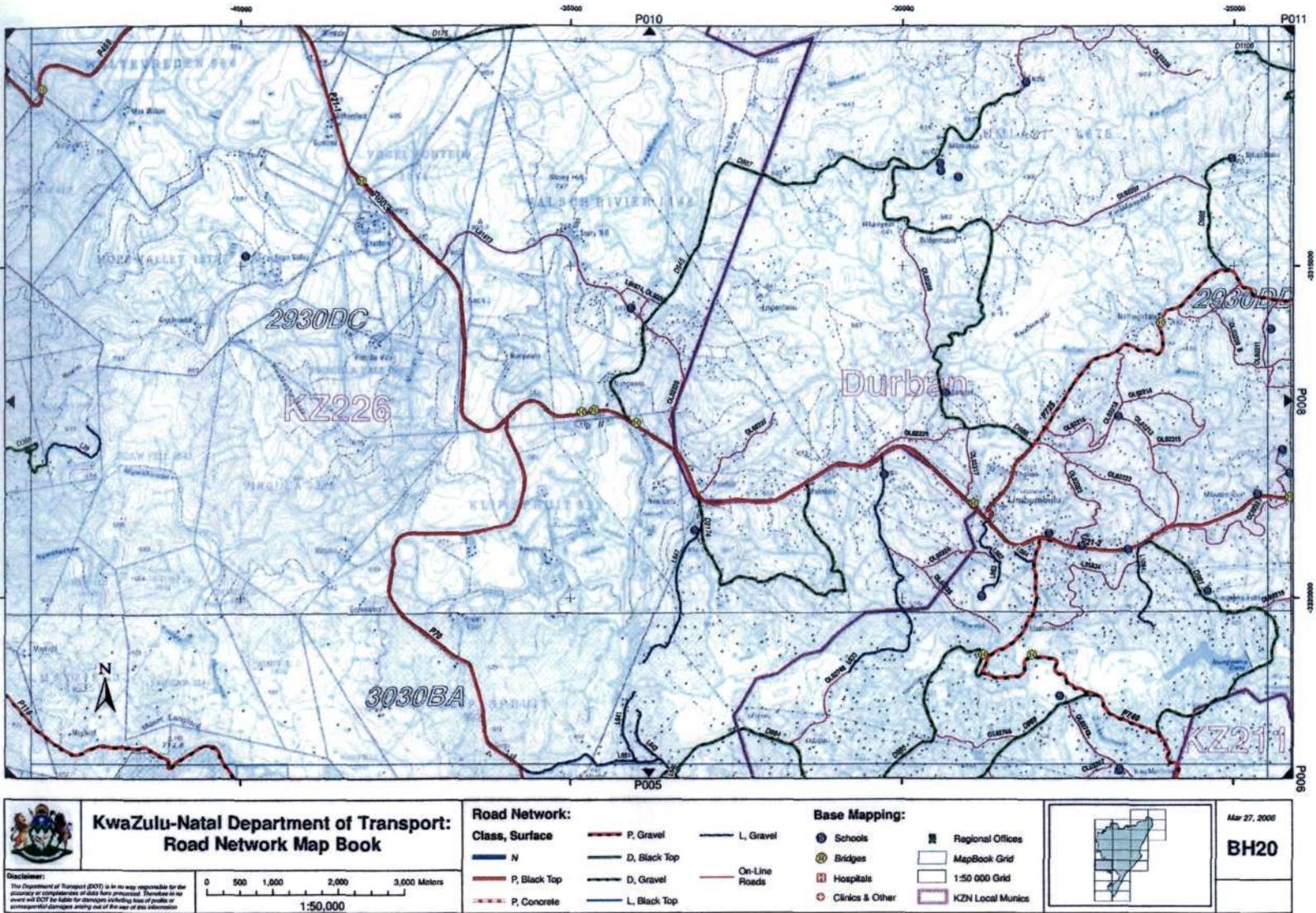
3.2.2 The Study Area Location and Characteristics

This study was carried out in the Intinyane Tribal Authority area in the Umbumbulu Magisterial district. Umbumbulu is a serene rural area to the South of the city of Durban in KwaZulu-Natal, South Africa (Meintjes and Nhlengetwa, 2002). The Umbumbulu district was part of Umlazi (Makhanya, 1997), which was declared a location in 1847 under the Locations Act of 1846. Umbumbulu was established under the Tribal Authorities Act of 1951. According to Meintjes and Nhlengetwa (2002), the community is vulnerable to further divisions and large-scale political violence wracked the province in the 1980s and 1990s. The area is still strongly divided into the two leading political parties of the area, the African National Congress (ANC) and the Inkatha Freedom Party (IFP).

The Umbumbulu district, indicated in Map 3.1, is about 15 125 hectares (ha) in size (Makhanya, 1997). The area is governed by two political systems: traditional and municipal. The three tribal authorities comprise local traditional structures that include Amakhosi, Izinduna, and traditional councillors. Within each of these tribal authorities are a number of municipally demarcated wards. The case study area falls under ward 98-100 in the Umbumbulu area. The wards overlap into four district councils: Richmond District Council, Camperdown, Ugu and Durban Metropolitan Council. It lies about 30km south of Durban and about 12km from the Indian Ocean. The Umbumbulu area population is estimated at over 500 000 people with the communities being dispersed over a wide geographic area (Makhanya, 1997).

Makhanya (1997) states that the Umbumbulu terrain is undulating, with a mean annual rainfall of about 1 020 mm that occurs mainly during the summer when maximum temperatures are about 30 degrees centigrade. The area is frost free with mean winter temperatures of about 16 degrees centigrade. There is dense natural vegetation cover in the form of coastal forests, riparian trees and grass. Soil erosion is not apparent except in densely built up areas (Makhanya, 1997).

Map 3.1: Umbumbulu District Map



Source: KwaZulu-Natal, Map Source Book (1996: 6)

The Intinyane area is a typical rural area with a dispersed type of settlement. Normally each homestead has a vegetable garden and fields for the growing of crops. Sugar cane is the dominant crop (Makhanya, 1997). Oliver (2005) states that small subsistence farmers in this area have been engaged in growing indigenous crops like maize, madumbe, sweet and baby potatoes, green beans and wild melons. However, the lack of infrastructure limits development in this area.

3.2.3 Research questions to be answered

This study conducted in the Intinyane community in Umbumbulu focuses on the socio-economic impacts of labour-based rural road maintenance. The study was guided by the following research questions:

- What is the socio-economic profile of the community members that are both Zibambele participants and non-participants?
- What are the advantages of the Zibambele road maintenance for the participant and non-participant households and the rural poor community in general?
- What are the community views and concerns pertaining to the Zibambele road maintenance programme?
- To what extent and how are the community members involved in decision-making processes that are associated with the Zibambele programme?
- What impacts does the Zibambele programme have on women-headed households in the area?
- How has the Zibambele programme impacted on the livelihoods of the “ultra poor”?

3.3 Methodology

The research methods used in this study is guided by participatory and human geography approaches that support the use of a variety of methods and encourage research that is politically relevant. The selection of research methods influence the way in which the researcher collects data (Myers, 1997). Precise research methods also involve different

skills, assumptions and research practices. Maxwell (1998) asserts that quantitative methods result in numeric data, which is usually machine-readable and can be analysed by recognised statistical tests and models. Qualitative methods result in textual or narrative information that is either descriptive, or subject to other forms of analysis (Myers, 1997). According to Myers (1997), qualitative research can be positivist, interpretive, or critical thus the choice of a specific qualitative research method is independent on the underlying philosophical position adopted. Qualitative methods cannot be used to draw statistical or empirical inference, but can be used to draw logical or analytical inference.

Quantitative research, "...concerns itself with counting things to arrive at statistically projectable data" (Goldman and McDonald, 1987 cited in Dickson et al, 1999: 3). Maxwell (1998) states that quantitative methods can be used to draw statistical inferences such as drawing empirical conclusions about an entire population based on a sample. Examples of quantitative methods that are accepted in the social sciences include survey methods, laboratory experiments, formal methods such as econometrics and numerical methods such as mathematical modelling (Maxwell, 1998). Dickson et al (1999) assert that it is useful when employing quantitative research methods to situate them within the broader methodological context of how researchers, sociologists, marketers, etc. carry out the process of collecting information and constructing theoretical explanations for action.

Quantitative data is generally accumulated by asking the same set of questions to a specific sample of a reference population, with answers recorded in numeric codes or actual numbers (Dickson et al, 1999). Survey methods, according to Maxwell (1998), usually generate quantitative information, although open-ended questions with narrative answers can be used on survey questionnaires. The survey method, according to Dickson et al (1999), is based on the recognition of the value of quantitative inquiry, the theoretical basis of which differs distinctly from that of qualitative inquiry. Depending on the structure of the observational protocol, and on the nature of the selection of the sample, observational methods can result in either qualitative or quantitative information (Maxwell, 1998).

Rapid appraisal methods were perfected to gather important information briskly, since most traditional methods (whether qualitative or quantitative) are very time-consuming (Maxwell, 1998). As such, rapid appraisal methods can generate either quantitative or qualitative information, particularly qualitative. Participatory methods specifically draw the respondents or subjects of research into the research process, partly through the use of a variety of techniques. However, according to William (2002), all quantitative data is based on qualitative judgment since numbers themselves can't be interpreted without understanding the assumptions which underlie them.

In this research which focuses on the impacts of labour-based road maintenance and poverty alleviation, both quantitative and qualitative methods were used to complement each other. Qualitative methods that were used to undertake the study is of importance because it allowed the researcher to become directly involved with the people being studied. A quantitative examination was required to infer on the condition of rural road networks as well as to determine the socio-economic nature of the households involved.

3.3.1 Participatory Research Methods

The development paradigms of the 1960s and 1970s were consequent from the legacy of colonial rule, particularly the planning systems of the late 1930s and post-WW2 period (International Institute for Sustainable Development Net-IISDnet, 1999). According to the IISDnet (1999), the outset was top-down whereby development was something governments did for or to people and there was little stakeholder involvement of those undergoing development. The IISDnet (1999) further indicate that the situation is a fact which must rank high among the causes of the failures of development to improve the lives of the majority poor of the developing world.

A positive trend globally and in South Africa, in recent years, has been a notable shift in the focus of rural development strategies, from dictatorial 'top-down' approaches to locally-based and more democratic bottom-up strategies (Network for Environment and Sustainable Development in Africa-NESDA, 1996). One of the key reasons for this typical swing is undoubtedly due to the development of new, more enlightened and sensitive rural research methodologies, most notably an array of methods known

collectively as Participatory Rural Appraisal (PRA). At one level PRA, as stated by the Network for Environment and Sustainable Development in Africa (1996), can be seen as a reaction to previous econometric and quantitative approaches, which frequently ignored people and preferred to concentrate on issues of production rather than on the producers, and the critical role played by indigenous people and coping systems. The emergence of PRA has led to a reappraisal of research methods, which has in turn led to a reformulation of rural development strategies (Network for Environment and Sustainable Development in Africa, 1996). A key feature of PRA is its holistic outlook, in which the interactions between different elements in people-environment relationships are considered.

What is participation?

Participation can be regarded as being fashionable with many different interpretations, some of which hinder rather than support sustainability and empowerment (Pretty et al, 1995). According to Pretty et al (1995), participatory research has several virtues and vices and its methods vary with the research situation and the practitioner. Pretty et al (1995) further indicate that two overlapping schools of thought and practices have emerged over time. The first views participation as an effective means to ensure buy-in of development projects by people, thereby increasing efficiency. The second school of thought views participation as a fundamental right that can promote collective decision-making, enhance community building and increase local empowerment of people and not influential individuals. Several types of participation are outlined by Pretty et al (1995) and are illustrated in Table 3.2 below:

Table 3.2: A typology of participation - how people participate in development programmes and projects

Typology	Characteristics of Each Type
1. Passive participation	People participate by being told what is going to happen or has already happened. It is a unilateral announcement by an administration or project management without any listening to people's responses. The information being shared belongs only to external professionals.
2. Participation in information giving	People participate by answering questions posed by extractive researchers using questionnaire surveys or similar approaches. People do not have the opportunity to influence proceedings, as the findings of the research are neither shared nor checked for accuracy.
3. Participation by consultation	People participate by being consulted, and external agents listen to views. These external agents define both problems and solutions and may modify these in the light of people's responses. Such a consultative process does not concede any share in decision-making, and professionals are under no obligation to consider people's views.
4. Participation for material incentive	People participate by providing resources, for example labour, in return for food, cash, or other material incentives. Much on-farm research falls in this category, as farmers provide the fields but are not involved in the experimentation or the process of learning. It is very common to see this type of participation, yet people have no stake in prolonging activities when the incentives end.
5. Functional participation	People participate by forming groups to meet predetermined objectives related to the project, which can involve the development or promotion of externally initiated social organisation. Such involvement does not tend to be at early stages of project cycles or planning, but rather after major decisions have been made. These instructions tend to be dependent on external initiators and facilitators, but may become self-dependent.
6. Interactive participation	People participate in joint analysis, which leads to action plans and the formation of new local institutions or the strengthening of existing ones. It tends to involve interdisciplinary methodologies that seek multiple perspectives and make use of systemic and structured learning processes. These groups take control over local decisions, and so people have a stake in maintaining structures or practices.
7. Self-mobilisation	People participate by taking initiative independent of external institution to change systems. They develop contacts with external institutions for resources and technical advice they need, but retain control over how resources are used. Such self-initiated mobilisation and collective action may or may not challenge existing inequitable distribution of wealth and power.

Source: Pretty et al (1995)

Pretty et al (1995) state that participatory research methods can be conveniently classified into four main types, each with a distinctive style and ethos:

- Participant Observer

- Rapid Rural Appraisal (RRA)
- Participatory Rural Appraisal (PRA)
- Participatory Action Research (PAR)

For the purpose of this research, emphasis will be placed on the Participatory Rural Appraisal (PRA) method. The following section is an attempt to explain PRA.

3.3.2 Participatory Rural Appraisal (PRA)

Participatory Rural Appraisal is one of the techniques used for gathering information on community resources and needs for use in literacy and community development programmes (Summer Institute of Linguistics International (SIL), 1999). Similarly, Chambers (1992) states that PRA is a label given to a growing family of participatory approaches and methods that emphasise local knowledge and enables local people to make their own appraisal, analysis, and plans. PRA uses group animation and exercises to facilitate information sharing, analysis, and action among stakeholders. The techniques include the use of transect walks, maps, calendars, matrices, and diagrams using locally available materials (SIL International, 1999). Some of the key PRA techniques as cited in Network for Environment and Sustainable Development in Africa (1999) include:

- direct observation, and 'do it yourself'
- discussion with key informants
- case-studies and stories
- group discussions
- participatory mapping and modelling
- transect walks
- time-lines and trend and change analysis
- seasonal analysis
- daily time use analysis
- wealth ranking
- matrix scoring and ranking

Participatory Rural Appraisal evolved from Rapid Rural Appraisal which is a set of informal techniques used by development practitioners in rural areas to collect and analyse data (IISDnet, 1999). According to Chambers (1992), rapid rural appraisal was developed in the 1970s and 1980s in response to the perceived problems of outsiders missing or miscommunication with local people in the context of development work. In PRA, data collection and analysis are undertaken by local people, with outsiders facilitating rather than controlling. PRA is an approach for shared learning between local people and outsiders.

Emerging in the 1980s, PRA builds on RRA but goes much further. To RRA it adds some more radical activist perspectives. Its five central additional concepts, according to IISDnet (1999), are:

- **Empowerment** - Knowledge is power. Knowledge arises from the process and results of the research that, through participation, come to be shared with and owned by local people. Thus the information, used for planning and management decisions, is broken. New local confidence is generated, or reinforced, regarding the validity of their knowledge.
- **Respect** - The PRA process transforms the researchers into learners and listeners, respecting local intellectual and analytical capabilities. Researchers must avoid at all costs an attitude of patronising surprise that local people are so clever they can make their own bar charts, etc. When you can really understand the local jokes, poetry and songs, then you may feel you are starting to understand the people's culture.
- **Localisation** - The extensive and creative use of local materials and representations encourages visual sharing and avoids imposing external representational conventions.
- **Enjoyment** - PRA that is well done is and should be fun. The emphasis is no longer on "rapid" but on the process.

- **Inclusiveness** - Enhanced sensitivity, through attention to process; include marginal and vulnerable groups, women, children, aged, and destitute.

According to the World Bank (1994), the key tenets of Participatory Rural Appraisal are:

- **Participation:** Local people's input into PRA activities is essential to its value as a research and planning method and as a means for diffusing the participatory approach to development.
- **Teamwork:** To the extent that the validity of PRA data relies on informal interaction and brainstorming among those involved. It is best done by a team that includes local people with perspective and knowledge of the area's conditions, traditions, and social structure and either nationals or expatriates with a complementary mix of disciplinary backgrounds and experience.
- **Flexibility:** The combination of techniques that is appropriate in a particular development context will be determined by such variables as the size and skill mix of the PRA team, the time and resources available, and the topic and location of the work.
- **Optimal ignorance:** To be efficient in terms of both time and money, PRA work intends to gather just enough information to make the necessary recommendations and decisions.
- **Triangulation:** PRA works with qualitative data. To ensure that information is valid and reliable, PRA teams follow the rule of thumb that at least three sources must be consulted or techniques must be used to investigate the same topics.

Participatory Rural Appraisal involves local people and outsiders from different sectors and disciplines (Bishnu and Bhandari, 2003). Outsiders facilitate local people in analysing information, practicing critical self-awareness, taking responsibility and sharing their knowledge of life and conditions to plan and to act.

According to Bishnu and Bhandari (2003), PRA has the following unique features:

- **Iterative:** goals and objectives are modified as the team realises what is or is not relevant. The newly generated information helps to set the agenda for the later stages of the analysis. This involves the “learning-as-you-go” principle.
- **Innovative:** Techniques are developed for particular situations depending on the skills and knowledge available.
- **Interactive:** The team and disciplines combine together in a way that fosters innovation and interdisciplinary. A system perspective helps make communication easy.
- **Informal:** Focuses on partly structured and informal interviews and discussions.
- **In the community:** Learning takes place largely in the field, or immediately after, or in intensive workshops. Community’s perspectives are used to help define difference in field conditions.

A community consists of diverse groups of people (Bhandari, 2003). Different groups have different viewpoints on the community problem. According to Bhandari (2003), some groups of people in the community know the problem fully while others may not know it at all, or know it only partially. Similarly, some may be highly vulnerable to the problem, while others may be only partially vulnerable, or not at all. Bhandari (2003) suggests that the concerns and needs of these groups should be addressed fully, in order to tackle this problem. Therefore, the research conducted in the Intinyane community in Umbumbulu made use of the Participatory Rural Appraisal methods of data collection and analysis which included direct observation, focus group discussions, mental mapping, venn/ chapatti diagrams and ranking exercises.

With regards to the study conducted in the Umbumbulu area on labour-based rural road maintenance for poverty alleviation, the Participatory Rural Appraisal (PRA) approach was used to gather qualitative data concerning the community members. A focus group discussion was used to gain information on the problems community members are currently concerned with. Furthermore, the focus group was required to undertake a

ranking exercise, sketch a mental map and draw a venn/ chapatti diagram of the organisational structures present in the community.

3.4 Research Instruments

The data collection method or research instrument influences a number of factors. Different data collection methods allow for very different sample sizes, and the number of respondents determine the degree of reliability with which the results may be generalised to various population segments (Laiho et al, 2005). Myers (1997) states that each method has its own strengths and limitations, however, time and resource constraints are deterministic issues in the final choice. The choice of data collection method is not an isolated decision in survey design, as it influences the whole statistical survey process. For instance, according to Myers (1997), the choice of data collection method or instrument used has an impact on the design and preparation of the questionnaire, on the quantity and quality of the data that are to be collected, and on the cost and the timetable of the survey. According to Laiho et al (2005), research instruments range from interviews, observational techniques such as participant observation and fieldwork, through to archival research. Written data sources can include published and unpublished documents, company reports, memos, letters, reports, email messages, faxes, newspaper articles and so forth.

3.4.1 Secondary Data and Information Sources

The collection of secondary data was primarily a desktop study of a variety of literature as well as reports on poverty, labour-based rural road maintenance and their impacts. The research includes a review of scholarly journals, dissertations, reports, policies, and speeches acquired from the Department of Transport, published works, a review of articles, books, newspaper and magazine clips as well as the use of the internet as a means of obtaining information that is relevant to the study. The primary data and information was used to inform the literature review and assisted in contextualising the study in relation to poverty, rural transport, rural women and labour-based rural road maintenance.

3.4.2 Primary Data Sources

The primary data sources used in the study included quantitative (socio-economic questionnaire surveys) and qualitative (mental mapping, venn/ chapatti diagrams and ranking exercises) methods. Participatory methods undertaken during a focus group meeting held with the community members were used to unpack underlying meanings and processes. Fieldwork was conducted in the form of a survey to determine the socio-economic profile, accessibility, community awareness, issues, concerns and perceptions regarding the Zibambebe programme and the impact of such a project on the lives of the poorest of the poor, particularly women-headed households. Questionnaires comprised of closed, open-ended and multiple response questions (Appendix 1). All respondents were assured that their identities would remain confidential and that the information required was for research purposes only. The questionnaires were carried out over a period of two weeks. Fieldwork was conducted during the day for convenience and the researcher was assisted by four field workers acquired from the Department of Transport.

3.4.2.1. Questionnaire survey

A questionnaire is a mode of eliciting the feelings, beliefs, experiences, perceptions, or attitudes of a particular sample of individuals (Key, 1997). As a data collecting instrument, it could be structured or unstructured. According to Crump (2000), there is a variety of questionnaire styles: closed-ended questionnaires, structured interviews and observation using data recording sheets. Sample range and size are critical factors. This method will give a rapid picture of overall trends. It is the process of conducting a study of specific groups or populations. According to Key (1997) a questionnaire interview is an attempt to obtain reliable and valid measures in the form of verbal responses from one or more respondents. William (2002) asserts that a questionnaire interview is a conversation in which the roles of the interviewer and the respondent change continually. Interviews are among the most challenging and rewarding forms of measurement. They require personal sensitivity and adaptability as well as the ability to stay within the bounds of the designed protocol (William, 2002).

The advantages of using the questionnaire method, according to Bailey (1994), are:

- Flexibility when the respondent indicates misunderstanding, interviews can be used to probe for more specific answers and can repeat a question.
- Interviews tend to have a better response rate than the mailed questionnaire. People that are unable to read and write can still answer questions in an interview, and others who are unwilling to expend their energy to write out their answers may be glad to talk.
- Control over the question order can be carried out by the interviewer which will ensure that the respondent does not answer the questions out of order or in any other way other than the structure of the questionnaire.
- The interviewer can ensure that all of the questions are answered.
- The interviewer can record the exact time, date, and place of interview.

However, according to Key (1997), there are some disadvantages of using a questionnaire and these are:

- Unstructured interviews often yield data too difficult to summarise or evaluate.
- Training interviewers, sending them to meet and interview their informants, and evaluating their effectiveness all add to the cost of the study.
- Structured interviews are rigidly standardised and formal.
- The same questions are presented in the same manner and order to each subject.
- The choice of alternative answers is restricted to a predetermined list.
- The same introductory and concluding remarks are used.
- They are more scientific in nature than unstructured interviews.
- They introduce controls that permit the formulation of scientific generalisations.

According to Key (1997), face-to-face interviews are a direct communication, primary research collection technique that is used during questionnaire surveys. Myers (1997)

implies that face-to-face interviewing is considered to be the most expensive data collection method. Given the limited size of the population under study, the benefits of this method in terms of fulfilling quota requirements speedily far outweighed the financial costs. Additional benefits included the fact that interviewing affords the opportunity of ensuring that the respondent is the intended one and allows for further explanation of questions, where necessary (Myers, 1997). Key (1997) stipulate that the questionnaire is most frequently a very concise, pre-planned set of questions designed to yield specific information to meet a particular need for research information about a pertinent topic.

3.4.2.1.1 Sampling Process

Bailey (1994) refers to samples as being used as a substitute for a population to save time or where measuring and counting the whole population is impractical. Samples can be defined as a sub-set or portion of the total population. According to Bailey (1994), samples can be classified into probability and non-probability samples. Probability sampling techniques represent mathematically based sub-sets of a population and are typically used in quantitative research (Neuman, 2003). The purpose of a sampling techniques is to get a sample that represents the population from which it was drawn. Neuman (2003) stipulates that very often it is not practical to cover the entire population as a result of various constraints.

3.4.2.1.2 Random Sampling

Random sampling is the best form of probability sampling (Bailey, 1994). In a random sample, according to Welman and Kruger (2000), every member of the population has the same chance of being included in the sample and every sample of a particular size has an equal chance of being chosen. This is true regardless of the similarities or differences between or among them, however, they must be members of the same universe (Bailey, 1994).

A random sample is conducted after an adequate sampling frame is constructed, without showing bias for any personal characteristics (Welman and Kruger, 2000). However,

according to Bailey (1994), the weakness of random sampling is that the person who is listed more than once will have the same random probability of being selected. Some people will not be selected at all if they are omitted from the list. In cases such as these, the sampling by definition will not be random.

For the purpose of this study, a total of 100 questionnaires were implemented at the household level by utilising a stratified random sampling approach. Face-to-face interviews were conducted. A stratified random sample involves the sub-grouping of the population in different categories (William, 2002). A list of households that were contracted to the Zibambele programme and a separate list of households that were not contracted to the Zibambele programme were acquired from the Department of Transport. The list provided a base for formulating a data frame and for randomly selecting households. Stratified random sampling was used to select households from each data frame (contracted and non-contracted households). A random sample of households was selected from each data frame to administer the household questionnaires. Fifty questionnaires were directed towards the households that are contracted to the Zibambele programme, while 50 questionnaires were directed towards the rest of the households (non-participants) from the Umbumbulu community.

3.4.2.1.3 Quantitative Analysis

The data obtained from the quantitative data (questionnaire) was analysed statistically using the Software Package for Social Sciences (SPSS). Questionnaires were first coded and then captured into an SPSS template that had been designed prior to the data collection process. The process of data capturing occurred over a period of two weeks and descriptive statistics were used to generate tables and graphs. The purpose of descriptive statistics was to enable the researcher to meaningfully describe the distribution of scores or measurements using a few indices or statistics. Multiple response questions were analysed and displayed in the form of tables.

3.4.2.1.4 Design of Household Questionnaire

A well designed questionnaire is the peak of a long process of planning the research objectives, formulating the problems, generating a hypothesis and so on (Meyers, 1997). A poorly designed questionnaire can invalidate any research results, in spite of the qualities of the sample, the fieldwork or the statistical techniques. The specific objectives of this research questionnaire were to:

- Determine the current socio-economic profile of the population;
- Investigate accessibility and services available to the community;
- Assess peoples awareness and participation in the programme;
- Identify household contractor tasks required to be carried out;
- Study the contribution of the programme wage on household livelihood expenditure; and
- Assess peoples' (both Zibambele participants and non-participants) perceptions and concerns regarding the programme.

3.4.2.2 Qualitative Methods

A range of qualitative methods were used in this study, as indicated earlier. These are discussed below.

3.4.2.2.1 Direct observation

Direct observation is a measuring instrument used to measure such traits as self-control, cooperativeness, truthfulness, and honesty (Key, 1997). In many cases, systematic direct observation of behaviour is the most desirable measurement method. According to Key (1997), an investigator identifies the behaviour of interest and devises a systematic procedure for identifying, categorising, and recording the behaviour in either a natural or artificial situation.

Taylor-Powell and Steel (1996) assert that direct observation is a method used for collecting evaluation information, which provides the opportunity to document activities,

behaviour and physical aspects without having to depend upon peoples' willingness and ability to respond to questions. Direct observation allows the researcher to gather live data from live situations. Bailey (1994) states that although observation most commonly involves sight or visual data, it can also include data collected through other senses, and does not prohibit simultaneous use of other data collecting tools. Direct observation in this study was conducted through a series of field visits to identify the location and the setting of the study area and to observe labour-based maintenance works being carried out and the severity of poverty.

3.4.2.2.2 Focus Group Discussions

Focus group research involves organised discussion with a selected group of individuals to gain information about their views and experiences of a topic (Jones, 2006). Focus group discussions involve a small group of people with specialist knowledge such as a group of community members or with common characteristics such as adult women that head households, who are invited to discuss specific topics in detail. According to Jones (1996), the groups are chosen to be uniform, so that people might feel more comfortable and able to speak more freely. Focus group interviews and discussions were held in the community to gain knowledge about the study area and concerns about the Zibambele programme.

The researcher extended an invitation to the focus group discussion through the wife of the local Induna of the Intinyane community, Umbumbulu. Only women were invited to be present at the meeting which was held at the Induna's house. The meeting was held during the early hours of the day and eight women attended. Issues that were discussed related to the Zibambele rural road maintenance programme and other community concerns such as HIV/AIDS, crime, income, employment, etc.

The community members (women) present were asked to draw up an organisational structure of the community, do a ranking exercise of their concerns and to sketch out a map of the area. The stationery for the exercises were provided by the researcher. The researcher explained to the community that the exercises were purely for research

purposes and therefore no promises of combating or alleviating the issues and concern raised could be made.

3.4.2.2.3 Ranking Exercises

Ranking exercises, according to Guijt (1992), involve asking people to place something in order of its importance to them. An example would be when, having first elicited an open-ended list of community needs, people are shown the list and asked to rank them according to the most important to the least important. Ranking reveals the differences within a population and helps to identify the main problems or priorities of people. Guijt (1992) asserts that ranking exercises allow consensus to be reached on community needs and provides information about what informants see as most serious problems.

The researcher made use of a ranking exercise during the focus group discussion. The community members (women) present at the discussion were asked to identify the major problems that the community members undergo in the area and then rank them according to their level of importance. Concerns that were identified during the ranking exercise related to unemployment, education, health, crime, transport and access to agricultural land.

3.4.2.2.4 Chapatti/ venn diagrams

Venn diagrams are a way of getting informants to graphically illustrate relationships, power and communication between institutions and key individuals in the village (Jones, 1996). Institutions and key individuals are allocated different sized circles according to their perceived level of power and importance within the community. Participants are then asked to place the circles according to how they see the inter-relationships between institutions and key individuals. According to Jones (1996), if the circles are separate, there is little or no relationship between them. The extent to which the circles touch or overlap indicates the strength of the relationship.

During the focus group discussion held in the Intinyane community, participants were required to draw a venn/ chapatti diagram illustrating the organisational structure of the community. The organisational structure included organisations and people of power and

authority in the community. The group was able to rank them in circles of different sizes according to the level of power the organisations and structures have in the community.

3.4.2.2.5 Mental Mapping

Mental mapping involves constructing on the ground or on paper maps or models using materials such as sticks, stones, grasses, wood, cigarette packets, tree leaves, coloured sands and soils, rice powders, coloured chalk, pens and paper. As the mental maps are being created, more community members become involved and contribute and make sequential changes (Pretty et al, 1995). According to Guijt (1992), there are several distinct types of maps that can be developed, each providing its own characteristic information about a community. Resource maps, for example, sketch the layout of the village, showing the location of community infrastructure such as roads, schools, health centres and agricultural practices. Social maps show where groups of people live and can help identify particular sub-groups such as the landless.

The focus group discussion held in the Intinyane community included mental mapping, whereby the focus group participants were required to sketch the physical features such as roads, schools, residents, etc. of the community on a chart paper by using felt tip pens and pencils. The map was first created by one participant and then several changes were made as the other participants indicated different features in the area.

3.5 Fieldwork

The primary fieldwork conducted during the study included the use of both qualitative and quantitative methods. The questionnaire method was used to gather data from the sampled households of the community. The administration process of the questionnaires took place over a period of two consecutive weeks and the interviewers were sensitive not to impose themselves on the household members. Thus, the interviews were scheduled to take place at the respondent's convenience. The interviews were a direct face-to-face attempt at acquiring data and therefore the interviewers notified the respondents that the information that was required was solely for research purposes. Thus, no false expectations of the research were created.

Fieldwork in the community was also undertaken through focus group discussions that included participatory exercises such as drawing of a venn/ chapatti diagram, mental mapping and a community problem ranking exercise. Field observations were also recorded by the researcher. The focus group discussion was held between the researcher, a few women from the community and the Zibambele area manager.

3.6 Limitations

The study was limited to only one community and region due to time and cost constraints. Consequently, the research findings cannot be used to generalise on the rest of the country or provinces, where different sets of demographics, service provision and opportunities prevail. However, the study does shed light on some important opportunities that can be provided through labour-based rural road maintenance.

A second limitation to the study was the inability of the researcher to communicate and understand the dominant IsiZulu language. This resulted in the use of interpreters in order to gain information from the community, particularly during the focus group interviews and questionnaire surveys. The lack of communication may have prevented the researcher from identifying with the emotions of the respondents.

The researcher was also limited to direct observation of the current maintenance of the rural roads, thus the researcher had no factual observation of the prevailing road condition that may have existed before the starting of the Zibambele programme. However, there were a few roads that were observed to be in need of maintenance that are currently not maintained. These roads were mainly footpaths and tracks between households.

3.7 Conclusion

The methodology chapter attempted to present an overview of the strategies and research methods that were employed during the study. The chapter provided background information of the case study (Zibambele) and the physical characteristics of the Umbumbulu study area. The background information depicted in this chapter is fairly

similar to most Black rural areas in South Africa that are as a result of racial segregation and marginalisation of Black communities. This chapter also portrayed the significance of making proper choices in choosing the correct methodologies that are essential to meeting the research objectives of the study as well as influencing the end result of the research.

CHAPTER FOUR

DATA DESCRIPTION AND ANALYSIS

4.1 Introduction

This section of the dissertation presents the results from the research conducted on the socio-economic impacts of labour-based rural road maintenance for poverty alleviation. The case study was conducted in the Intinyane tribal community in the Umbumbulu Magisterial District in KwaZulu-Natal. The chapter is an analysis of the data obtained during the questionnaire survey and includes the results obtained from the focus group discussions, direct observations made, the mental map created by the community members as well as an organisational structure of the community, in the form of a venn/chapatti diagram that was depicted by the members of the Intinyane community in Umbumbulu.

This chapter will attempt to address the research objectives of the study through the statistical analysis of components such as demographic and socio-economic profiles, accessibility, awareness of the labour-based rural road maintenance programme and community views and concerns with reference to the programme, by applying SPSS Version 13.0. The data collected through the use of qualitative techniques will also be illustrated in this chapter.

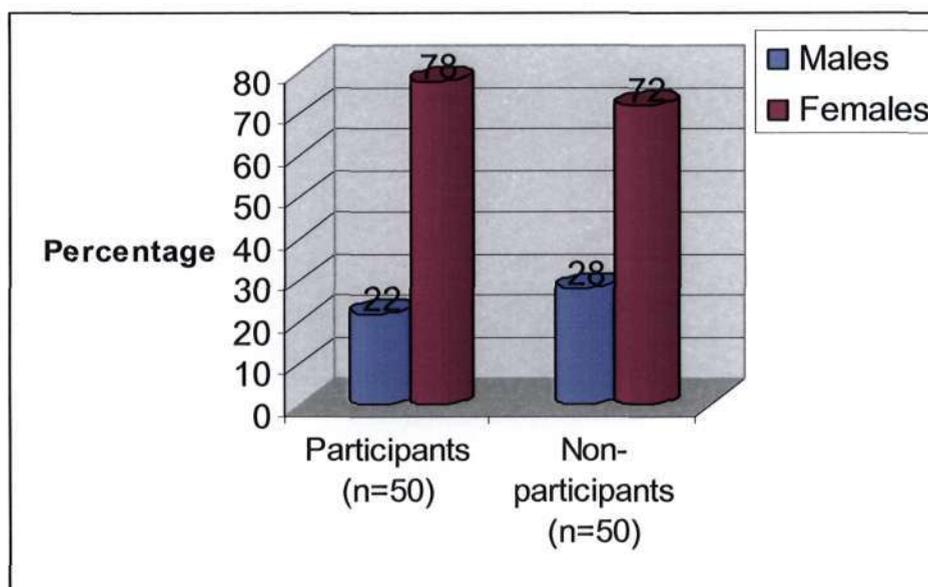
4.2 Questionnaire Analysis

4.2.1 Introduction

This section provides a critical analysis of the data collected from the questionnaires implemented, which were administered to households in the study area (Umbumbulu). The questionnaires were designed with a combination of single responses, multiple responses, and open-ended questions that were administered to both Zibambele participants (50) and the community members that are non-participants (50) in the programme. Consequently, this section provides a comparative analysis. An analysis of the Zibambele participant's background that includes the age, gender, level of education and income sources of respondents' surveyed is presented below.

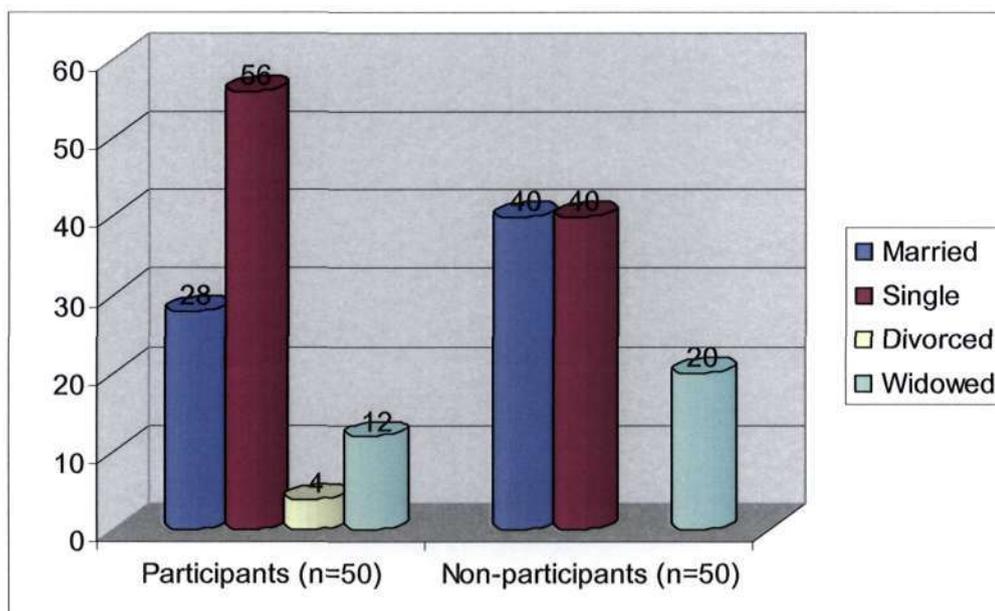
4.2.1 Demographic Profile of Respondents

Figure 4.1: Gender of Zibambele Participant



The sample was constituted by 78% female participants and 22% male participants. This demonstrates that the programme is consistent with targeting more women headed households than those that are headed by males, since only a small percentage (22%) of the Zibambele participants surveyed were male. Figure 4.1 illustrates that 72% percent of all non-participants surveyed were females. The male population of the sample constituted 28%. The reasons for these statistics could be due to the unavailability of many male members during the day since they may have been at work. It is also possible that many of the non-participant households that were surveyed are women-headed households.

Figure 4.2: Marital Status of Respondents



The marital status of the sampled population as illustrated in Figure 4.2 demonstrates that 56% of Zimbabwe participants are single. This is due to a wide array of reasons, such as the absence of male figures due to migrant work, death of fiancés and fathers as well as abandonment by living male partners. Twelve percent of participants stated that they were legally married and then widowed as a result of apartheid and faction fighting in the area. A handful (4%) of the sample said that they were divorced due to domestic abuse and violence, while 28% of the sampled participants indicated that they are married and have spouses.

Forty percent of the non-participants surveyed were married, while a further 40% were single. Twenty percent of respondents indicated that they were widowed due to unforeseen accidents, murder, and faction fighting. This means that most women in the community are single and therefore, are left to make decisions regarding their households on a daily basis. Thus, their poverty status is increased as a result of the many financial requirements of the household.

Figure 4.3: Level of Education of Respondents

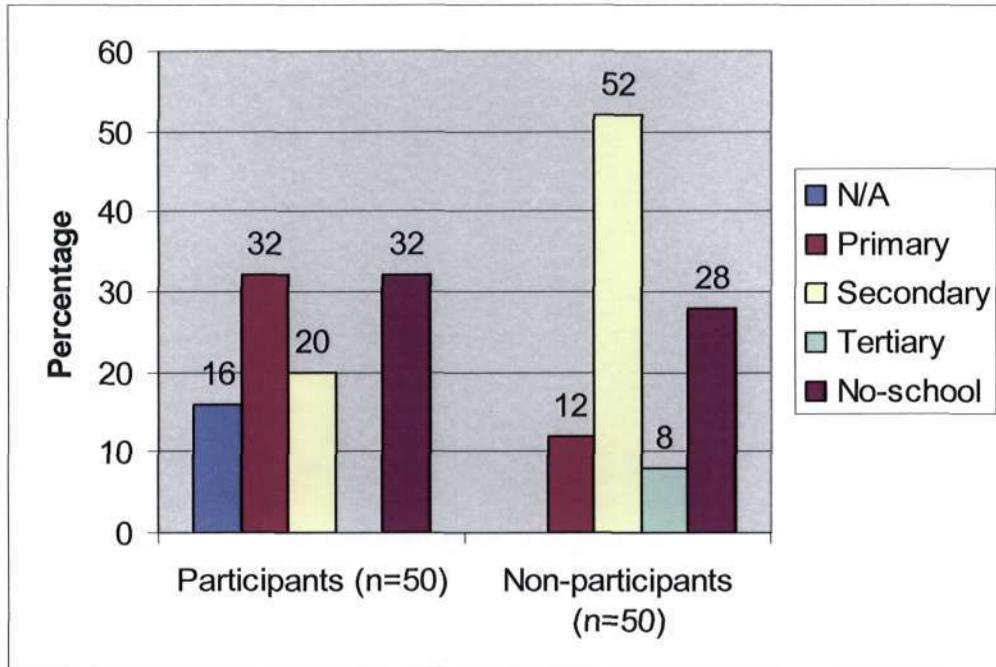
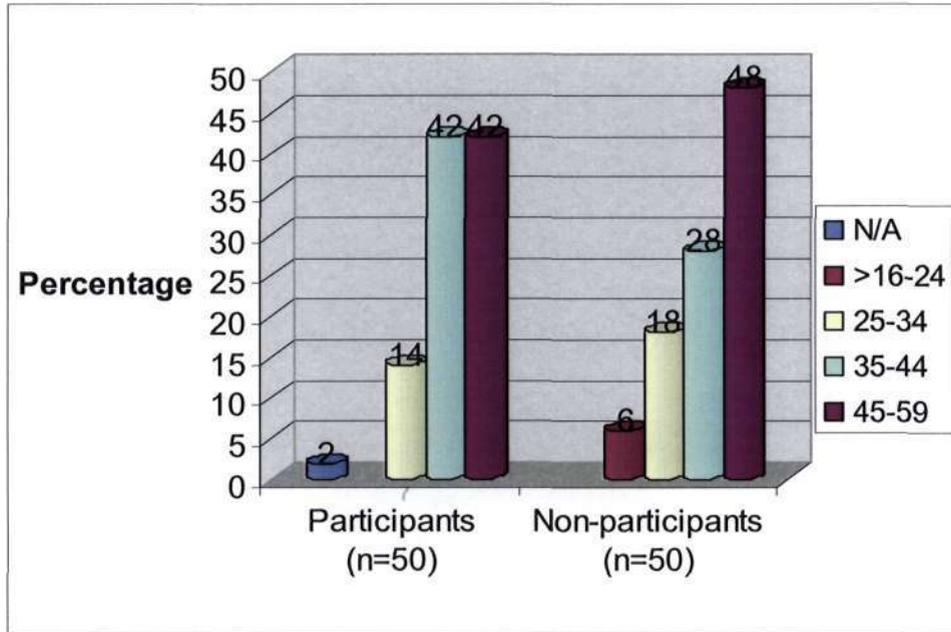


Figure 4.3 indicates that 82% of the sampled participants have not attended school, while 32% have managed to attend primary school. Twenty percent of the respondents indicated that they were able to attend secondary school, but, did not complete their studies. A possible reason for this is that schools in most rural areas are located kilometres away from the communities. The level of education was not applicable for 16% of the participants. This could be due to respondents feeling intimidated or uneasy with the question.

The bulk of the non-participants (52%) in Figure 4.3 indicated that they had attended secondary school, 12% said that they attended primary school, and 8% of respondents indicated that they had the opportunity to attend tertiary institutions. These results indicate that many (72%) non-participants have been given educational opportunities and have some sort of qualification. However, 28% of respondents indicated that they had not attended school at all. This could be due to the old system of apartheid as well as traditional norms that discouraged females from receiving an education.

Figure 4.4: Age of Respondents



Forty two percent of the Zimbabwe participants surveyed were between the ages of 35-44 years old, while a further 42% of respondents were between the ages of 45-59 years old (Figure 4.4). A small percentage (14%) of respondents were between the ages of 25-34 years old. One participant did not respond. The non-participant sample was constituted by 48% of persons that were between the ages of 45-49 years old, 28% that were between the ages of 35-44 years old, 18% between the ages of 25-34 years old and 6% of respondents were between the ages of 16-24 years old. The figure above indicates that most of the respondents interviewed were in the 45-49 year age category and between the 35-44 year age category.

Table 4.1: Household Income Sources of Respondents: Multiple Responses

Household Income Sources	Participants (n=50)		Non- participants (n=50)	
	<i>f</i>	%	<i>f</i>	%
Household farming	2	4	22	44
Own business	4	8	6	12
Agricultural wage labour/ farm worker	-	-	5	10
Informal activities (crafts, traditional medicine)	1	2	3	6
Non-agricultural wage labour	1	2	-	-
Forest utilisation	-	-	1	2
Pension, welfare grants, etc	-	-	35	70
Professional	-	-	6	12
Zimbabwe	50	100	-	-

The main determinants of poverty usually include agricultural productivity, non-agricultural employment and non-agricultural productivity (Ali and Pernia, 2003). The above Table indicates that all Zimbabwe participants surveyed received an income from the Department of Transport. Sixteen percent of the participants received alternative sources of income in conjunction with that received from Zimbabwe. These sources of income included household farming (4%), own business (8%), informal activities (2%) and non-agricultural wage labour (2%). These results indicate that for the majority (84%), the only source of income received is that from the Zimbabwe rural road maintenance programme. Reasons for these alarming results are directly linked to the lack of employment opportunities and the isolation of areas away from city centres and industries.

Table 4.1 also indicates that 44% of those households that are non-participants of the Zimbabwe programme receive an income from household farming, 12% have their own businesses, 10% are involved in agricultural wage labour or are farm workers and 6% receive an income from informal activities such as crafts and traditional medicine. Seventy percent of non-participants indicated that they received pension or welfare grants, 2% received money from forest utilisation and 12% of the respondents were professionals. These results show that most non-participant households receive multiple sources of

income and therefore, can survive without being awarded a Zimbabwe labour-based road maintenance contract. The results obtained from the income sources of the Zimbabwe participants clearly indicate that generally the Zimbabwe labour-based rural road maintenance programme provides a source of income to those members of the community that are most deserving and lack adequate income sources.

4. 2.2 Socio-Economic Profile of Respondents

Table 4.2: Services available for the households in the community: Multiple Responses

Services Available for Community Members	Participants (n=50)		Non-Participants (n=50)	
	<i>f</i>	%	<i>f</i>	%
Telephone	5	10	6	12
Water sources (borehole, tap, etc)	44	88	44	88
Electricity	44	88	45	90
Land for cultivation	4	8	19	38
Land for grazing	3	6	1	2
Toilet	45	90	19	38

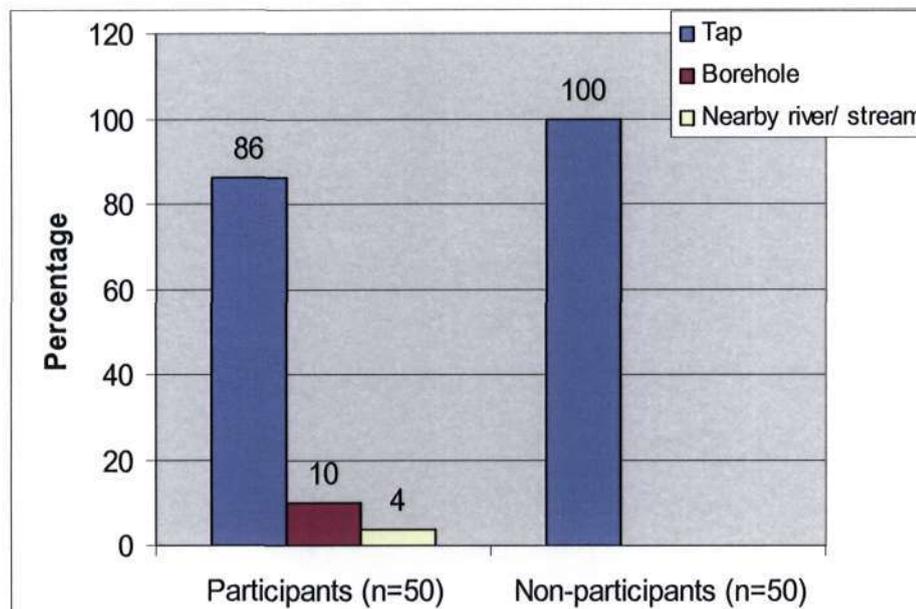
The deprivation of a community to services, amenities and facilities is directly related to inadequate access to infrastructural services, such as clean water, sanitation, transportation, and communication, which are commonly known as input indicators of poverty (Ali and Pernia, 2003). These input indicators, according to Ali and Pernia (2003), limit access to other sets of indicators, namely health services, education facilities, food, markets, and causes a negative impact on the output indicators of poverty, such as literacy, income and nutrition.

According to most participants (88%), water sources such as taps and boreholes are available for households in the community (Table 4.2). Eighty-eight percent of participants also indicated that electricity has recently become available to the households in the form of prepaid electricity units. Ninety percent of all respondents specified the availability of toilet facilities that are present as separate structures outside the household.

These statistics are pleasing to an extent since studies conducted in the area a few years ago by Ramsarup (2005), show that the households in the community have no access to proper water, sanitation or electricity facilities. A small proportion (12%) pointed out that they have access to telephones in the form of landline telephone booths and cell phone outlets. The issue of land for cultivation (8%) and land for grazing (6%) is disappointing in that the bulk of the respondents have no access to land to cultivate or for their farm animals to graze. This could be due to the uneven distribution of land during the apartheid era and the lack of money to purchase small areas of vacant land.

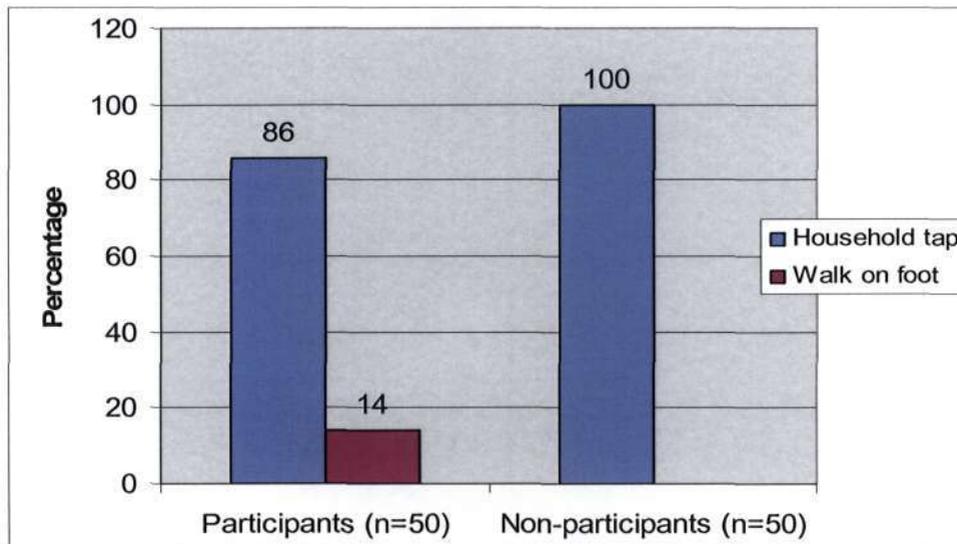
Similarly, the vast majority of non-participants (88%) indicated that water sources such as boreholes and taps are available for the community members, 90% indicated that electricity was recently available, 98% indicated the availability of toilet facilities for the community members and 12% said that telephone booths were available for the community. Thirty-eight percent of respondents said that land for cultivation is available. One respondent indicated that land for grazing is available for the community members. These results are similar to the responses received from the interviews with the Zibambele participants. However, more respondents from the non-participants (38%) indicated that land was available for cultivation.

Figure 4.5: Access of primary source of water that is used by the household



Eighty-six percent of Zimbabwe participants surveyed said that the household uses a tap for their water supply, while 10% indicated that they have access to a borehole. A minute number (4%) indicated that they access water from a nearby stream or river. Although all households have access to household taps, 14% of the sample pointed out that they do not have enough money to pay water accounts and therefore, make use of the nearby boreholes, rivers and streams. All non-participants indicated that they have access to household taps and therefore experienced no difficulties in accessing or obtaining the water source and they do not have to travel to access the water.

Figure 4.6 Access to the water source(s) identified



The Figure above shows that 86% of the participants that were interviewed do not experience difficulties accessing the primary water source because they have household taps present. The remaining fourteen percent indicated that water sources are easily accessible and is in walking distance from their households. All non-participants indicated that they do not experience any difficulties in accessing, obtaining or collecting the primary water source because they have access to household taps.

Given that 86% of respondents have designated the presence of household taps, the distance travelled to obtain, collect or purchase the water source is not applicable for these participants. The 14% of respondents that indicated that they walk to nearby boreholes, taps and nearby rivers said that the distance they walked to access the water source was less than 1km. Non-participants indicated that they did not have to travel any distance to access the water source because they have taps in their households.

Table 4.3: The primary sources of fuel used for cooking: Multiple Responses

Fuel used for cooking	Participants (n=50)		Non-participants (n=50)	
	<i>f</i>	%	<i>f</i>	%
Wood	24	48	13	26
Paraffin	26	52	35	70
Coal	7	14	-	-
Electricity	11	22	38	76

Table 4.3 indicates the primary sources of fuel that is used for cooking by the respondents (participants and non-participants). A number of participants stated that multiple sources of fuel are used within the households. Forty-eight percent of the Zimbabwe participants indicated that they used wood to cook, 52% used paraffin stoves, 14% still used coal stoves and 22% made use of the electricity supply by using electrical hotplates and stoves to cook. The bulk of the respondents indicated that they used wood for cooking because electricity cards are expensive and they do not have sufficient money to pay for the electricity. Taking into account non-participants and the sources of fuel used for cooking, 28% stated that they used wood that is collected from the nearby bushes and forest to cook, 70% preferred the use of paraffin purchased from stores, and 76% made use of the electricity by purchasing electricity cards and using electrical hotplates and stoves to cook. The table shows that more non-participants use electricity. This is mainly due to income levels.

Table 4.4: The primary sources of fuel used for lighting: Multiple Responses

Fuel used for lighting	Participants (n=50)		Non-participants (n=50)	
	<i>f</i>	%	<i>f</i>	%
Electricity	33	66	45	90
Generator	11	22	3	6
Candles	8	16	36	72

Sixty-six percent of respondents indicated that they use electricity for lighting while 22% of the sample made use of a generator. Only 16% of the Zimbabwe participants surveyed

said that they use candles as a source of lighting. Ninety percent of respondents indicated the use electricity for lighting while 6% of the sample made use of a generator. Only 72% of the non-participants surveyed also said that they used candles purchased from stores as a source of lighting. It is evident from the table above that the majority of respondents that use electricity for lighting are non-participants and are able to purchase electricity cards and candles as compared to the non-participants that lack sufficient income to purchase electricity cards and candles.

Table 4.5: The primary sources of fuel used for heating: Multiple Responses

Fuel used for heating	Participants (n=50)		Non-participants (n=50)	
	<i>f</i>	%	<i>f</i>	%
Wood	1	2	-	-
Coal	17	34	2	4
Electricity	21	42	6	12

In view of heating sources, 42% of participants indicated that they used electricity, 34% used coal and 2% used wood. With regard to the non-participants use of fuel sources for heating, 12% of respondents used electricity and 4% used coal.

Tables 4.3 to 4.5 clearly show that electricity is more frequently used by the non-participants for cooking, heating and lighting. However, the non-participants also indicated that they make use of wood and paraffin for cooking and heating and candles are frequently used by all respondents for lighting when electricity is unavailable due to the lack of money to purchase electricity cards. The non-participants also indicated that they try to reduce the cost of electricity were possible. It is evident from the tables above that although electricity is available for the Zibambebe participants, many cannot afford to pay for the electricity and therefore they use alternative sources of fuel for cooking, heating and lighting. Participants further indicated that before the road maintenance programme could be implemented, they could not make use of the electricity available to them because they had no source of income to purchase electricity cards.

Figure 4.7: Distance travelled to access the source(s) fuel

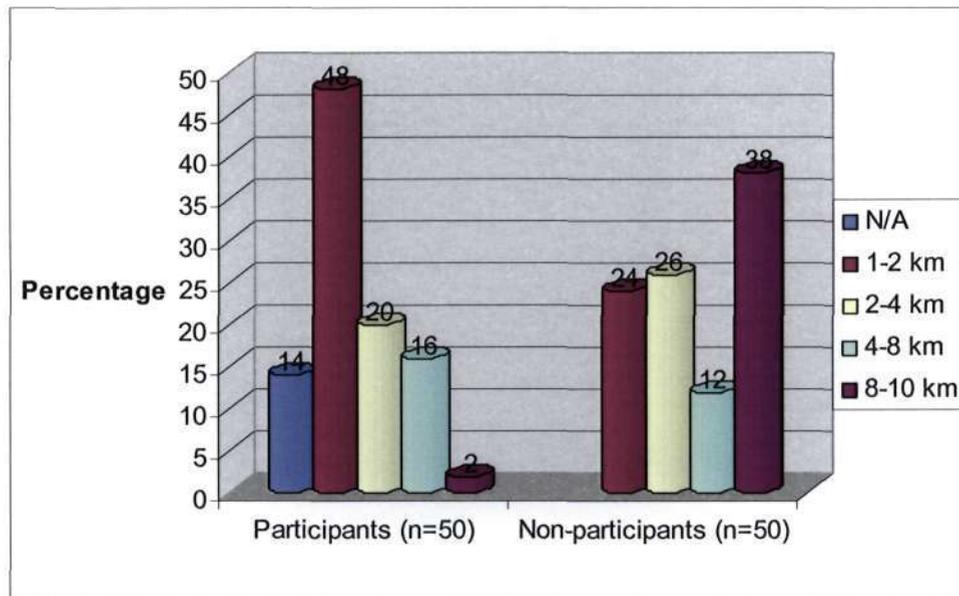


Figure 4.7 illustrates that 48% of Zibambele participants travel between 1-2km to purchase the sources of fuel used by the household from the local shop. Twenty percent of respondents travel between 2-4km to access the local shop, 16% travel between 4-8km to access the local shop, city centre or town and only 1 respondent needed to travel 8-10km to the nearest city/ town to access the source of fuel that they identified.

Twenty-four percent of non-participants travel between 1-2km to the local store to access the sources of fuel used by the household. Twenty percent of respondents travel between 2-4km, 12% travel between 4-8km to the nearest store or city centre and the majority of respondents (38%) need to travel 8-10km to the city centre or town to access the source of fuel that they identified.

Figure 4.8 clearly indicates that the majority of the participants do not travel to the nearest city/ town (8-10km). The reasons forwarded by the participants were that they do not have sufficient money for transport costs and hiring of delivery vehicles. With regards to the non-participants, it is evident that most of them are able to afford transport costs to the main town/ city to purchase the sources of fuel that they need. Therefore, it can be understood that income levels are a major obstacle to accessing sources of fuel.

Figure 4.8: Difficulties in obtaining/ collecting/ purchasing the source of fuel

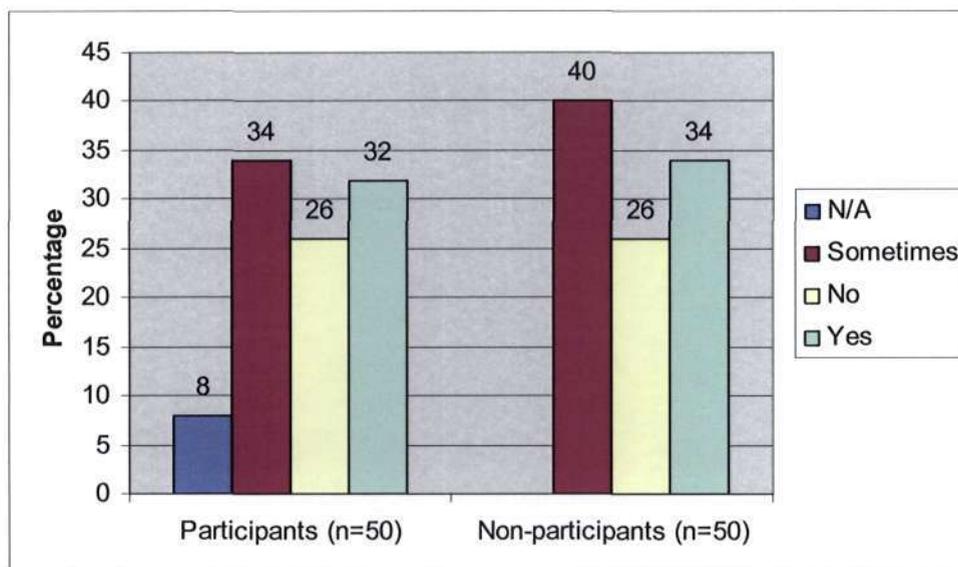


Figure 4.8 illustrates the level of difficulties that Zibambele participants and non-participants experience in obtaining, collecting or purchasing the sources of fuels identified in the previous figures. Many participants (34%) indicated that they sometimes experience difficulties, while 32% said that they frequently experience difficulties in obtaining the sources of fuel. This is because many participants are only able to purchase prepaid electricity cards, paraffin and coal when they have the money to purchase them as well as to pay for transport costs to the nearest shop that stocks their sources of fuel. Participants also indicated that because they live away from the road that allows access to nearby shops and transport facilities such as taxis and buses, it is time consuming to walk through the bushes and paths to get to the road. Many participants felt that the rural roads that link the main roads to their houses should be tarred, thereby making access to the nearby shops and transport routes more easily accessible. Twenty-two percent of respondents experienced no difficulties at all and 8% did not respond.

With regards to non-participants, 40% indicated that they sometimes experience difficulties, while 34% said that they frequently experience difficulties in obtaining the sources of fuel. This is because many respondents are only able to purchase prepaid electricity cards, paraffin and coal from the nearest shop and city centre and because they

work, they have insufficient time and sometimes insufficient money. Twenty-six percent of respondents experienced no difficulties at all in obtaining, collecting or purchasing the sources of fuel.

Table 4.6: Type(s) of materials that are used to build and maintain households: Multiple Responses

Type of Building Material	Participants (n=50)		Non-participants (n=50)	
	<i>f</i>	%	<i>F</i>	%
Brick	-	-	9	18
Blocks	13	26	23	46
Mud	38	74	23	46
Thatch	1	2	-	-
Tin	1	2	-	-

Twenty-six percent of participant household's surveyed use blocks to build their home while 74% use mud. One respondent indicated the use of thatch and a further one respondent indicated the use of tin in building their house. Figure 4.6 indicates that most participant households are unable to afford bricks and therefore use alternative building materials such as blocks, mud, tin and thatch which are relatively less expensive.

Eighteen percent of non-participant households surveyed indicated that they used bricks to build their homes, 46% indicated that they used blocks, and a further 46% of respondents indicated that they used mud to build their houses. The results indicate that most households are able to afford bricks and blocks and therefore do not use alternative building materials such as tin, thatch or poles which are reasonably less expensive.

Figure 4.9: Difficulties experienced in obtaining, collecting, and purchasing the building materials identified

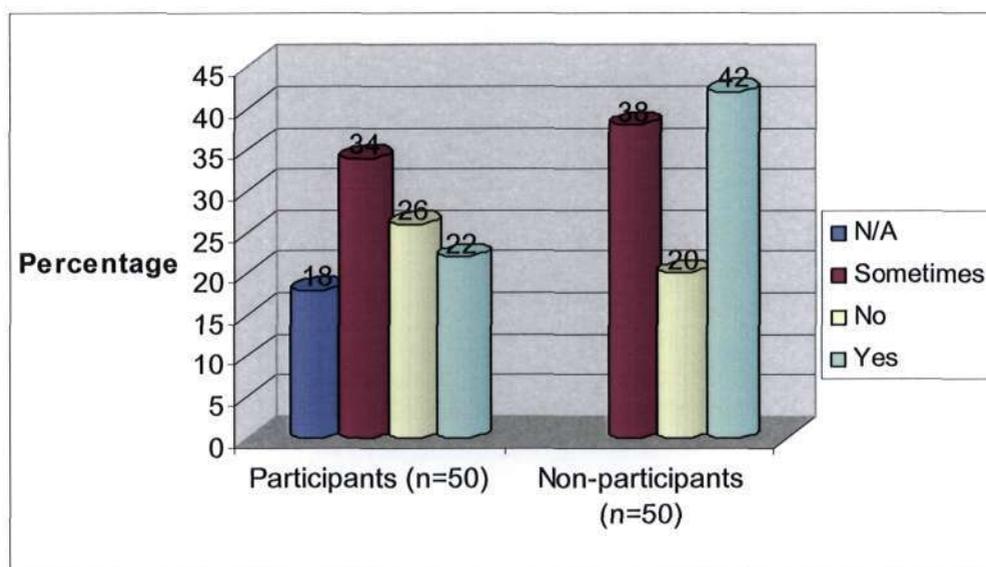
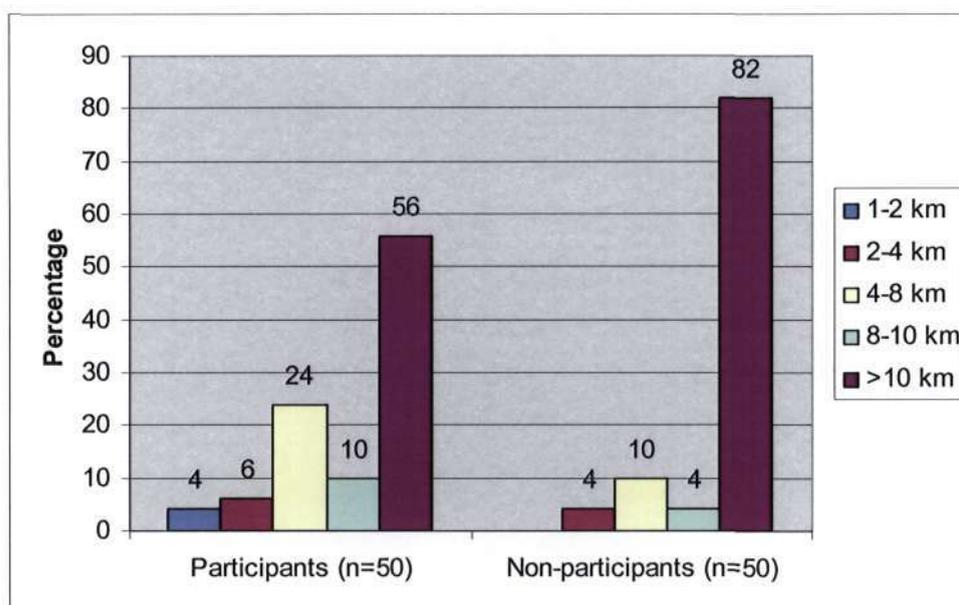


Figure 4.9 illustrates the level of difficulties that respondents experience in obtaining, collecting or purchasing the building materials identified in the previous table. Many Zibambele participants (34%) indicated that they sometimes experience difficulties, while 22% said that they frequently experience difficulties in obtaining the building materials. This is because many respondents have to travel to the main centres that sell the building materials that they require. Respondents pointed out that sometimes they do not have extra money for transport and delivery costs and many delivery vehicles are reluctant to use the rural roads because often their vehicles get damaged. Twenty-six percent respondents did not respond.

Many non-participants (38%) indicated that they sometimes experience difficulties, while 42% said that they frequently experience difficulties in obtaining the building materials. This is because many non-participants have to travel into the main centres that sell the building materials that they require. Respondents also indicated that sometimes they do not have extra money for transport and delivery costs. Twenty percent of respondents experienced no difficulties in obtaining, collecting or purchasing the building materials that they require.

Figure 4.10: The distance travelled to obtain/ collect/ purchase the building materials required by the household



The majority (56%) of the Zimbabwe participants interviewed indicated that they had to travel greater than 10km to obtain, collect and purchase the building materials they require. Ten percent of respondents indicated that travelled between 8-10km, 24% travelled between 4-8km, 6% travelled between 2-4km and 4% indicated that they travelled less than 1-2km.

Eighty-two percent of the non-participants interviewed indicated that they had to travel greater than 10km to the main city or town to obtain, collect and purchase the building materials they require. Four percent of respondents indicated that they travel between 8-10km, 10% travel between 4-8km and 4% of respondents said that they travel between 2-4km to obtain, collect or purchase building materials that they require.

Touton (2003) suggests that good transport infrastructure such as roads are essential for such long distance transportation and the connection of the entire transport system from the urban market hubs to the remote rural villages. There are substantial benefits in roads in developing countries, particularly in the reductions in travel time from farm to market. Work conducted by Shroeder (1997) in Indonesia, for example, has shown that upgrading

a rural road reduced the duration and distance of trips from residence to market from one and a half hours to forty five minutes.

Table 4.7: Problems experienced by the respondents (participants and non-participants): Multiple Responses

Problems Experienced	Participants (n=50)		Non-Participants (n=50)	
	<i>f</i>	%	<i>f</i>	%
Inadequate infrastructure e.g. roads, telephones	44	88	45	90
Lack of employment opportunities	48	96	48	96
Not enough land	33	66	10	20
Lack of access to savings clubs	8	16	-	-
Community structures not functioning properly	4	8	3	6
Environmental problems e.g. overgrazing, erosion	3	6	-	-
Inadequate extension services	31	62	44	98
Clinics	1	2	-	-

Rural people in the developing world lack adequate and affordable access to transport infrastructure and services (Starkey, 2004). Their limited mobility contributes to a vicious circle of poverty by hindering economic activity and social improvement. Ahmed and Hossain (1990) suggest that the hope for a better lifestyle for rural communities lies within the opportunity to access services, goods, an income, and to participate in social, political and community activities. Better infrastructure can provide a direct link to better agricultural output, higher incomes, better indicators of access to health services, and greater wage income opportunities.

Table 4.7 shows the problems experienced by the households in the community with regards to services available for the entire community. The majority of the participants felt that they lacked employment opportunities (96%), had inadequate infrastructure such as roads and telephones (88%), lacked enough land for cultivation and grazing (66%), and suffered a lack of extension services. These results are characteristic of most rural areas and can be attributed to the cruel realities of the apartheid era since Black

communities were deprived of adequate infrastructure and facilities and were excluded from the employment sectors, while White communities enjoyed the benefits of enough job opportunities, had adequate infrastructure and land, and benefited from extension services.

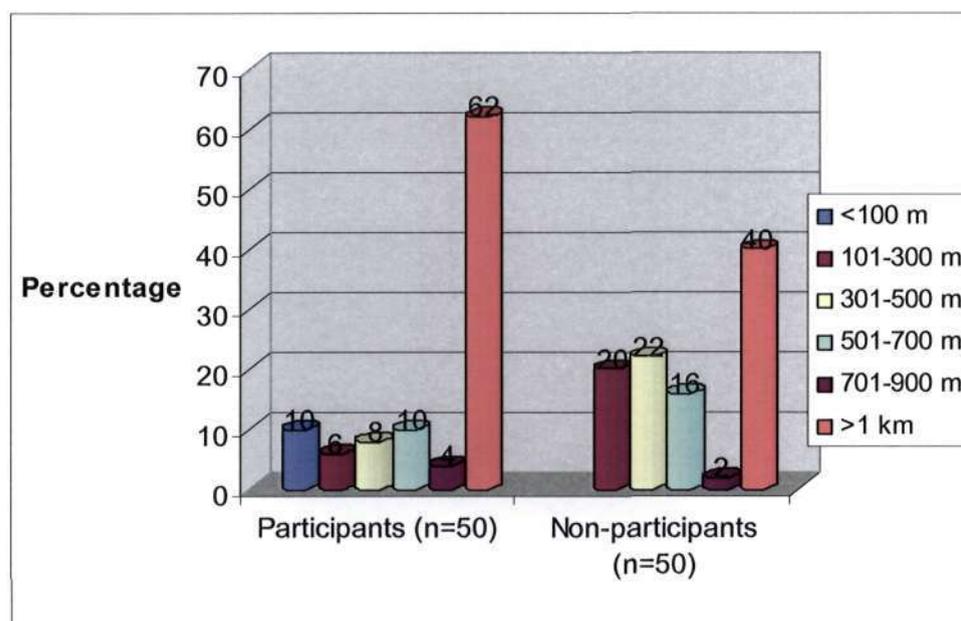
Sixteen percent of respondents said that people in the community lacked access to saving clubs, while 8% felt that community structures in the community are not functioning properly. Environmental problems such as overgrazing, erosion and dry soils were identified by 6% of respondents. One respondent indicated that he/ she was dissatisfied with the local clinic since it is located far from the households.

The majority of the non-participants (96%) felt that most of the members in the community lacked employment opportunities, 90% said that the community had inadequate infrastructure such as roads and telephones, and 98% indicated that the community lacked extension services. Twenty percent of respondents said that there was not enough land available for the community, while 6% indicated that community structures were not functioning properly.

These figures are comparatively similar to responses received from the Zibambele participants and therefore paint a clear picture of the harsh realities created by the apartheid government which facilitated the skewed distribution of communities, infrastructure and employment opportunities. By introducing new labour-based infrastructure programmes, the infrastructure (such as roads, sanitation and telecommunications) within a community, the quality of life immediately improves, thus alleviating many affects of poverty.

4.2.3. Accessibility of Closest Main Road

Figure 4.11: Distance of household from closest main road

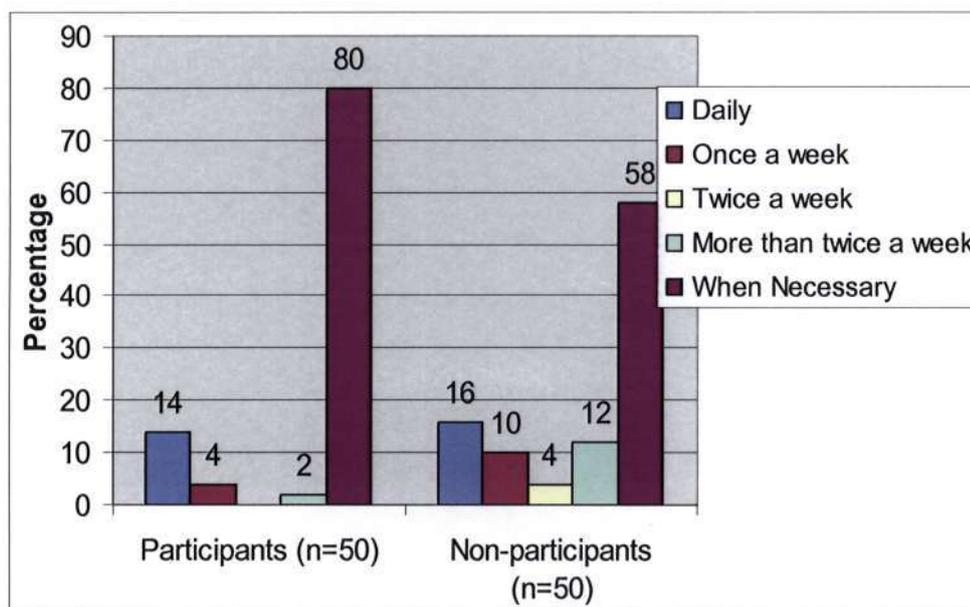


Geographical isolation and difficulty of access by national or provincial roads limit poor communities participation in labour and productive markets and constrain their economic opportunities (Hanmer et al, 2000). Sixty-two percent of Zimbabwe participants that were interviewed indicated that they reside more than 1km away from the closest road. The remaining 38% indicated that they reside 701-900m (4%) away from the closest road, 501-700m (10%) away, 301-500m (8%) away and less than 100m (10%) away from the closest road. Forty percent of non-participants surveyed indicated that the closest main road is located more than 1km away from their household, while it was indicated that one non-participant resides 701-900m away from the closest road, 16% live 501-700m away, 22% live 301-500m away and 20% of the non-participants lived 101-300m away. All respondents mentioned that the closest main road to their households is called “P21” and is a provincial road that is mainly used to access other areas and communities.

Figure 4.11 illustrates that the majority of respondents (participants and non-participants) live a distance of more than 1km away from the closest main road. The results demonstrate that most respondents live in the remote rural areas, thereby making access

to the main road difficult. The main road serves as a catalyst to link the rural population to the city centres and other areas that are outside the Umbumbulu magisterial district. Transport services such as taxis and buses are only accessible on the main road and therefore respondents indicated that the rural unpaved roads make access to the main road difficult. Respondents indicated that they have to walk on foot to get to the main road, making access time-consuming. Furthermore, respondents said that they felt that transport vehicles such as taxis and buses may use the paved rural roads as a route to load passengers if the rural roads were paved.

Figure 4.12 Frequency of main road use by household members



The road P21 is used by 80% of Zibambele participants when it's necessary for them to use the road (from a few times a day up to several times in a day or night). Fourteen percent of the surveyed respondents use the road daily, 2% use the road more than twice a week and 4% use the road once a week. Fifty-eight percent of non-participants indicated that they use the provincial road when it is necessary for them to use the road (from a few times a day up to several times in a day or night). Sixteen percent of the non-participants said that they use the road daily, 12% indicated that they use the road more than twice a week, 4% mentioned that they use the road only twice a week and 10% of the surveyed respondents indicated that they use the road once a week.

Figure 4.12 illustrates that the road is frequently in use, day or night and serves an essential function to the community members to link them to other areas. Respondents indicated that they use the road when there is a need for them to travel to the main city/ town to purchase household requirements and to look for employment opportunities. The main road connects the rural community to the markets, educational facilities, and hospitals as well as facilitating social interaction with neighbouring communities.

Table 4.8: Type(s) of vehicles that use the main road: Multiple Responses

Type(s) of vehicle(s)	Participants (n=50)		Non- Participants (n=50)	
	<i>f</i>	%	<i>f</i>	%
Bicycle	48	86	24	48
Car	48	86	49	98
Bus	41	82	50	100
Mini bus taxi	44	88	50	100
Heavy vehicles e.g. trailers/ trucks	34	68	41	82
Animal drawn vehicles e.g. carts	-	-	17	34

Eighty-eight percent of Zibambele participants indicated that the road is used frequently by bicycles, 86% indicated road use by cars, 82% observed the use of buses on the road, 88% said that taxis make use of the road and 68% of participants noticed heavy vehicles and trucks using the road. Forty-eight percent of non-participants indicated that the road is used frequently by bicycles, 98% indicated that the road is used by cars, all non-participants observed the use of buses on the road and all non-participants said that taxis make use of the road, while 82% of respondents have noticed heavy vehicles and trucks that use the road.

Figure 4.13: Frequency of road use by vehicles

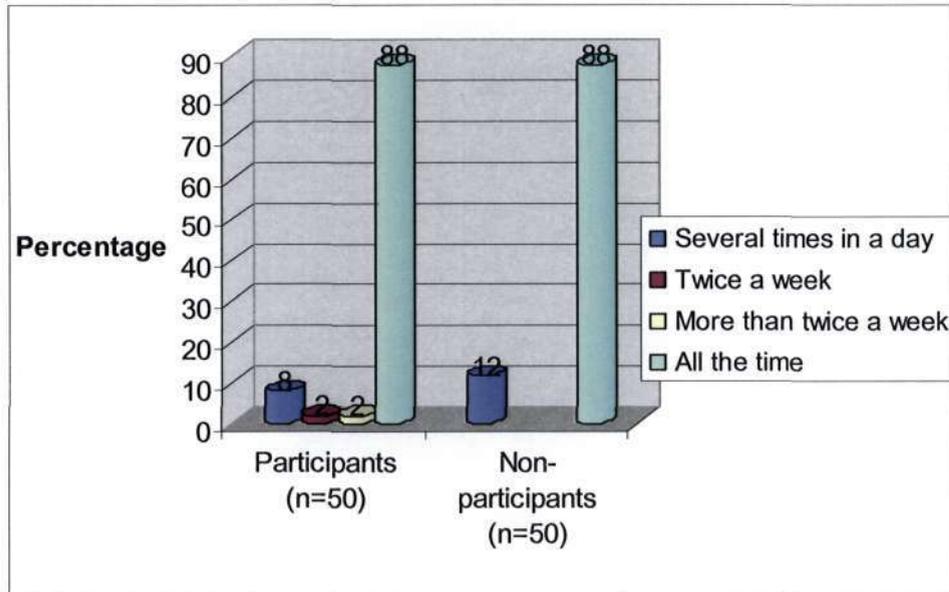
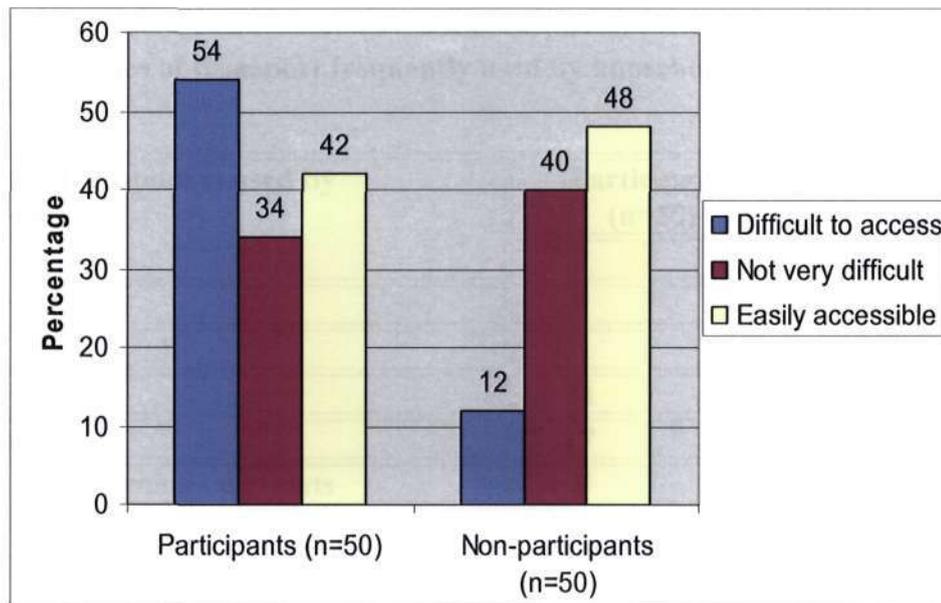


Figure 4.13 shows the frequency of the road P21 use by vehicles. The majority of the respondents (88%) indicated that vehicles use the road all the time, day or night, 8% of the participants said that the vehicles use the road several times in a day. One participant said that the vehicles use the road twice a week and a further non-participant observed that the vehicles use the road more than twice a week. Eighty-eight percent of non-participants that were surveyed indicated that vehicles use the road all the time, day or night, while 12% of the non-participants indicated the road is used several times in a day by the vehicles.

Figure 4.14: Rating of the distance of the road from households



Respondents were asked to rate the distance of the road (P21) from their household (Figure 4.14). Most participants (64%) felt that the road is difficult to access and takes more than fifteen minutes to access, 34% said that the road is not very difficult to access and 12% of the sample indicated that the road is easily accessible. Many non-participants that were surveyed (42%) felt that the road is difficult to access and takes more than fifteen minutes to access. However, 40% of non-participants felt that the road is not very difficult to access and takes about 10 minutes to access. Twelve percent of the non-participant sampled indicated that the road is easily accessible in less than 10 minutes. Respondents (participants and non-participants) that found it difficult to access the road said that their houses are located far from the road and therefore they need to walk through footpaths and tracks to get to the road. Respondents that found the road easily accessible live closer to the road.

All Zibambele participants and non-participants surveyed indicated that the closest main town/ city travelled to for goods and services is Isipingo, which is situated about 10km away from the community. Isipingo was a predominately Indian township during the apartheid era.

Table 4.9: Modes of transport frequently used by household members: Multiple Responses

Type(s) of transport(s) used by households	Participants (n=50)		Non-participants (n=50)	
	<i>f</i>	%	<i>f</i>	%
Foot	8	16	46	92
Car	-	-	1	2
Bus	24	48	23	46
Mini bus taxi	17	34	48	96
Animal drawn vehicles e.g. carts	1	2	2	4

In order for rural transport to be effective a variety of means of transport should be available to mobilise people and their goods. The bulk (48%) of the participant households surveyed used a bus to access other areas and services, 34% make use of taxi services, 16% walked to their destination and one participant indicated that he/ she uses animal drawn vehicles such as carts (Table 4.9). The majority of the non-participant households surveyed (96%) indicated that they used a taxi as a mode of transport that is frequently used by the household, 92% indicated that they walk on foot, 46% use the bus to get to their destinations and 4% of the respondents indicated that they use animal drawn vehicles such as carts. Touton (2003) stipulates that most rural transport simply involves walking and carrying between villages and to main roads for long distances.

The results in Table 4.9 illustrate that bus and taxi services are available for the rural community, however, the cost of making use of these vehicles should always be taken into account since the masses are significantly poor. The responses from the non-participants differ from the Zibambele participants in that the results for the non-participants are multiple responses and indicate that the non-participants most probably can afford to make use of any mode of transport that they desire. Intermediate transport is most frequently used by the poor, both in urban and rural areas, and includes walking, bicycles, and animal drawn carts (Touton, 2003). It was evident from the table that most respondents (participants and non-participants) still walk to their destinations while a few respondents make use of animal drawn vehicles such as carts.

Table 4.10: Type(s) of transport used among participants to access specific services/ areas: Multiple Responses

Participants (n=50)										
Type(s) of transport	Shopping centre		School		Clinic		Market		Church	
	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%
No response	-	-	25	50	4	8	47	94	14	28
Animal drawn vehicles	1	2	-	-	-	-	-	-	-	-
Foot	-	-	28	36	7	14	2	4	13	26
Bus	11	22	2	4	10	20	-	-	5	10
Taxi	38	76	5	10	29	58	1	2	18	36

Seventy-six percent of the Zimbabwe participants use the taxi services to travel to shopping centres, 22% uses the bus and 2% uses an animal drawn cart (Table 4.10). A significant proportion of the participants (36%) said that their children travel to school on foot, 4% by bus and 10% with a taxi. The remaining 50% of respondents did not respond to the type of transport used to school. Fifty-eight percent of participants use the taxi to go the clinic, 20% use the bus, 14% walk to the clinic and 4 participants did not respond. Two participants from the sample indicated that they walk to the market while one respondent said that he/ she uses a taxi. Ninety-four percent of the participants did not respond to the type of transport used to the market. According to the table above, 36% of Zimbabwe participants interviewed indicated that they use a taxi to go to church, 10% use the bus, and 26% walk to church. Twenty-eight percent of the participants did not respond to the type of transport used to go to church.

Table 4.11: Type(s) of transport used among non-participants to access specific services/ areas: Multiple Responses

Non-participants (n=50)										
Type(s) of transport	Shopping centre		School		Clinic		Market		Church	
	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%
No response	10	20	17	34	3	6	25	50	9	18
Foot	2	4	27	54	33	68	1	2	20	40
Bus	5	10	-	-	5	10	6	12	9	18
Taxi	33	66	6	12	8	16	18	36	12	24

Sixty-six percent of non-participants surveyed indicated that they use the taxi to travel to shopping centres, 10% use the bus and 4% walk on foot to get to the shopping centre (Table 4.11). Twenty percent of non-participants did not respond to the type of transport used to get to the shopping centre. Fifty-four percent of non-participants indicated that their children travel to school on foot while 12% of respondent's children travel with a taxi. Thirty-four percent of non-participants did not respond to the type of transport used to go to school. Sixteen percent of non-participants used the taxi to go to the clinic, 10% use the bus, 68% walk to the clinic and 6% of the non-participants did not respond to the type of transport used to go to the clinic. Thirty-six percent of the non-participants indicated the use of a taxi to go to the market, 12% use the bus and 2% said that they walk to the market. Fifty percent of non-participants did not respond. Twenty-four percent of the non-participants that were interviewed indicated that they use a taxi to go to church, 18% use the bus, and 40% walk to church. Eighteen percent of the non-participants did not respond to the type of transport used to go to church.

Tables 4.10 and 4.11 indicate that the respondents (participants and non-participants) use taxis, buses and foot as their main modes of transport. However, according to Hanmer et al (2000), the lack of affordable transport services or means of transport can mean that provision of transport alone may not alleviate the situation. The transport services such as buses and taxis are only useful to the communities if there is sufficient income. Therefore, it is imperative that government provides these services in conjunction with employment

intensive programmes that involve the communities' participation and increases income generation opportunities.

Table 4.12: Cost of transport among participants to access specific services/ areas: Multiple Responses

Participants (n=50)										
Cost of transport	Shopping centre		School		Clinic		Market		Church	
	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>F</i>	%
No response	1	2	40	80	11	22	49	98	27	54
< R5	1	2	8	16	1	2	-	-	1	2
R5-R10	13	26	2	4	11	22	1	2	21	42
>R10	35	70	-	-	27	54	-	-	1	2

Seventy percent of participants indicated that they pay more than R10 to get to the shopping centre, 26% pay between R5-R10 and 2% pays less than R5 to travel to the shopping centre (Table 4.12). One respondent did not respond. Sixteen percent of participants said that they pay less than R5 travel fare to go to school, 4% pay between R5-R10 and 80% of the participants did not respond. Fifty-four percent of the sample is charged more than R10 for transport fares to the clinic, 22% are charged between R5-10, 2% pay less than R5 and the remaining 22% of participants did not respond. Two percent of the surveyed respondents paid more than R10 transport costs to go to the market, while 98% of participants did not respond. Two percent of the sampled households pay more than R10 to go to church, 42% pay between R5-10 and 2% pay less than R5 travelling cost. Fifty-four percent of the participants did not respond.

Participants indicated that the transport costs are high and sometimes they can barely afford to use the buses and taxis. Many participants said that they walk to their destinations whenever possible because they do not have the money to pay for fares. They only use the transport services when they have to travel long distances. Furthermore, participants indicated that the rural roads are difficult to access during rainy weather and therefore taxis and buses do not use the main road to load passengers. This results in a

situation whereby participants feel isolated since they are not able to access the main bus routes due to paths, and dirt roads being muddy and unusable.

Table 4.13: Cost of transport among non-participants to access specific services/ areas: Multiple Responses

Non-participants (n=50)										
Cost of transport	Shopping centre		School		Clinic		Market		Church	
	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%
No response	12	24	44	88	38	76	26	52	29	58
< R5	1	2	1	2	-	-	-	-	12	24
R5-R10	22	44	5	10	12	24	24	48	9	18
>R10	15	30	-	-	-	-	-	-	-	-

Thirty percent of the non-participants indicated that they pay more than R10 to get to the shopping centre, 44% pays between R5-R10 and 2% pays less than R5 to travel to the shopping centre (Table 4.13). Twenty-four percent of the non-participants did not respond. Two percent of non-participants said that they pay less than R5 for their children's travel fare to school while 10% of respondents pay between R5-R10 a day for their children's fares. Eighty-eight percent of the non-participants did not respond. Twenty four percent of the respondents pay between R5-10 to go to the clinic, while the remaining 76% of the non-participants did not respond. Forty-eight percent of the surveyed respondents paid between R5-R10 transport costs to get to the market, while 52% of the non-participants did not respond to the cost to go to the market. Eighteen percent of the non-participants indicated that they pay between R5-10 to go to church and 24% pay less than R5 travelling cost. Fifty-eight percent of the non-participants did not respond.

According to Bakth (2000), the improvements in transport facilities and associated reduction in transport costs transmit positive impacts all around the economy. The immediate effect of road improvement is felt on the transport sector and the development of earthen roads into paved roads can improve pliability, particularly during the rainy seasons. Bakth (2000) states that if rural roads are paved there will be reductions in

transport costs of existing modes. Better pliability also facilitates use of mechanised means of transport, which further contributes towards reduction in transport cost. In this study respondents felt that the rural roads should be upgraded and paved.

Table 4.14: Time taken to access specific services/ areas among participants: Multiple Responses

Participants (n=50)										
Time	Shopping centre		School		Clinic		Market		Church	
	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%
No response	1	2	26	52	5	10	47	94	14	28
< 15 minutes	2	4	20	40	6	12	2	4	32	64
15-30 minutes	18	36	2	4	6	12	1	2	3	6
30-45 minutes	19	38	1	2	6	12	-	-	-	-
45 minutes-1 hour	3	6	1	2	4	8	-	-	-	-
>1 hour	7	14	-	-	23	46	-	-	1	2

Fourteen percent of participants indicated that it takes more than an hour to reach the shopping centre, 6% travel for 45 minutes to 1 hour, 38% travel for 30-45 minutes, 36% travel for 15-30 minutes and 4% take less than 15 minutes travelling time to reach the shopping centre (Table 4.14). One participant did not respond. Forty percent of responses to time taken were that it takes less than 15 minutes to reach the school, 4% said that it takes between 15-30 minutes, one participant indicated it takes between 30-45 minutes and a further participant said that it takes 45 minutes to an hour to travel to the school. Fifty-two participants did not respond. Forty-six percent of the sample takes more than an hour to travel to the clinic, 8% takes between 45 minutes to 1 hour, 12% takes 30-45 minutes, a further 12% takes 15-30 minutes travelling time and another 12% take less than 15 minutes to reach the clinic. Ten percent of the participants did not respond to time taken to go to the clinic. With regards to time taken to go to the market, 4% of responses were less than 15 minutes, 2% were between 15-30 minutes and 94% of the participants did not respond. Taking into account time taken to travel to church, 2% said that it takes more than an hour to reach the church, 6% said that it takes between 15-30

minutes, 64% indicated that it takes less than 15 minutes to go to church and 28% of the respondents did not respond.

Table 4.15: Time taken to access specific services/ areas among non-participants: Multiple Responses

Non-participants (n=50)										
Time	Shopping centre		School		Clinic		Market		Church	
	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%
No response	10	20	17	34	3	6	25	50	9	18
< 15 minutes	3	6	26	52	1	2	-	-	6	12
15-30 minutes	15	30	7	14	46	92	25	50	32	64
30-45 minutes	22	44	-	-	-	-	-	-	-	-
>1 hour	-	-	-	-	-	-	-	-	3	6

Forty-four percent of the non-participants said that it takes between 30-45 minutes to reach the shopping centre, 30% travel for 15-30 minutes and 6% take less than 15 minutes travelling time to reach the shopping centre (Table 4.15). Twenty percent of the non-participants did not respond. Fifty-two percent of respondents said that it takes less than 15 minutes to reach the school and 14% said it takes between 15-30 minutes. Thirty four percent of the non-participants did not respond. Ninety-two percent of the surveyed non-participant sampled takes 15-30 minutes travelling time to reach the clinic and 2% said that it takes less than 15 minutes to reach the clinic. Six percent of the non-participants did not respond to the time taken to go to the clinic. With regards to time taken to go to the market, 50% of non-participant responses were between 15-30 minutes while 50% of the non-participants did not respond. Taking into consideration time taken to travel to church, 6% said that it takes more than an hour to reach the church, 64% said that it takes between 15-30 minutes, 12% indicated that it takes less than 15 minutes to go to church and 18% of the non-participants did not respond.

Tables 4.14 and 4.15 indicate that the duration of travel to many areas is considerably long (30 minutes -1 hour), depending on the location. It was identified in the literature review that improvements in road networks are necessary to reduce vehicles operating cost and travel time requirements. For example, in a study conducted by Edmonds (2002)

cited in the literature review, it was found that reductions in travel time and transport costs due to road improvements led to changes in market conditions that in turn affected the land use and production decisions of farm households. Similarly, Jacoby (2000) noted that crop prices as well as land values decreased with distance from markets, as measured by travel time. This indicates that road improvements or maintenance can reduce vehicles operating costs and travel time, thus reducing transport fares and time spent on travelling.

Table 4.16: Distance travelled to access specific services/ areas among participants: Multiple Responses

Participants (n=50)										
Distance	Shopping centre		School		Clinic		Market		Church	
	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%
No response	3	6	27	54	4	8	47	94	14	28
< 1 km	1	2	19	38	5	10	-	-	12	24
1-3 km	3	6	2	4	2	4	2	4	7	14
3-5 km	7	14	2	4	3	6	1	2	15	30
5-7 km	14	28	-	-	11	22	-	-	1	2
7-10 km	15	30	-	-	9	18	-	-	-	-
>10 km	7	14	-	-	16	32	-	-	1	2

Fourteen percent of the participants that were surveyed indicated the distance travelled to the shopping centre to be more than 10km away, 30% said it was between 7-10km away, 28% said that it was 5-7km away, 6% percent indicated that the distance to the shopping centre was 1-3km and 2% indicated it was less than a km away (Table 4.16). Six percent of the participants did not respond. In regard to distance to school, 38% indicated less than 1km, 4% indicated between 1-3km and a further 4% indicated between 3-5km. Fifty-four percent of the participants did not respond. Thirty-two percent of the responses to distance to clinic were greater than 10km, 18% were between 7-10km, 22% were between 5-7km, 6% were between 3-5km, 4% were between 1-3km and 10% were less than 1km. Eight percent of participants did not respond. Four percent of the respondents indicated that the distance to the market is between 1-3km, one participant said that it is between 3-5km and 94% of the participants did not respond. One participant indicated the distance to church as being greater than 10km, a further participant

indicated between 5-7km, 30% indicated between 3-5km, 14% indicated 1-3km and 24% indicated the distance to church as being less than 1km. Twenty-eight percent of the respondents did not respond.

Table 4.17: Distance travelled to access specific services/ areas among non-participants: Multiple Responses

Non-participants (n=50)										
Distance	Shopping centre		School		Clinic		Market		Church	
	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%
No response	10	20	17	34	3	6	25	50	9	18
< 1 km	-	-	20	40	-	-	-	-	-	-
1-3 km	3	6	8	16	35	70	1	2	24	48
3-5 km	3	6	1	2	12	24	22	44	13	26
5-7 km	9	18	2	4	-	-	2	4	4	8
7-10 km	25	50	2	4	-	-	-	-	-	-

Fifty percent of the non-participants that were surveyed indicated the distance travelled to the shopping centre was between 7-10km away, 18% said that it was 5-7km away, 6% percent indicated that the distance to the shopping centre was 3-5km and 6% indicated it was 1-3km (Table 4.17). Twenty percent of the non-participants did not respond. With regard to distance to school, 40% of the non-participants indicated that they travel less than 1km, 16% indicated between 1-3km, 2% indicated between 3-5km, 4% indicated that the distance to school is between 5-7km and a further 4% said that the distance was between 7-10km. Thirty-four percent of the non-participants did not respond. Seventy percent of respondents indicated that the distance travelled to the clinic is between 1-3km and 24% indicated that the distance travelled to the clinic was between 3-5km. Six percent of the non-participants did not respond. Two percent of the non-participants indicated that the distance to the market is between 1-3km, 44% said that it is between 3-5km, 4% said that the distance was between 5-7km and 50% of the responses were not applicable. Eight percent of respondents indicated the distance to church as being between 5-7km, 26% indicated between 3-5km and 48% of the respondents indicated the distance as being between 1-3km. Eighteen percent of the non-participants did not respond.

4.2.4 Zimbabwe Rural Road Maintenance Awareness

All respondents (Zimbabwe participants and non-participants) are aware of the Zimbabwe rural road maintenance programme.

Table 4.18 Awareness Details: Multiple Responses

Awareness	Participants (n=50)		Non-participants (n=50)	
	<i>f</i>	%	<i>f</i>	%
Contracts awarded to the poorest households	50	100	50	100
Maintenance of a length of road	50	100	50	100
Upgrading of rural road	49	98	50	100
Poverty alleviating road maintenance programme	50	100	50	100
Construction of deteriorating roads	1	2	-	-

The awareness table above illustrates that all the respondents (participants and non-participants) are aware that contracts are awarded to the poorest households in the community. All participants and non-participants that were surveyed indicated that the programme entails the maintenance of a length of rural road and is also a poverty alleviating road maintenance programme. Ninety-eight percent of participants indicated that the programme entails the upgrading of rural roads, while one participant indicated that in certain cases the programme entails the construction of deteriorating roads. All non-participants that were surveyed also indicated that the programme is a poverty alleviation road maintenance programme and entails the upgrading of rural roads. The results indicate that all respondents (participants and non-participants) are aware of the main aspects of the Zimbabwe labour-based rural road maintenance programme being implemented in the area. Therefore, it is clear that community members are familiar with the characteristics of the programme.

Table 4.19: Awareness of tasks that are required to be carried out as part of the Zibambele programme: Multiple Responses (Participants)

Tasks	Participants (n=50)	
	<i>f</i>	%
Clearing the verges	42	84
Clearing debris of the road	45	90
Cleaning of debris from drainage systems	48	96
Rehabilitating and repairs to deteriorating roads	40	80
Building of new roads	13	26

Eighty-four percent of Zibambele participants pointed out that clearing of the verges is a task required to be carried out as part of the contract, 90% indicated clearing of debris off the road and 96% said that they are required to clean debris from drainage systems (Table 4.19). Eighty percent of respondents indicated that rehabilitation and repairs to deteriorating roads is also part of the programme, while 26% were aware that there have been some cases where the programme involved the building of new roads and bridges. Image 4.1 below illustrates women participants carrying out maintenance tasks in the Umbumbulu community.

It has been identified in the literature review chapter that the tasks that appear in the table above is extremely important in ensuring the safety of passengers and vehicles travelling on the road as well as for aesthetic beauty and to avoid erosion and runoff. According to Johannesen (1999), routine maintenance tasks include repairs to deteriorating roads, potholes and ruts; clearing of side and metre drains to allow for free passage of water; clearing of culverts and other water ways; clearing of grass and bushes; performing minor repairs to culverts; and retaining structures.



Image 4.1: Women Zibambele workers carrying out maintenance tasks

The Table 4.18 and 4.19 indicates the link between the respondents' awareness of the programme and the Zibambele policy objectives (2003) which is to provide ongoing and sustainable work for destitute households in an effort to break their poverty cycles, provide cost effective, labour intensive methods of routine maintenance of the KwaZulu-Natal provincial road network, and to empower rural women by providing training on road maintenance and other life skills programmes.

Zibambele participants further indicated during the interviews that they are required to work a maximum of 1-2 hours a day and a maximum of 60 hours per month in maintaining the road. The monthly wages received is between R200-R500 for all participants, more specifically R390 per month. However, all respondents felt that the number of working hours and the wages should be increased, since people are eager to work more for more income.

Table 4.20: Expenditure of the money earned from being contracted to the Zibambele programme: Multiple Responses (Participants)

Response	Participants (n=50)	
	<i>f</i>	%
School fees	49	98
Food	49	98
Shelter	16	32
Clothing	48	96
Farming	12	24
Medical treatment	43	86
Repairs to vehicles	2	4

The vast majority of participants (98%) use the money earned from the programme to pay school fees, while a further (98%) use the money earned to buy food (Table 4.20). Thirty-two percent of the Zibambele participants indicated that some money goes towards shelter, 96% said that it helps in buying clothes, 24% indicated that the money is used for farming and buying seeds for their household gardens and 96% of participants use the money to pay medical bills and for treatment.

Many households in the Umbumbulu community are not male-headed, and women increasingly are supporting and maintaining their families. With few employment opportunities in the area, female headed households tend to be the most disadvantaged. Given the severe lack of formal job opportunities for rural women, and the fact that more and more women are being forced to generate some form of income in order to survive, it is of critical importance to create income generation projects such as the Zibambele labour-based rural road maintenance programme.

In essence, the results represented in Table 4.20 are significant because they reveal that the little money that is earned from the programme has many uses, which may not have been possible with the high lack of employment opportunities that exist. It is comforting to note that although the wages earned is realistically very little, the Zibambele

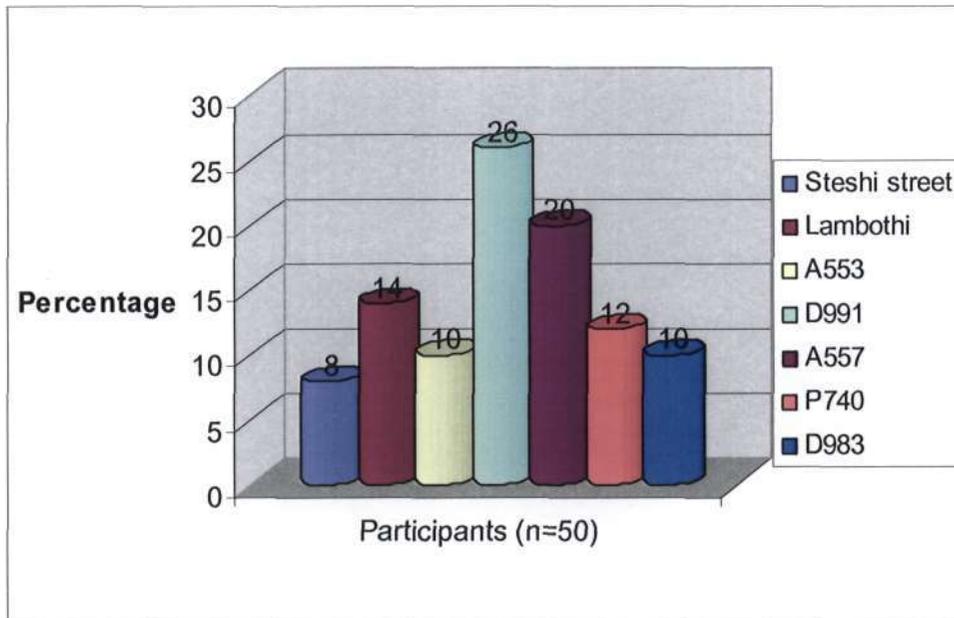
programme provides some of the necessities required to live, such a food, shelter and clothing. The figures can therefore be seen as being justified by the statement in Barber (2000), that Zibambele is an innovative economic initiative that is aimed at improving livelihoods for the impoverished that can be achieved through the maintenance of road infrastructure facilitated by labour intensive methods. It is evident that Zibambele provides opportunities for people that are generally excluded from employment opportunities due to their poverty status. Thus, the prospects for improved access to education and training, nutrition and credit are enhanced by labour-based income generating programmes.

Table 4.21: Non-participants that like to have been awarded maintenance contract (Participants)

Response	Non-participants (n=50)	
	<i>f</i>	%
Yes	38	76
No	12	24

Seventy-six percent of the non-participants that were interviewed indicated that they would have liked to have been awarded a Zibambele maintenance contract (Table 4.21). The reasons forwarded for their response was that the income generated from the Zibambele programme would have contributed towards their current household income. Therefore, respondents felt that they would be able to meet their households requirements with ease since income sources would be increased. However, despite indicating that they would like to have been awarded a maintenance contract, respondents also indicated that they understand that the Zibambele programme is a poverty alleviation programme that focuses on the poorest members in the community. The remaining 26% of the non-participants indicated that they would not have liked to have been awarded a Zibambele contract because they receive sufficient income and do not like to work on the road.

Figure 4.15: The name of the length of road that households are contracted to maintain (Participants)



Eight percent of participants surveyed are required to maintain Steshi street, 14% Lambothi, 10% are responsible for A553, 26% maintain D991, 20% carry out maintenance on A557, 12% work on P740 and 10% carry out maintenance on road D983. These roads are rural access roads. Image 4.2 below is an example of a rural road (D991) in the Umbumbulu area that is currently being maintained by Zibambele participants.



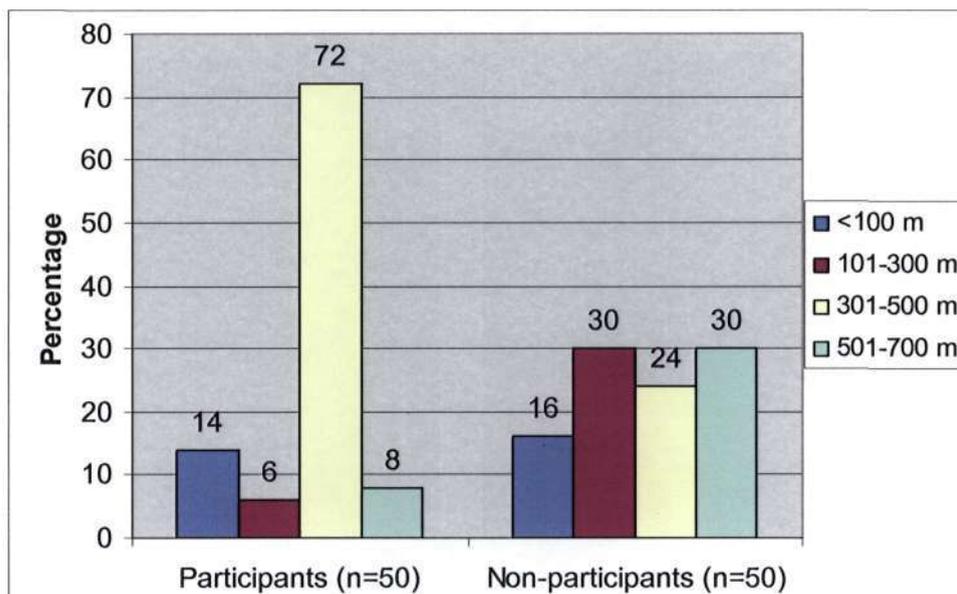
Image 4.2: Maintained Rural Road in Umbumbulu (D991)

Evidence from the literature review show that rural roads extend over all aspects of development of rural communities including demand for and access to health, education, information, etc. Rural Roads provide the connectivity to communities so that the needs of the people are satisfied and daily activities can be carried out efficiently. The provision of a road link to an area increases its accessibility and further helps in catalysing its development (Agha and Siddiqui, 1995).

It is imperative to understand that critical to addressing low rural productivity and low off-farm employment is the improvement of rural roads (Du, 2005). A good transportation system is essential at production stage in carrying the raw materials such as seeds, coals, minerals, manure, and cotton as well as to transport commodities/ goods to marketing centres. Roads in rural areas offer improved access to much needed employment opportunities and also contribute to the development of skills. Songo (2002) conducted a field survey in two provinces of the central highlands region in Vietnam to assess how poor household perceived benefits from upgrading low grade roads to year

round access. Benefits were numerous in the price of goods and in the removal of health hazards from dusty roads.

Figure 4.16: Distance of household from the closest length of road that is being maintained



Seventy-two percent of the Zibambele participants live 301-500m in distance away from the closest road being maintained, 8% indicated a distance of 501-700m, 14% illustrated a distance of less than 100m and 6% said that they live 101-300m away from the maintained road (Figure 4.17). Thirty-one percent of the non-participants live a distance of 101-300m away from the maintained road, 24% of respondents live 301-500m in distance away from the closest road being maintained, 30% indicated a distance of 501-700m, 15% of the non-participants illustrate the distance of the household as being less than 100m away from the maintained road.

Figure 4.16 illustrates that most Zibambele participants live much closer to the rural maintained roads than the non-participants. A key feature of the lengthmen system is that lengthmen must generally reside adjacent to or close to the road being maintained and therefore does not require government accommodation or transport (Taylor, 1993). The

Zimbabwe programme can, therefore, be seen as being in keeping with the objectives of the lengthmen system.

Figure 4.17: Frequency of use of the maintained road

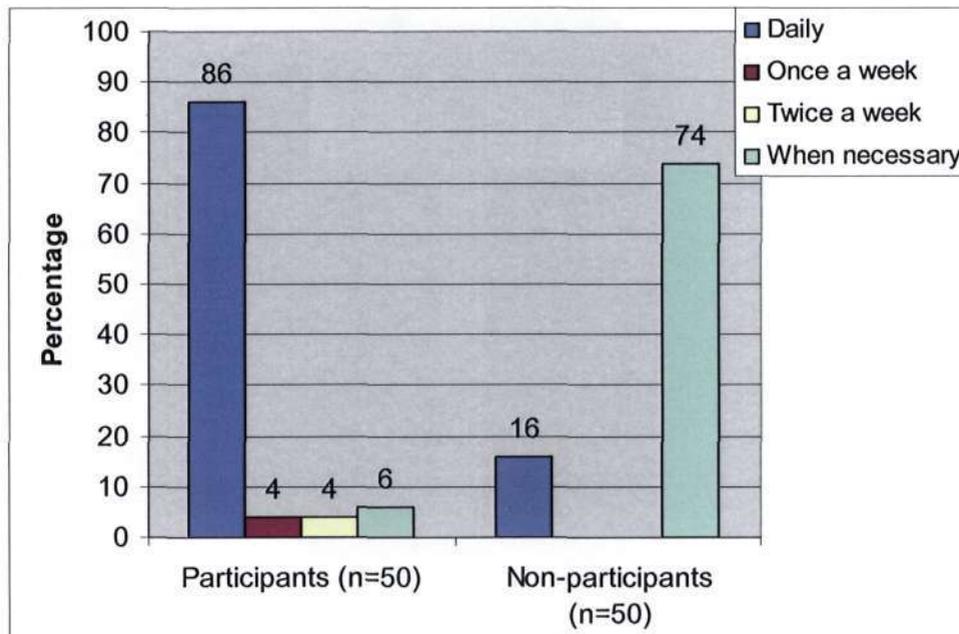


Figure 4.17 demonstrates the frequency of use of the maintained road by the households. Eighty six percent of Zimbabwe participants use the road on a daily basis, 4% use the road once a week, a further 4% use the road twice a week and 6% of respondents indicated that they use the road when it is necessary. Seventy-four percent of the non-participant respondents indicated that they use the road when it is necessary and 16% of the respondents indicated that they use the road on a daily basis.

All responses from surveyed households indicated that an increase has been noted in the number of vehicles that use the road after the implementation of the Zimbabwe rural road maintenance programme. This could be due to the improvement in the condition of the road.

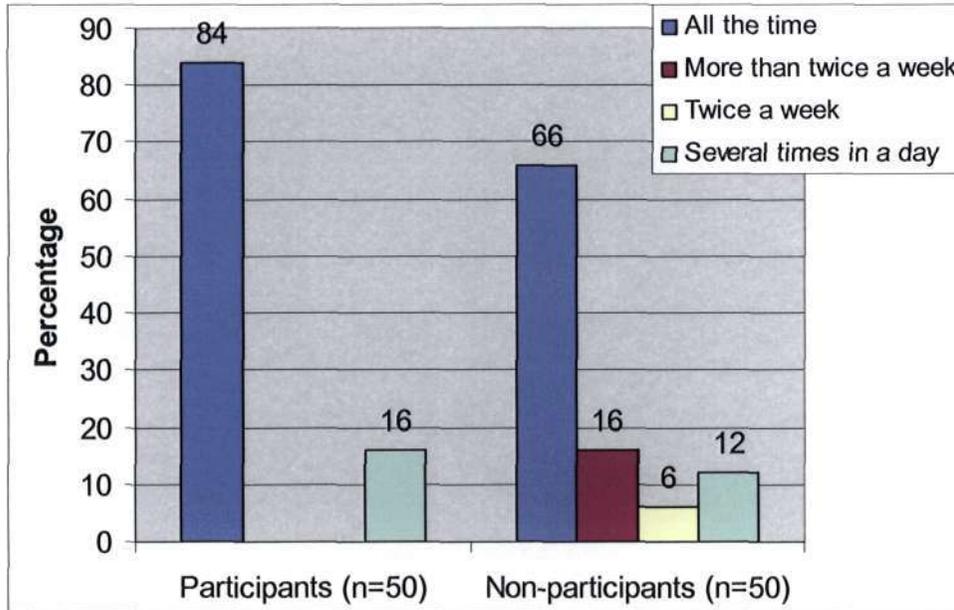
Table 4.22: Type(s) of vehicles that use the maintained road: Multiple Responses (Participants)

Type(s) of vehicle(s)	Participants (n=50)	
	<i>f</i>	%
Bicycle	17	34
Car	45	90
Bus	26	52
Mini bus taxi	6	12
Heavy vehicles e.g. trailers/ trucks	44	88
Animal drawn vehicles e.g. carts	26	52

Thirty-four percent of the Zibambele participant respondents stated that bicycles make use of the maintained road, 90% have noticed cars on the road, 52% indicate that the road is a bus route and 12% have observed taxis on the road (Table 4.22). The vast majority of respondents (88%) indicate that heavy vehicles are frequently using the maintained road, while 52% pointed out the use of animal drawn vehicles such as carts on the maintained road.

The results indicate that cars and heavy vehicles frequently use the maintained rural roads. This could be due to the carrying of agricultural goods, mainly sugar cane from the rural area to the markets. Intermediate transport is most frequently used by the poor in rural areas, and includes walking, bicycles, handcarts, wheelbarrows and animal drawn carts (ITDG, 2005). The results in the table 4.22 indicate that the maintained road is frequently used by intermediate transport such as bicycles, and animal drawn vehicles such as carts. This is probably because alternative means of transport are more feasible than motorised vehicles.

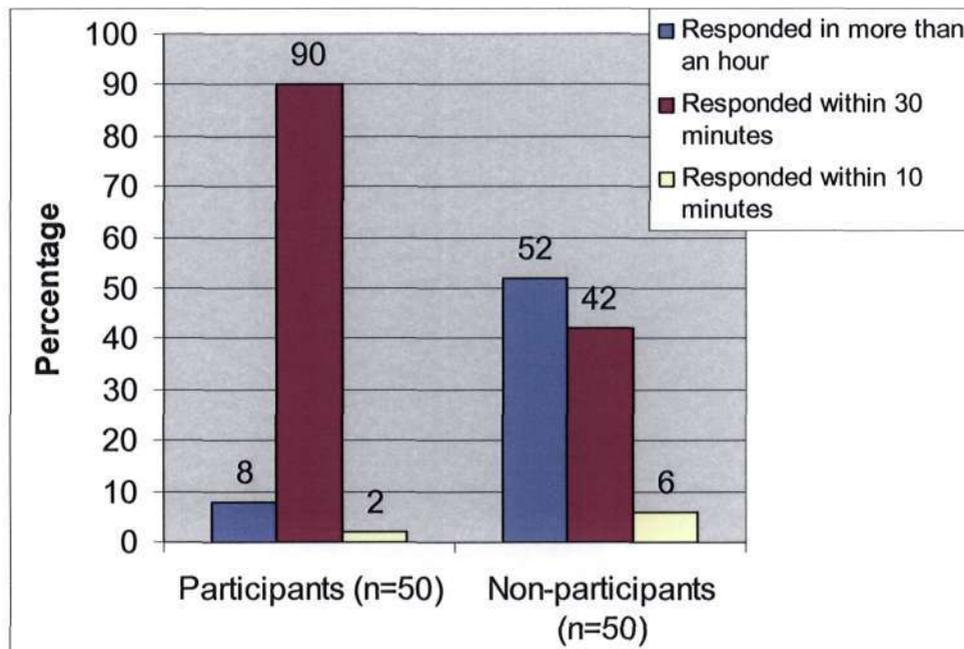
Figure 4.18: Frequency of maintained road use by vehicles



Eighty-four percent of Zimbabwe participants said that the vehicles that were identified in Table 4.22 use the maintained road all the time, while 15% said that the vehicles make use of the road several times in a day (Figure 4.18). Sixty-six percent of Zimbabwe non-participants said that the vehicles use the maintained road all the time, while 12% said that the vehicles make use of the road several times in a day. Sixteen percent of the non-participants indicated that the vehicles make use of the maintained roads more than twice a week and 6% indicated that they use the maintained road twice a week.

These results indicate the importance of the road to be maintained continuously since vehicles require the use of the road at all times. With vehicles making frequent use of the maintained road, travel would be more common and will impact on the socio-economic status of rural communities. Vehicles using the maintained road are mainly to access educational and employment opportunities, health facilities, markets, and friends and relatives that exist outside the rural community. Motorised public and private transport services concentrate on main routes from communities to market towns and from towns to cities, where there is greater demand and better infrastructure (Starkey, 2002). Improved interconnecting routes will also promote the establishment of rural markets.

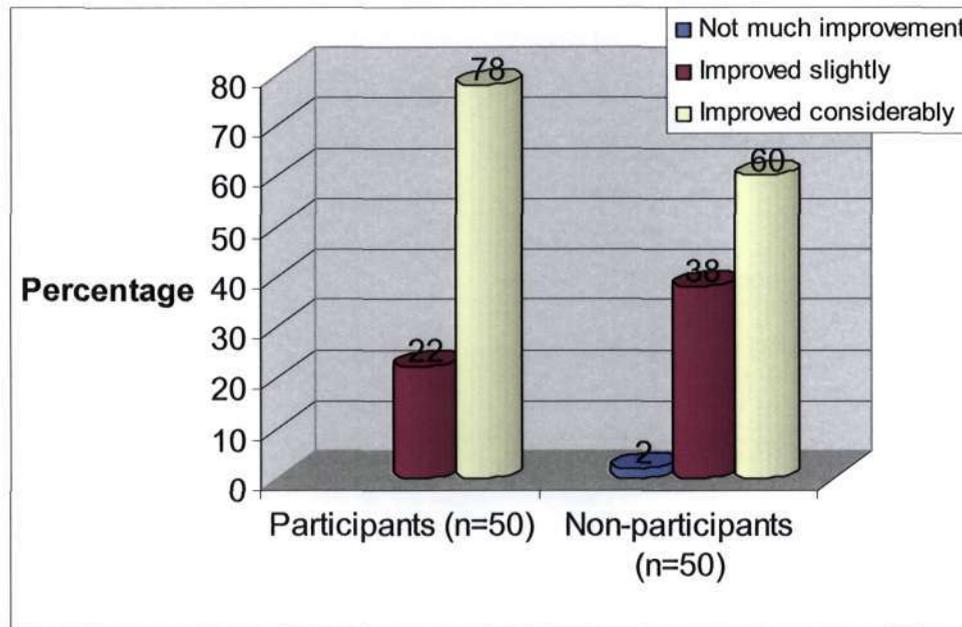
Figure 4.19: Response of Emergency Vehicles such as ambulance and police services to current location before the road could be maintained



The response of emergency vehicles before the road could be maintained is shown in Figure 4.19 above. Ninety percent of Zimbabwe participants indicated that emergency vehicles such as the ambulance and police responded within 30 minutes before the road could be maintained. Eight percent of participant responses indicated that emergency vehicles took more than an hour to respond, and one participant said that emergency vehicles responded within 10 minutes. Fifty-two percent of non-participants indicated that emergency vehicles took more than an hour to respond before the road could be maintained, 42% indicated that emergency vehicles such as the ambulance and police responded within 30 minutes before the road could be maintained and a small percentage of non-participant responses (6%) were that emergency vehicles responded within 10 minutes. These results depend on the access and location of the emergency services. The reasons given for the response of emergency vehicles before the road could be maintained was that the road was in a deteriorating condition before the Zimbabwe programme could be implemented. Respondents indicated that the road consisted of potholes and ruts. Additionally, uneven slopes and large bushes on the sides of the roads

hindered the use by vehicles and therefore delayed emergency vehicles accessing the households.

Figure 4.20: Rating of the response from emergency vehicles to your current location after road has been reconstructed and maintained



Seventy-eight percent of respondents point out that the response from emergency vehicles has improved considerably after the implementation of the road maintenance programme (Figure 4.20). Twenty percent said that the response of emergency vehicles has improved slightly. Sixty percent of non-participants indicated that the response from emergency vehicles has improved considerably after the implementation of the road maintenance programme. Thirty-eight percent of the non-participants said that the response of emergency vehicles has improved slightly. The reasons forwarded by the respondents (participants and non-participants) for the increase in response rate of the emergency vehicles were that the road was difficult to access before road maintenance could be implemented and consisted of potholes and ruts that were not repaired. Many respondents indicated that the road condition was deteriorating rapidly before the implementation of the Zibambele programme. Furthermore, respondents believed that the clearing of vegetation from road sides, repairing of potholes and ruts, and the reshaping of the road structure made access to their locations less difficult and less time-consuming.

Image 4.3 below illustrates a rural access road that has been reshaped and maintained to improve access to farm households. One non-participant indicated that there has not been much improvement in the response of emergency vehicles although the road is being maintained and felt that participants were not maintaining the road properly.



Image 4.3: Umbumbulu access road that has been reshaped and maintained

Table 4.23: Impact of rainy weather on the use of the road before the road could be maintained (Non-Participants)

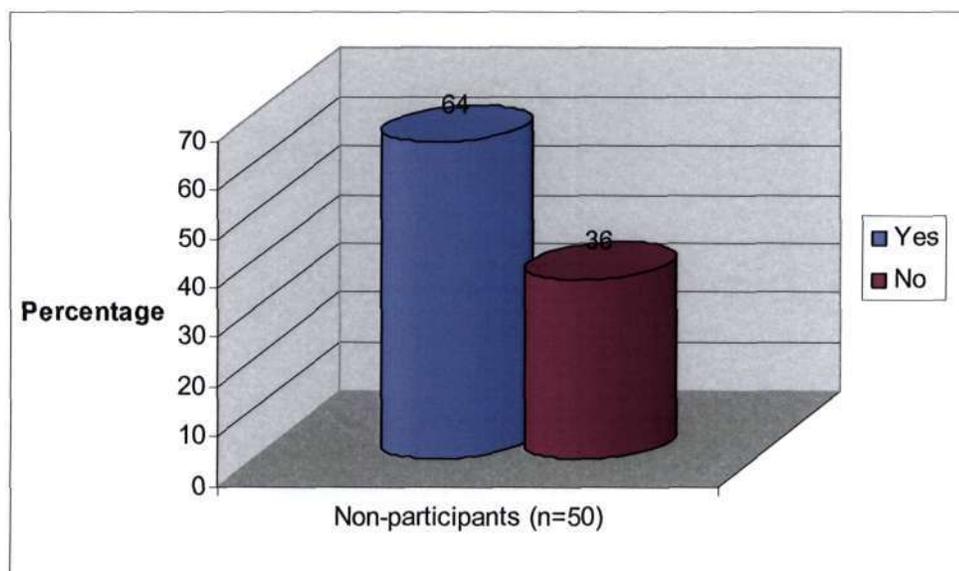
Response	Non-Participants (n=50)	
	<i>f</i>	%
Yes	33	66
No	17	34

According to all Zimbabwe participants' surveyed, rainy weather impacted on the road negatively before the road could be maintained. This is because the road was deteriorating; there was significant amount of soil erosion and water runoff; and potholes used to accumulate with water thereby making it difficult for vehicles to use the road. All participants further agreed that road maintenance has had a positive impact on the use of the road during rainy weather because drainage systems are now kept clear to facilitate the water runoff, potholes have been fixed and the road is in a good condition to use even when it rains.

Sixty-six percent of the non-participants that were interviewed indicated that the road was unusable as a result of rainy weather. The reasons forwarded by the non-participants for the impact of rainy weather on the road use was that the road consisted of potholes and ruts that accumulated water during the rainy weather, and the side drains were not cleared for the flow of runoff. This situation created soil erosion and made the roads muddy and inaccessible. Thirty-four percent of the non-participants that were interviewed said that rainy weather did not have a significant impact on the use of the road and that roads were still inaccessible after the implementation of the road maintenance programme.

4.2.5 Zimbabwe Participants Perceptions on the Zimbabwe Programme and Poverty Alleviation Programme

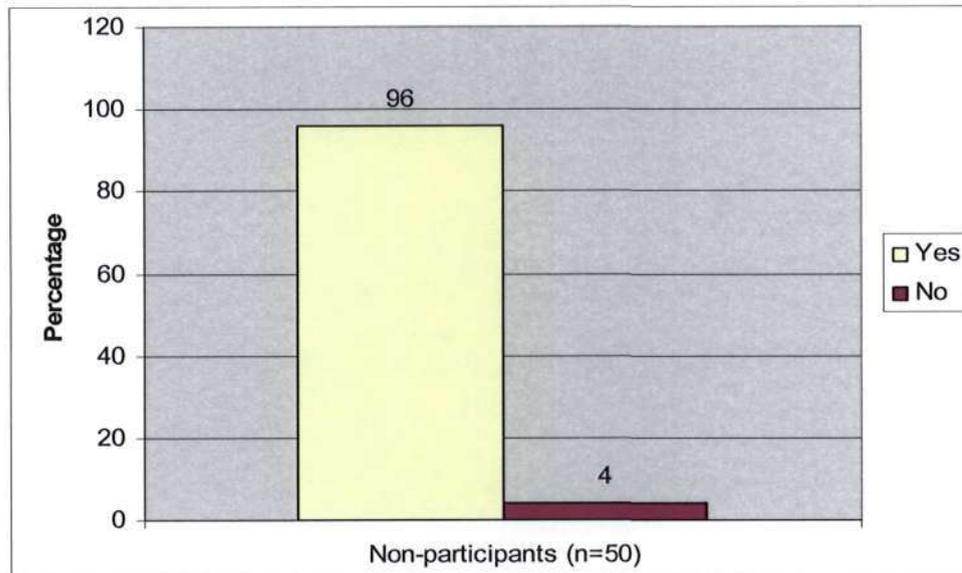
Figure 4.21: Respondents satisfaction with the Zimbabwe road maintenance programme (Non-participants)



All Zimbabwe participants indicated that they are satisfied with the programme since it enables them to receive an income and it keeps the road in good condition simultaneously. The programme has created opportunities for the participants to receive an income and thereby provide the participants with some basic needs such as food, shelter, clothing, school fees and medical treatment. Income generated from the programme helps the participants pay for other expenses such as sources of fuel, water and building materials. Furthermore, the programme has enabled participants to access services and markets in other areas during rainy weather because roads are repaired and continually being maintained.

Figure 4.21 indicates that 64% of the non-participants that were interviewed said that they were satisfied with the Zimbabwe labour-based rural road maintenance programme because it provided the poorest community members with employment and maintained the roads at the same time. However, 36% of the non-participants were dissatisfied and felt that Zimbabwe participants were not carrying out their maintenance tasks properly. The results obtained from the participants and non-participants indicate that the Zimbabwe labour-based rural road maintenance programme has produced results in targeting poverty in the area and has further provided opportunities for those members that were normally excluded because of their lack of education and poverty status. Although 36% of the non-participants indicated that they were dissatisfied with the programme because they felt that the participants were not maintaining the road properly, this dissatisfaction did not appear to be widespread in the community.

Figure 4.22: Respondents and household members consulted about the Zibambele programme/ project (Non-participants)



All participants indicated they were consulted about the programme before it could be implemented. The consultation process is of significant importance to the determination of people's attitudes, feelings and views about the implementation of the programme as well as the benefits the programme could provide to the community members. The Zibambele consultation process will be discussed further in the figures that follow.

Figure 4.22 indicates that 90% of the non-participants that were surveyed indicated that they were consulted about the Zibambele programme, while 4% said that they were not consulted by anyone about the programme. The ninety percent of non-participants that indicated that they were consulted about the Zibambele programme indicated that they were invited to attend a roadside meeting that was held by the Zibambele area manager and the community members. The two non-participants that indicated that they were not consulted about the programme were not present in the community when the programme was implemented because they were away undertaking migrant work.

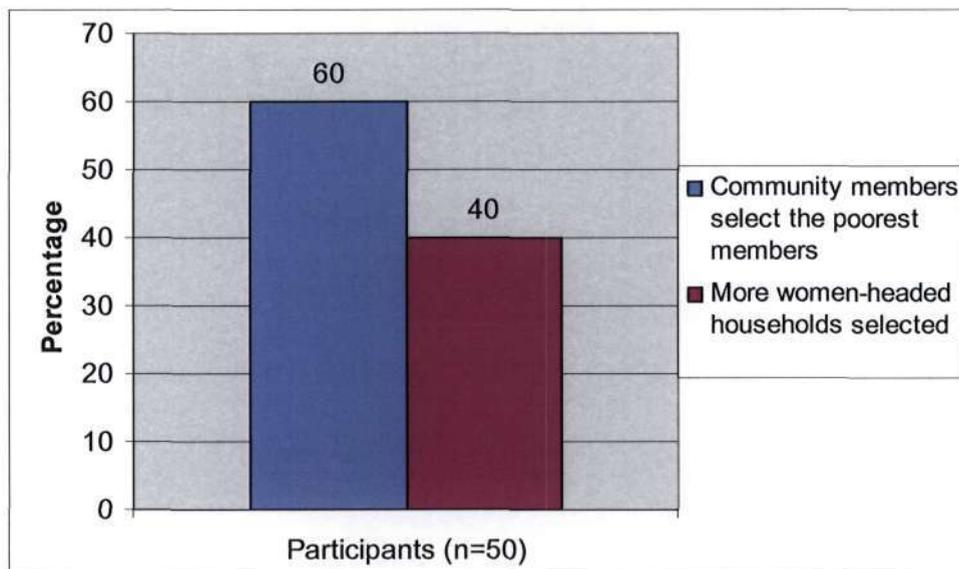
Table 4.24: Method used to inform respondents and household members about the road maintenance programme: Multiple Responses

Way Informed	Participants (n=50)		Non-participants (n=50)	
	<i>f</i>	%	<i>f</i>	%
Through government authorities	34	68	3	6
Traditional authorities	46	92	45	90
Local district councillors	7	14	18	36
Word of mouth from family/ friends	-	-	19	38

Ninety-two percent of participants said that they were consulted by the traditional authorities and indunas of the community on the Zibambele programme, while 68% indicated that government authorities were also involved in the consultation process with the Zibambele participants. Fourteen percent of participants indicated that they were consulted by local district councillors.

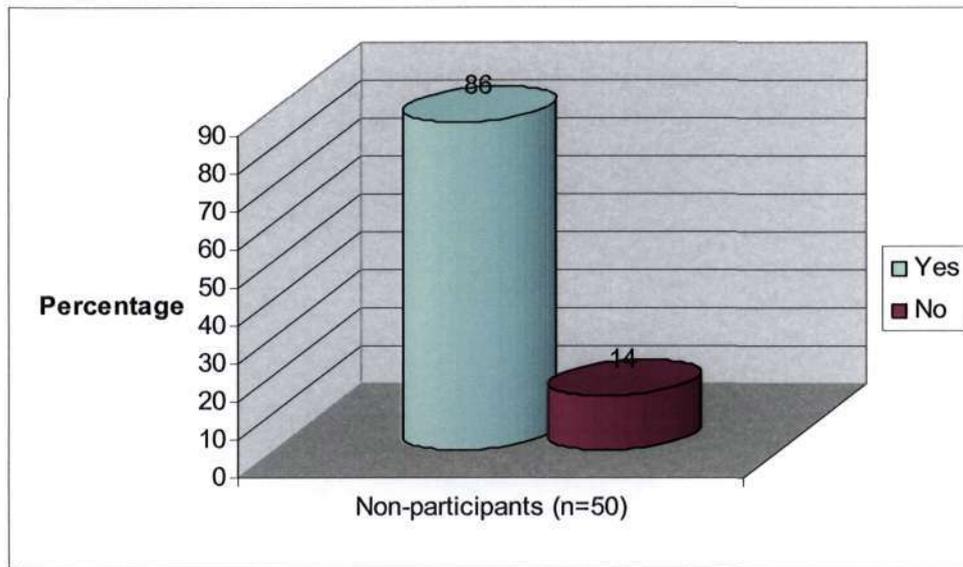
Ninety percent of non-participants said that they were consulted by the traditional authorities and indunas of the community on the Zibambele programme, while 6% indicated that government authorities were also involved in the consultation process with the community members. Thirty-six percent of respondents indicated that they were consulted by local district councillors and 38% of respondents indicated that they were also told about the programme by word of mouth from family and friends. These statistics are considerably pleasing to note, since the community was consulted in one way or another about the programme and was not excluded from the process.

Figure 4.23: Method used for household selection and awarded Zibambele contracts (Participants)



Sixty percent of participants surveyed indicated that households were selected by members of the community, while 40% of the participants indicated that more women-headed households were selected to be awarded road maintenance contracts. During the focus group discussion Zibambele participants indicated that candidate roads were first identified by a Zibambele area manager from the Department of Transport, who then informed the local induna of the area about the programme objectives. The local induna then extended an invitation to all community members to attend a roadside meeting that was held by the Department of Transport officials. At the meeting, community members were asked to identify the poorest households in the community that are in need of employment. The community members selected households that were the most poor and required employment, especially women headed households and contracts were allocated to the houses at a separate meeting.

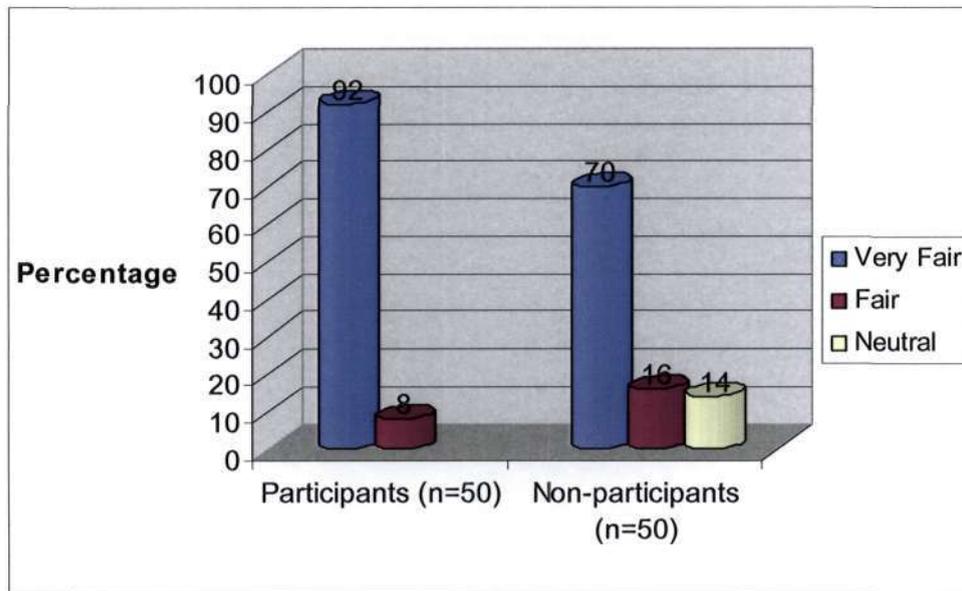
Figure 4.24: Respondents satisfaction with the selection process



All participants that were interviewed indicated that they were pleased with the selection process because the programme allowed for a community-driven process and the community members were responsible for choosing the households and not the government. The participants indicated that all the members of the community were given the chance to identify those households that were poorer than the rest and then contracts are awarded to those households that were most deserving.

Eighty-six percent of the non-participants that were interviewed indicated that they were satisfied with the selection process because the programme focused on facilitating poverty reduction and allowed for a community-driven process whereby the community members were responsible for choosing the households that were most deserving of a maintenance contract and not the government. However, 14% of the non-participants were not satisfied with the selection process because they felt that they were excluded and were also in need of a Zimbabwe maintenance contract.

Figure 4.25: Respondents rating of the selection process



Ninety-two percent of respondents rated the selection process as being very fair since it was a community-driven process, however, 8% of respondents felt the process was fair. Seventy percent of non-participants rated the selection process as being very fair since it was a community-driven process and contracts were awarded to the poorest households in the community. Eight percent of respondents felt the process was fair since it was members of the community that identified the most deserving households. Fourteen percent of non-participants were neutral to rating the selection process.

Table 4.25: The impact of Zimbabwe road maintenance programme on various aspects (Participants)

Aspects	Participants (n=50)					
	Better		Unchanged		N/A	
	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%
Collection of firewood/ water	47	94	1	2	2	4
School attendance	49	98	-	-	1	2
Church	26	52	23	46	1	2
Local clinics	12	24	37	74	1	2
Mobile clinics	1	2	48	96	1	2
Community centres	48	96	1	2	1	2
Neighbouring communities	48	96	1	2	1	2
Travel to main town/ city	48	96	1	2	1	2
Visiting other residents	48	96	1	2	1	2

Table 4.26: The impact of Zimbabwe road maintenance programme on various aspects (Non-participants)

Aspects	Non-participants (n=50)					
	Better		Unchanged		N/A	
	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%
Collection of firewood/ water	38	76	3	6	9	18
School attendance	41	82	-	-	9	18
Church	40	80	1	2	9	18
Local clinics	30	60	11	22	9	18
Mobile clinics	-	-	41	82	9	18
Community centres	20	40	29	58	11	22
Neighbouring communities	32	64	7	14	11	22
Travel to main town/ city	35	70	6	12	9	18
Visiting other residents	32	64	9	18	9	18

It was clear in the literature review that poor transport and communication infrastructure impact negatively on rural women. Peters (2002) indicated that women have continued to be used as transporters of heavy loads such as firewood, water and other products, which they carry on their heads and backs. This has a negative impact on their well-being.

According to Peters (2002), an improved rural transport infrastructure has a positive impact on the livelihoods of rural women. It was further stipulated by Lungu and Price (not dated) that improved rural roads can improve women's health, and generally their social welfare will also improve. Tables 4.25 and 4.26 illustrate the impact of the Zibambele programme on various aspects. Ninety-four percent of the participants felt that the collection of firewood is better now after the start of the road maintenance programme, one participant felt that collection of firewood remains unchanged and two participants did not respond. With regards to the non-participants, 76% of the non-participants felt that the collection of firewood was better now after the start of the road maintenance programme. This is because roads are well maintained and bushes are cleared making it safe for community members to collect firewood in the forests. Six percent of respondents felt that collection of firewood remains unchanged and 18% of non-participants did not respond.

Ninety-eight percent of Zibambele participants indicated that school attendance was significantly better now because they are able to pay school fees and transport costs, while one participant did not respond. Eighty percent of non-participants indicated that school attendance was significantly better now because roads are more accessible, while 18% of non-participants did not respond.

With regards to church attendance, 52% of Zibambele participants said that it was better because they now have money for bus fares. Forty-six percent of respondents indicated that attendance to church was unchanged, while one participant did not respond. Eighty percent of non-participants said that church attendance is better, 2% of respondents indicated that church attendance is unchanged, while 18% of non-participants did not respond.

Twenty-four percent of the participants indicated access to local clinics as being better because they have access to transport. However, 74% of participants indicated that access to clinics has not changed. One participant did not respond. Sixty percent of non-participants indicated access to local clinics as being better because they have access to

transport, however, 22% indicate that access to clinics have not changed. Eighteen percent of the non-participants did not respond.

One participant surveyed indicated that access to mobile clinics are better, while 96% of participants and 82% of the non-participants were of the opinion that access to mobile clinics remain unchanged because mobile clinics continue to come once a week and not more often. One participant did not respond. Eighteen percent of non-participants did not respond.

Ninety-six percent of Zibambele participants agreed that access to community centres is better because the road maintenance programme affords them transport fares when there is a community meeting or function. One participant indicated that access to community centres remains unchanged, while a further participant did not respond. Forty percent of non-participants agreed that access to community centres is better, 38% of responses were that access to community centres remains unchanged, while 22% of the non-participants did not respond.

In relation to travel to the main town/ city, 96% of respondents indicated that it is better because they have money to pay for their transport costs and purchase the items they require such as food. One participant felt that access to the main town/city had not changed for them because the money earned is too little. One participant did not respond. In regard to non-participants, 70% indicated that it is better, while 12% of non-participants stated that access to the main town/ city has not changed for them. Twenty-two percent of non-participants did not respond.

Ninety-six percent of Zibambele participants said that visiting other households and neighbouring communities are better now because the roads are in a good condition, while one respondent said that access to visiting other households and neighbouring communities remain unchanged. One participant did not respond. Sixty-four percent of non-participants said that visiting other households and neighbouring communities are better now because the roads are in a good condition, while 14% said that access to

visiting other households and neighbouring communities remain unchanged. Twenty-two percent of non-participants did not respond.

Sixty-four percent of non-participants indicated that it is now better to visit other residents in the community because roads are clear of dirt and obstructions and looks aesthetically pleasing, while 18% of respondents felt that there has been no change. Eighteen percent of the non-participants did not respond.

The literature review gives evidence that improved accessibility through rehabilitation and maintenance of the road infrastructure encourages the formation of self-help committees along the improved roads which has a positive impact on the livelihood of the community (Lungu and Price, not dated). The maintenance of rural roads is viewed as enhancing socio-economic status of the community as well as that of the country. Lungu and Price (not dated) further assert in the literature review that the ease of mobility has the ability to effectively improve communication with other communities in neighbouring areas, thereby setting a forum for exchange of ideas and social integration. It also will enable access to social services.

It is evident in Tables 4.25 and 4.26 that the maintained rural roads have impacted positively on the lives of the respondents (participants and non-participants). The majority of respondents indicated that access to the specified areas has improved for the better. The reasons forwarded by the respondents were that the maintained roads are now repaired and bushes and dense vegetation are cleared making it easy to walk on the roads. Respondents also indicated that they are able to use the road during rainy weather since potholes and ruts that accumulate water and cause erosion and runoff have been repaired. Many respondents also felt that the maintenance of the rural roads made the road far more evenly textured, less muddy and less slippery. Therefore, access during the rainy weather has improved. Many women respondents also indicated that they feel a sense of safety to travel on the maintained road. It was indicated during the focus group discussion that bushes and dense vegetation made them easy targets for crime and violence. Furthermore, before the road could be maintained the criminals used the bushes and dense vegetation to hide and escape. Although there were a few respondents that

indicated that access to the specified areas have not changed, their feelings and views are not widespread.

Table 4.27: The benefits that Zibambele provides to the community members: Multiple Responses

Benefits	Participants (n=50)		Non-Participants (n=50)	
	<i>F</i>	%	<i>f</i>	%
An income to the household	50	100	50	100
Savings clubs	50	100	50	100
Skills/ training	50	100	50	100
Social gathering	38	76	50	100

All respondents (participants and non-participants) indicated that Zibambele has provided community members with an income, has introduced community members to saving clubs, and has provided community members with skills and training. Seventy-six percent of participants indicated that Zibambele has facilitated the emergence of social gatherings. All non-participants agreed that the programme provides community members with an opportunity to access savings clubs, provides skills and training, and facilitates social gatherings. According to the Construction Industry Development Board (2004), the following issues should be addressed in labour-based projects: promote community development and promote community involvement; impart technical skills to the unskilled and semi-skilled members of the community; transfer administrative, commercial and management skills to the community; retain funds expended on the project within the community; and develop contractors from within the community in which roads are to be constructed. Clearly, respondents feel that some of the issues raised are being addressed by the Zibambele programme.

With regards to the Zibambele rural road maintenance programme, the use of labour-based technologies addresses a broad array of other problems such as the creation of employment opportunities for those least able to compete on the job market; placing emphasis strongly on local labour, local expertise and locally available resources; and the training of participants on the technical aspects of road construction and maintenance, as

well as the administrative aspects of the project management is provided (Zimbabwe, 2005). Again, the results indicate that the respondents generally perceive that the Zimbabwe programme is having several positive impacts and achieving intended broader objectives.

Table 4.28: Benefits of the maintenance contract of a length of road for the household (Participants)

Benefits	Participants (n=50)	
	<i>f</i>	%
Zimbabwe has provided me with a sense of independence	40	80
I am now able to provide for my children's needs	33	66
I do not have to rely on the male members	36	72
I can now afford to buy things for my house	30	60

Table 4.28 illustrates the benefits that the maintenance contract has for the participants. Eighty percent of the participants indicated that the Zimbabwe programme has provided them with a sense of independence, 66% felt that Zimbabwe has enabled them to provide for their children's needs, 72% said that they do not have to rely on the male members of the household and 60% indicated that they can now afford to buy things required for their homes. It is evident from the results presented in the Table 4.27 that participants feel much more empowered after being awarded a maintenance contract. This is due to the income they receive, which enables them to provide and cater for their needs without having to rely on male members of the household.

All Zimbabwe participants responded that there are no disadvantages of Zimbabwe and there are only advantages to the programme such as employment generation and road improvements. Zimbabwe has enabled the participants to put food on their tables and has afforded them the opportunity to make-decisions regarding their households. Other benefits that have been accrued through Zimbabwe relate to shelter, clothing, school fees, and medical treatment. Zimbabwe has also assisted participants with the opening of saving accounts that enables participants to save for the implementation of other income generating projects. It is also worth noting that several respondents, especially women

indicated that participating in the programme benefited them at a personal level by providing them with a sense of independence.

Table 4.29: Participants level of satisfaction with the following statements

STATEMENT	Participant (n=50)							
	Strongly Agree		Agree		Neutral		Disagree	
	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%
Zimbabwe has changed my life for the better	50	100	2	4	-	-	-	-
Zimbabwe makes me feel proud to be part of the community	48	96	12	24	-	-	-	-
Being selected as part of Zimbabwe has given me a new hope in life	37	74	12	24	-	-	1	2
I've acquired skills and knowledge through Zimbabwe	38	76	3	6	-	-	-	-
I am now independent and can stand up for my own needs	40	80	2	4	7	14	-	-
Working for Zimbabwe gives me a chance to voice my opinions on road construction and development	35	70	4	8	10	20	3	6
Zimbabwe has provided me with access to credit institutions	44	88	11	22	2	4	-	-
I can now save for starting my own business	36	72	4	8	3	6	-	-
Zimbabwe has put food and other living essentials on my table	46	92	13	26			-	-
Through Zimbabwe, roads are improved and access to markets, school, clinics, etc. are quicker and efficient.	37	74	4	8	-	-	-	
Zimbabwe provides economic as well as social upliftment	38	76	12	24	8	16	-	
Zimbabwe centres around the strengthening of women headed households	38	76	5	10	-	-	-	-
My children can now afford to attend school and pay for fees.	45	90	-	-	-	-	-	-

Table 4.29 indicates the respondents' level of satisfaction with the Zimbabwe rural road maintenance programme. All participants strongly agree that Zimbabwe has changed

their lives for the better. Ninety-six percent of respondents felt that they strongly agree that the programme makes them feel proud to be part of the community, while 4% agree that Zibambele makes them feel proud to be part of the community.

Seventy-four percent of participants indicated that they strongly agree that being selected as part of the community has given them hope for a new life, while 24% agree with the statement, while one participant disagreed. Seventy-six percent of participants indicated that they strongly agree that they have acquired skills and knowledge through Zibambele and 24% indicated agreement. Eighty percent of respondents strongly agree that they are now independent and can stand up for their own needs, 6 agree with the statement and 14% were neutral.

According to the table, 70% of participants surveyed indicated that they strongly agree that Zibambele gives them a chance to voice out their own opinions on road maintenance and development, 4% agree, 20% remain neutral and 6% disagree with the statement. Eighty-eight percent of respondents strongly agreed that Zibambele has provided them with access to credit institutions, 8% agree with the statement, and 4% remained neutral. Seventy-two percent of the participants strongly agreed that they can now start saving for their own businesses, 22% agreed with the statement, while 6% of the responses were neutral.

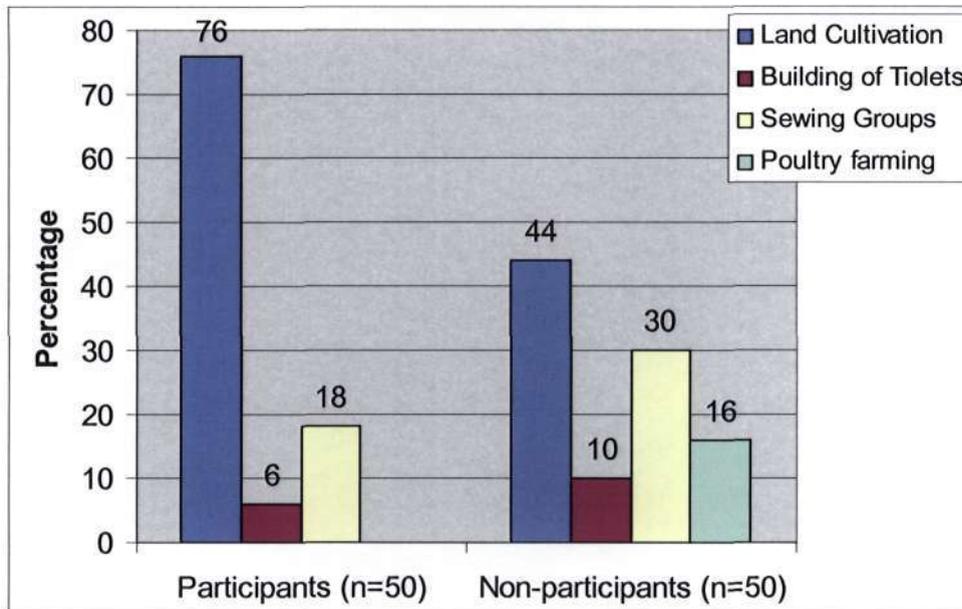
With regards to the statement that Zibambele has put food and other living essentials on the participant's table, 92% strongly agreed, while 8 percent agreed. Seventy-four percent of respondents strongly agreed that through Zibambele access to markets, schools, clinics, etc. are quicker and more efficient. Twenty-six percent of respondents agreed to the statement. Seventy-six percent of respondents strongly agreed that Zibambele provides social as well as economic upliftment, 8% agreed and 16% were neutral to the statement. Seventy-six percent of respondents strongly agreed that Zibambele revolves around the strengthening of women-headed households and 24% of respondents agreed. Ninety percent of the participants surveyed strongly agreed that through Zibambele their children

can now afford to go to school and pay school fees. Ten percent of respondents agree that it is true that their children can now afford to go to school and pay school fees.

Table 4.29 indicates a wide range of linked benefits for the Zibambele participants that are economic, social and personal in nature. Many respondents indicated that the Zibambele programme emphasises the strengthening of women-headed households and therefore has provided them with new hopes and dreams for a better quality of life. Respondents indicated that the Zibambele programme has enabled them to receive an income, which is used for a variety of households needs, such as food, clothing, school fees, etc. The programme has also facilitated participants' access to credit institutions. Thus, participants indicated that they are now able to start saving for starting their own income generating projects. It was further indicated by the participants that the programme has assisted them with the provision of skills and knowledge. This creates a feeling of independence and confidence for participants to make decisions concerning them and to voice their opinions regarding their households and their needs. Furthermore, participants indicated that the Zibambele programme has improved the condition of the rural roads, which in turn has improved access to schools, markets, clinics, neighbouring communities, etc. Participants indicated that access to the specific areas is safer, quicker and more efficient.

All responses (participants and non-participants) indicated that the Zibambele programme will help improve the development of the area by encouraging other labour-based programmes to take place in the community as well as facilitating the upgrade of infrastructure in the community. This aspect is examined in greater detail below.

Figure 4.26: Projects that have started in the area



Seventy-six percent of participants indicated that land cultivation projects have started in the area, 18% pointed out that sewing group projects have recently started and 6% said that a project that builds toilet facilities has also started in the community. A total of 44% of the non-participants indicated that land cultivation has started in the area following the implementation of the Zimbabwe rural road maintenance programme. Thirty percent of the non-participants indicated the development of sewing groups in the area, 16% noticed the inception of poultry farming and 10% are aware of the project that has begun to build toilets in the area. All respondents (participants and non-participants) indicated that there should be more government initiated labour-based programmes in the area.

Table 4.30: Problems generally facing the community: Multiple Responses

Problems facing the community	Participants (n=50)		Non-Participants (n=50)	
	<i>f</i>	%	<i>f</i>	%
Unemployment and Poverty	50	100	50	100
Lack of facilities such as clinics and libraries	50	100	46	92
Lack of skills training	49	98	42	84
HIV/AIDS	43	86	50	100
Tuberculosis	41	82	30	60
Lack of sports centres and grounds	41	82	36	72

With regards to the problems generally facing the community, all respondents (participants and non-participants) indicated that the community suffers from high levels of unemployment and poverty. All the Zibambele participants and 92% of the non-participants indicated that the community lacks facilities such as clinics and libraries. Ninety-eight percent of Zibambele participants and 84% of the non-participants responded that the community members lack skills training. Eighty-six percent of Zibambele participants and all non-participants found HIV/AIDS to be a major problem in the area. Eighty-two percent of participants and 60% of non-participants identified tuberculosis (TB). A further 82% of participants and 72% of non-participants indicated that the community lacked sport centres and a proper sports ground. These results demonstrate the urgent need for interventions aimed at alleviating the high unemployment levels that exist in the community as well the necessity and urgency for the provision of infrastructure services such as clinics and libraries, skills training centres and sporting facilities.

4.3.1 Direct Observation

Direct observation was conducted in the Umbumbulu community during several field visits. The following observations were made:

- It was observed that rural roads in the area are currently being maintained from Mondays to Thursdays and appear to be in a good condition for the daily utilisation by mobile vehicles and people.

- It was found that many households in the area have access to piped water and electricity, however, it was observed by the researcher that a few members of the community (women and children) still collected water from the nearby rivers and streams for their domestic uses, and fuel sources such as wood from the nearby bushes and forest areas for domestic cooking, heating and lighting.
- It was evident that taxis and buses were available to the community, however these services were observed to be accessible only on the provincial and main roads and to a limited extent on the rural roads. The taxis and buses were not observed to enter the rural dirt and gravel roads that led to households in the community.
- The researcher further observed the presence of primary and secondary schools in the area, which were located far (5 km) from several communities in the Umbumbulu area.
- Women in the area were observed while working on sugar cane fields and small patches of maize and other vegetable gardens.
- It was clear that most homesteads in the area were scattered and therefore access to community facilities such as schools and clinic were difficult for some households.

4.3.2 Ranking Exercise

The community members that were present at the focus group meeting raised several concerns about issues prevalent in the Umbumbulu community. The concerns were first identified and noted on paper and then the community was asked to rank the issues in order of the most disturbing and difficult to overcome to the least troublesome issues. The tables below illustrate the communities concerns (Table 4.31) and ranks them in order of importance (Table 4.32).

Table 4.31: Problem Ranking Matrix

Problems	(EO)	(ED)	(C)	H/A	(C/V)	(L)	(AG)	(T)
Employment opportunities (EO)	<input type="checkbox"/>	EO	H/ A	C	EO	ED	EO	ED
Education (ED)	<input type="checkbox"/>	<input type="checkbox"/>	T	H/ A	EO	EO	EO	EO
Clinic (C)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	T	ED	ED	T	ED
HIV/ AIDS (H/ A)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	EO	ED	ED	C
Crime/ Violence (C/V)	<input type="checkbox"/>	ED	EO	EO				
Libraries (L)	<input type="checkbox"/>	ED	EM					
Agricultural land. (AG)	<input type="checkbox"/>	EO						
Transport (T)	<input type="checkbox"/>							

Table 4.32: Community Problems

Problem	Scoring	Rank
1. Employment opportunities	11	1
2. Education	9	2
3. Clinics	2	4
4. HIV/AIDS	2	4
5. Crime	0	6
6. Libraries	0	6
7. Agricultural Land	0	6
8. Transportation	3	3

Matrix ranking is a grid which represents relative value or preferences that is achieved by creating hierarchies of activities or items (Wilde and Mattila, 1996). The ranking exercise results presented in Table 4.32 indicates that the major problem in the Umbumbulu area, according to the community members, is the lack of employment opportunities. The lack of employment opportunities is seen by the community members as a major factor contributing to their poverty status. Education was ranked as the second important

problem in the area. Community members said that the schools are located a far distance away from the households and that most schools are in a poor condition. Community members felt that there is an urgent need for more schools in the sub-wards. Transportation was ranked as a third concern by the community members. The community found it difficult to access taxis and buses on the main road to travel to the main town frequently. HIV/AIDS and the absence of clinics were ranked fourth during the ranking exercise. Respondents indicated that the local clinic is situated far from the households and that HIV/AIDS is a major concern in the community since many people are infected and are not receiving proper medical treatment.

It was further indicated that a mobile clinic comes once a week to the area. Respondents felt that the mobile clinic should come more frequently. Many community members are infected in the area and are not undergoing treatment. Crime, libraries and agricultural land were ranked last as problems of concern by the community members. However, respondents indicated that there is a lack of enough land for community members to engage in crop production. According to the respondents, crime is a rife in the area and community members are afraid of being attacked. Furthermore, there is a lack of library services in the area.

It is important to understand that transportation has a direct influence on other problems that were identified and ranked by the respondents. Well maintained rural transportation infrastructure has proven to link poor communities to employment sectors and facilitate the provision of services such as mobile clinics and libraries as well as link communities to education faculties such as schools and awareness workshops.

4.3.3 Venn Diagram

The Umbumbulu community members were asked to illustrate the control of power and organisational issues in their community. This was done in the form of drawing circles ranging from a big circle to the smallest circle. The following structure (presented in Figure 4.27) demonstrates how the different levels of authorities are perceived by the community members to be of importance in the community.

Figure 4.28: Organisational Structure of the Umbumbulu Community

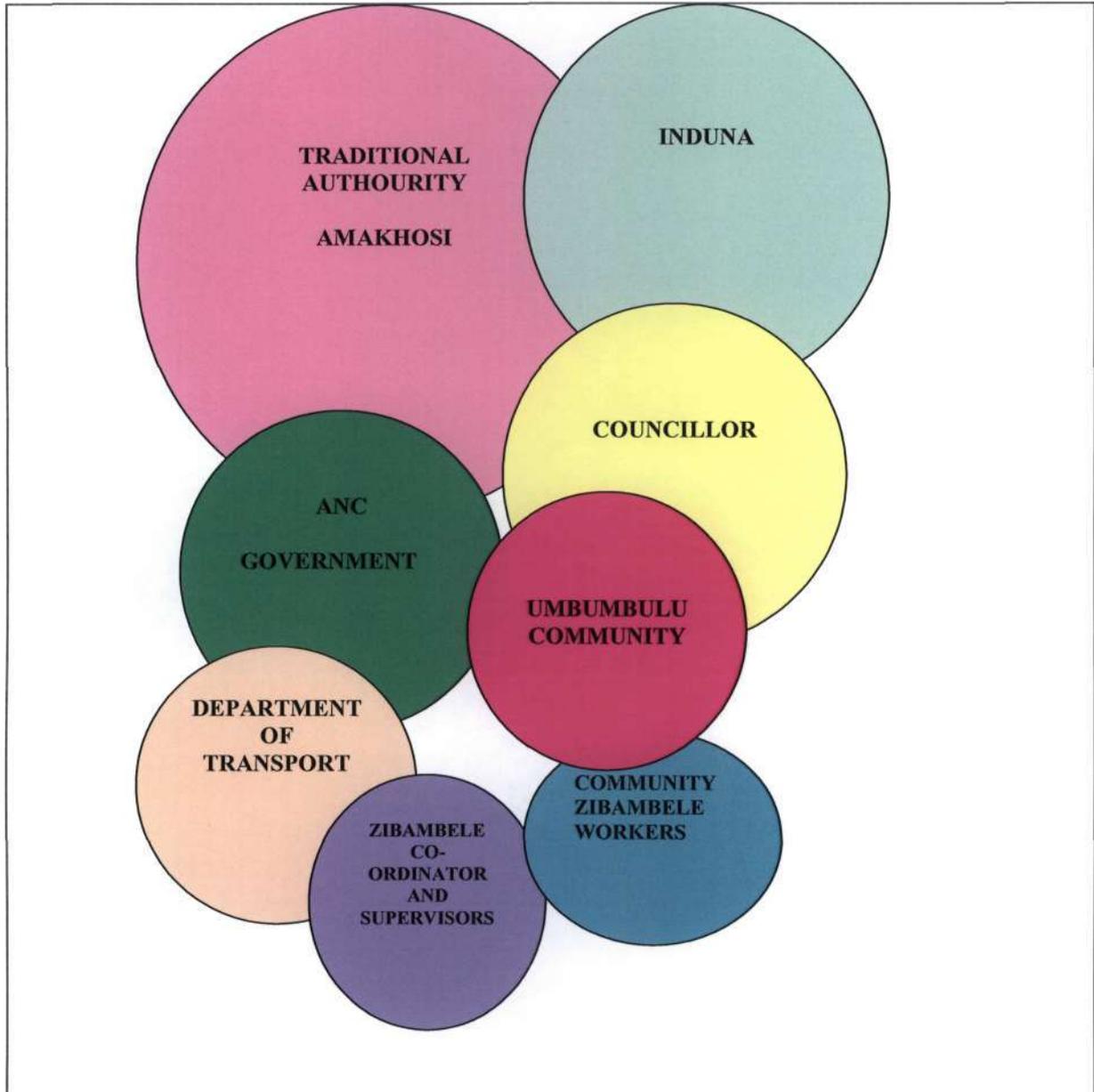


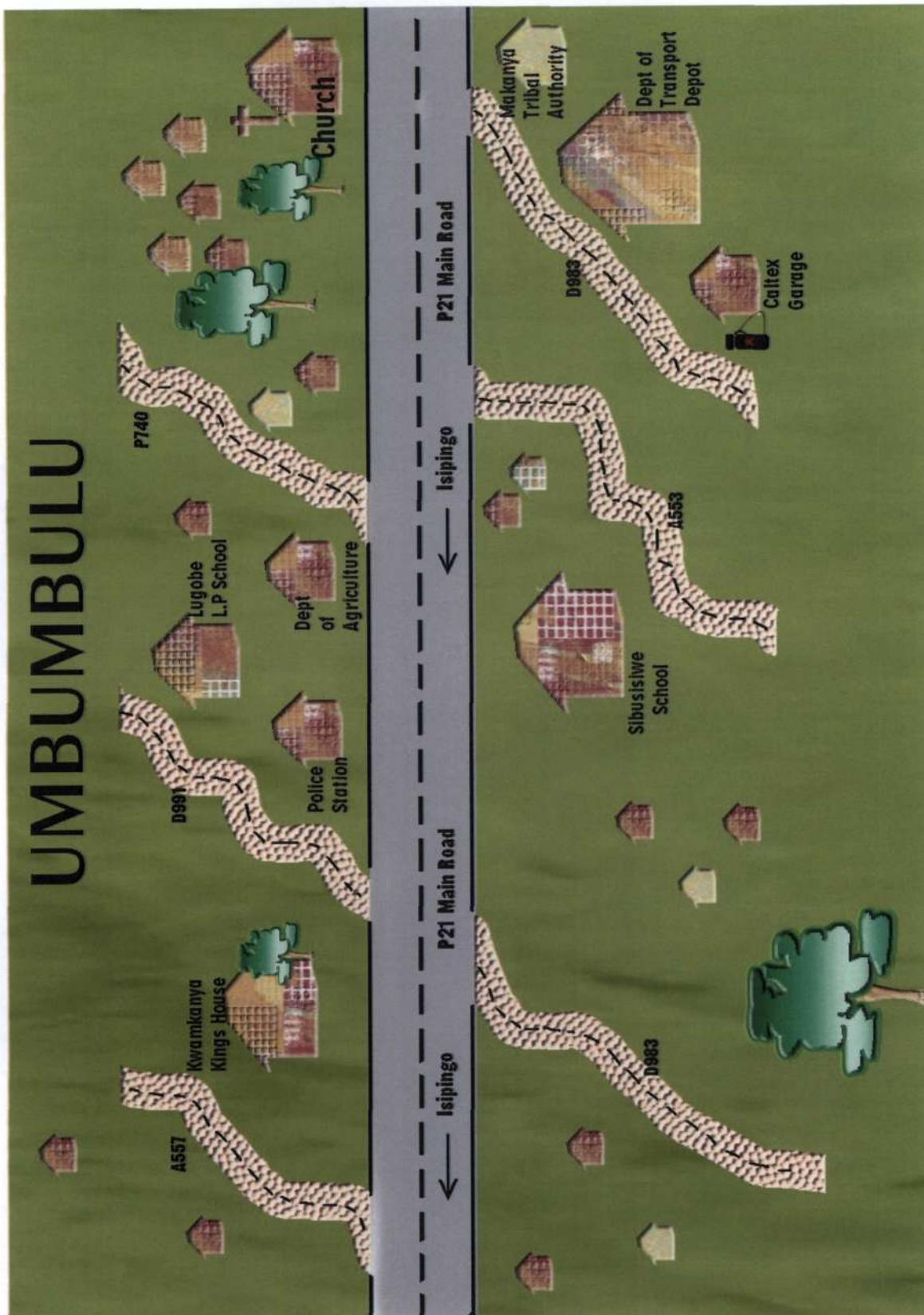
Figure 4.28 depicts a venn or chapatti diagram that was prepared by the women in the community during the focus group discussion. The groups were asked by the researcher to identify and rank institutions that are present in the area according to their importance and their influence in decision-making power as well as to show the relationships

between them. The community members designate the Amakhosi as holding the highest level of authority in the area. The Induna falls under the Amakhosi, while the councillor is linked to both the Amakhosi and the local Induna. The community forms part of the traditional authority control and is also linked to the local government. Community members view the local government as being a separate structure that consists of other structures such as the Departments of Transport, Agriculture, Water, Land Affairs, etc. In this case, DoT is used and community members created a link between the structures and community Zibambele workers.

4.3.4 Mental Map

Figure 4.29 illustrates a mental map that was prepared by the focus group of the Intinyane community in Umbumbulu. Participatory mapping is a process by which the community members produce a visual image of their community that they live in (Wilde and Mattila, 1996). The map illustrates the relevant points of geographical features that include the maintained roads, fields, trees, houses, schools, health facilities, shops, clinics, churches, tribal authorities and government structures. The Umbumbulu community map clearly indicates that there are several rural access roads in the area that connect to the main road. It is further evident in the map that some infrastructure is present for the community, such as primary schools, churches, and a petrol station. It is also clear that government depots such as the Department of Transport are present in the area. However, the map also indicates that the community lacks facilities such as a clinic, library and a sport ground. Contracted houses that live adjacent to the rural roads (shown in the mental map) are responsible to maintain a specific length of the road as stipulated by the lengthmen system that has been identified in the literature review. According to Wilde and Mattila (1996), outsiders gain insights into how rural women and men perceive resources and select their priorities, through using mental mapping.

Figure 4.29: Mental Map of Umbumbulu



4.4 Conclusion

The socio-demographic status of the Intinyane community in Umbumbulu reveals that the majority of the population are women and can be regarded as living in poverty. The community can be regarded as currently being in a transition phase after having to endure years of deprivation of basic services such as running water, proper sanitation, electricity, telecommunications and proper road infrastructure. The deprivation characteristics of the community can be regarded as being directly linked to past policies that were created by the apartheid government. After more than a decade since the new democratic ANC government came into power, many changes to address past imbalances of the apartheid government are slowly becoming visible. It was apparent from the research conducted in the area that households in the community have recently been provided with proper water and electricity supply. Suitable sanitation facilities in the community are currently being built through the utilisation of labour-intensive methods. A vast majority of households in the community lack telephone lines, however, they are able to access the local telephone booths provided in the community. Furthermore, it was determined that most respondents were not exposed to proper education during the apartheid era and therefore lacked the skills necessary for employment opportunities. Thus education can be regarded as being inextricably linked to the poverty status of the community.

With regards to the Zibambele programme, it was found that the programme played a vital role in the facilitation of income generation as well as skills development for more women-headed households. Hence, it is obviously clear that the adoption of labour-intensive techniques in road programmes provides the much needed opportunities to the poorest members of the community and further provides and maintains proper road infrastructure. The adoption of the Zibambele rural road maintenance programme in the Umbumbulu community has made some of the members of the community realise their potentials and also served as a stimulus for the community to become more involved in the development processes occurring around them. This has been evident not only in the Zibambele programme but also in the creation of other labour-intensive programmes such as land cultivation and sewing projects that has recently been adopted in the area.

The Zimbabwe labour-based rural road maintenance programme has paved the way for the development of the community. Community members have reported an increase in the number of vehicles and people using the road. A vast number of respondents have further indicated that there are improvements in the access of emergency vehicles such as ambulance and police vehicles into the area. The members of the community have expressed their feelings of safety, confidence and satisfaction of road maintenance for their household members. The road maintenance programme can be regarded as having countless positive socio-economic impacts for the community, since the community has identified significant changes with regard to their socio-economic status since the implementation of the programme.

CHAPTER FIVE

DISCUSSION, RECOMMENDATIONS AND CONCLUSION

5.1 Introduction

This research was undertaken in KwaZulu-Natal, in a tribal community known as Intinyane which forms part of the Umbumbulu Magisterial District. The area is part of the apartheid system and is classified as an area having high levels of unemployment and poverty, consisting predominately of Black tribal communities. Therefore, the Umbumbulu area formed an ideal research base to conduct socio-economic studies and evaluations on how labour-based rural road maintenance impacts on, and contributes to poverty alleviation as well as having the ability to satisfy other essential living requirements and improve access to other facilities, particularly those accrued by women-headed households.

The literature reviewed in chapter two of this dissertation, provides a suitable theoretical framework on the significance of infrastructure provision such as well maintained rural road infrastructure, in addition to socio-economic impacts of using labour-intensive methods in road maintenance. It also reflects on the colonial and apartheid history of South Africa, which denied poor Black communities the right to basic infrastructure such as roads. Consequently, the post-apartheid era is plagued with tremendous financial problems and backlogs in rural road maintenance and delivery, the lack of local capacity and an integrated approach to planning and implementation.

The research methodologies and approaches used in the study are highlighted in chapter three, which also details the case study area and background of the Zibambele, labour-based, poverty alleviation rural road maintenance programme. The underlying foundation for the primary data analysed in chapter four of the research was facilitated through the use of a quantitative method of household questionnaires that was undertaken in the Intinyane community as well as the outcomes of participatory approaches such as the focus group meeting. This chapter concludes the study with a discussion on some

evaluations made during the course of the study, and thereafter forwards a set of recommendations to be considered in order to improve the efficiency of rural road planning, maintenance and rehabilitation and their links towards poverty alleviation. The study conclusively ends with some final remarks.

5.2 Summary of Key Findings

Evidence from the data analysis chapter indicates that many households in the Umbumbulu community are not male-headed, and women increasingly are supporting and maintaining their families. With few employment opportunities in the area, female headed households tend to be the most disadvantaged. Given the severe lack of formal job opportunities for rural women, and the fact that more and more women are being forced to generate some form of income in order to survive (World Bank, 2005), it is of critical importance to create income generation projects such as the Zibambele labour-based rural road maintenance.

The study conducted in Umbumbulu revealed that time pressures play an important role in intensifying women's institutional powerlessness. Poor rural infrastructure increases women's task burden and therefore improvements in infrastructure can bring time benefits to women in terms of labour-saving technologies (Greico, 2002). Inadequate infrastructure greatly increases the labour time involved in domestic work and in this sense constrains women's participation in paid work. Women have to negotiate between the demands of work, caring for children and domestic work as well as having to deal with the different spatial locations of these activities.

Poor transport intensifies the task burdens of women, particularly in the Umbumbulu area case where women are themselves forms of transport, collecting fuel, water, agricultural produce and household goods in the absence of access to other forms of transport. According to the World Bank (2002), the provision of roads where local communities neither have resources to maintain the road nor have the necessary income to travel on motorised vehicles is challenging. Historically, road infrastructure has not been matched by measures which enable the vulnerable to make use of such facilities. The World Bank (2002) asserts that spatial marginality limits women's mobility as well as their access to

facilities and economic opportunities, and as a result, it drives up the cost of living. The poor conditions of many local roads and their lack of maintenance has meant that transport costs are increased, and that taxis and buses avoid going into certain areas, effectively isolating these areas.

Although no data exists to enable an assessment of the impact of HIV/AIDS on the Umbumbulu community, an important concern identified during the analysis of the focus group meeting and questionnaire interviews was the concern of a growing number of HIV/AIDS infected and affected households in the area. The need for the services of a qualified social worker was expressed by community members to deal with social problems faced by communities as a result of the impact of HIV/AIDS. With regards to transport, it was determined that transport is not readily available and patients often travel long distances for treatment. Because of a lack of resources, clinics have not been able to resolve health problems easily and incorrect decisions around HIV/AIDS have been made. Consequently, it should be noted that in order for the Umbumbulu community to confront this pandemic, future research on issues such as HIV/AIDS education needs to be addressed, and unemployment and poverty must be alleviated if not completely eradicated.

According to May (1998), women's chances of victimisation increases with having to walk long distances to collect firewood and water in rural areas. Furthermore, poor road conditions limit the effectiveness of emergency police vehicles, making it difficult to access communities and thus causing time delays.

The rural residents in the Umbumbulu area still cultivate small land holdings, particularly sugar cane. Each homestead in the area has a vegetable garden and fields for crop production, however, many members of the community indicated that there is not enough land for cultivation and grazing purposes. This situation can be regarded as emanating from unfair colonial and contemporary land and agricultural policies that resulted in the diminution of the per capita size of land held by Black rural dwellers (Makhanya, 1997). With regards to rural agricultural production, transport improvement may lower

input prices and production costs, improve access to credit, facilitate technological diffusion and increase the area of land under cultivation (National Department of Transport, 2006). It is suggested that further research be conducted on the shortage of land for agricultural practices in the Umbumbulu area.

Access to communication networks is poor in the area, with a large proportion of the population having no access to telephones and having to rely on public telephones. Although many households in the area have access to electricity, there exists a number of households that still use paraffin and candles for cooking, lighting and heating. This is due to the high level of unemployment in the area. The vast majority of households in the community make use of pit latrines as a method of sanitation and use tap water for cooking and drinking. This socio-economic profile paints a picture of a rural community that has limited access to infrastructure such as communication networks, and facilities such as libraries and mobile clinics.

Community members consulted (Zibambele participants) within the Intinyane community in Umbumbulu indicate that the Zibambele rural road maintenance project has impacted positively on their living environment and overall quality of life. Many members of the community felt that the programme makes them feel proud to be part of the community and has facilitated the hope for a new life that is free from poverty. With regards to poverty alleviation, community members confirmed that Zibambele has put food on their tables and provided other living essentials such as clothing and appliances as well as made access to markets, schools, and clinics more feasible.

It was also determined that the participants, especially women, have acquired skills and knowledge through Zibambele which subsequently makes them feel a sense of independence. An important point made by the vast majority of females in the community is that Zibambele gives them a chance to voice their own opinions on road maintenance and development and has provided them with access to credit institutions. The role of access to credit and banking facilities in reducing the social exclusion of women in rural areas is already evident in the research study (Zibambele) in Umbumbulu.

The success of the Zibambele programme in organising women in rural areas into sustainable banking and credit social movements has received widespread acknowledgement from government and rural communities (Bridraj, 2000). Access to credit and banking facilities creates a good cycle in which women can increase their participation and control over other areas of decision-making and resource allocation. It is also evident that the Zibambele programme has acted as a catalyst for other development since several projects such as land cultivation and poultry has started since it has been implemented.

In relation to the maintained rural roads specifically, it was found that maintenance has eased the burden of the community by providing greater mobility of vehicles and community members. The maintained rural roads has also facilitated all weather accessibility to transport goods, services and people to and from the community. The well maintained rural roads have also provided the community with the feeling of safety when accessing forests and other areas that was achieved through the clearing of bushes that obstructed the roads in the past. During the focus group discussion held with the women in the community, it was indicated by the women that the bushes, previously present before the road maintenance programme could be implemented, made women easy targets of crime and violence since it obscured the vision of other members in the community. It was further found in the study that road maintenance has improved the response from emergency vehicles such as the ambulance and police services. This reassures the community that the emergency vehicles will be able to access their locations more efficiently when the need arises.

The success of the Zibambele rural road maintenance project is highly dependent on the community's involvement in the various facets of the programme. Through the proper procedures of community participation and consultation, the programme can be regarded as being one that is community-driven. In fact, the most commendable part of the programme is the method of household contract selection, which is geared by the community members themselves. The consultation process appears to be transparent by involving all members in the community (participants and non-participants) from the

inception of the programme in taking a decision on how and by whom rural road maintenance should be carried out.

Making use of local resources and labour provides significant benefits to the people as well as to the government because the money spent on labour-intensive projects stays within the local economy (Taylor, 1992). Labour-intensive projects and programmes such as Zibambele are more feasible than capital intensive methods. Furthermore, the use of local labour can be vital to prevent the spread of diseases such as HIV/AIDS from foreign employees residing in local areas for extended periods of time, as in the case of conventional construction and maintenance methods (Perrin et al, 2003). DeSilva (2001) asserts that allowing the participation of communities in decision-making processes about the programme can be pivotal to the life-span of the programme as well as to the commitment and concerns displayed to the community by the government.

5.3 Recommendations emanating from the study

This section is an attempt to provide recommendations relating to labour-based routine road maintenance and further attempts to forward a set of recommendations that relates to the study undertaken in the Umbumbulu area. The recommendations discussed below are primarily concerned with routine maintenance of rural roads and are aimed at ensuring that suitable levels of maintenance are justified.

In the proceeding chapters, it was determined that rural road maintenance is best suitable to be carried out by labour-intensive methods and technologies. Technology choices are best determined by the state of which rural roads that are travelled on are in and the level of maintenance required. During the evaluation of labour-based rural road maintenance activities, government should consider areas of procurement, servicing and repairing of maintenance equipment (Mwango, 2000). This could be vital to ensuring the smooth running of maintenance tasks. Another important feature that gives communities better control over technology is the use of equipment and tools that are less heavy, paving way for women and senior members of a community to be part of the development processes.

Mwango (2000) assert that it is important that government never undertakes labour-based maintenance activities before the funding requirements have been established. Labour-based maintenance stresses supervision and prompt payment. Therefore, financial resources to pay the lengthmen workers must be properly allocated and be available as soon as maintenance has been carried out, depending on the payment agreement made at the initial implementation of the programme. According to Mwango (2000), maintenance operations must begin with distinct and visible lines of responsibility so as to encourage competitiveness and improved importance. The employment of local labour resources in programmes shows government's commitment to the well-being of its people by providing both cash and better access and is also beneficial to the local currency since it stays within the local community.

Institutional strengthening is also an area of major concern towards achieving a sustainable rural road maintenance programme (Mwango, 2000). Mwango (2000) suggests that government's intentions to implement rural road programmes that makes use of labour-based techniques should first consider the following key issues:

- Fiscal policies and the use of shadow prices such as the use of economic instead of market for labour or surges for equipment.
- Prejudiced levies on labour-based equipment intended to maintain roads.
- Interest rate policies that do not subsidise the import of construction and maintenance equipment.
- Tendering procedures that are not biased towards the use of labour-intensive equipment.
- Equivalent positions between staff of technical departments working on labour-based technique programmes.

Although it was noted in the research that Zimbabwe workers are given the opportunity to attend skills training workshops, government should also support the following strategies to facilitate the flow of good labour-based programmes (Mwango, 2000):

- Special training programmes for road engineers, technicians, local government officials, community leaders and authorities and others involved in rural road works, such as farmers.
- Basic and simplified administrative standards and procedures.
- Simplified contract documents, bidding and payment procedures to be applied to rural roads.
- The development of a domestic contracting industry that identifies those areas that are most in need of employment opportunities and rural road maintenance.

The recruitment of local resources is an important element for the prospect for labour-based rural road maintenance operations, mainly as a consequence of the continuing lack of finance and trained person-power. Through the invention of appropriate channels for participation, local participation can be improved. The lengthmen system provides an enhanced opportunity to involve local communities in maintenance programmes enabling them to identify with the costs and benefits involved in rural road maintenance. Zibambele can be considered to be appropriate in fitting with programmes which are beneficial to both road agencies and the community, since it provides employment to the people and improves the road condition simultaneously. It is, therefore, recommended that the feasibility of the Zibambele programme be explored on all other road projects since the benefits can be substantial.

The research conducted in the Umbumbulu area was based solely on the socio-economic impacts of labour-based rural road maintenance on poverty alleviation. It is recommended that extensive research on other areas such as on agricultural practices, education, basic services, etc. should be conducted in the community. However, a few observations with regards to education levels and basic services have been made.

With regards to the study conducted in the Umbumbulu area, the research revealed high levels of illiterate and partially educated people in the Umbumbulu community. The low level of education in the community can be a direct barrier towards employment opportunities, subsequently resulting in the community's poverty status. Training and

retraining to build basic literacy and basic entrepreneurial skills for vulnerable groups are critical to the integration of the poor into the labour market. It is, therefore, recommended that adult basic education and training (ABET) classes and workshops be made available for the members of the community that were previously denied such opportunities. Language classes for previously disadvantaged adults should also be provided in such ABET programmes. If improvement of provision focuses on these areas, it will have the greatest impact on the current educational disparities.

During the literature review it was determined that traditional methods of transport have been ignored in most rural areas. This is fitting with the scenario in KwaZulu-Natal, since very little research work has been done on informal transportation and the contemporary use of alternate and non-motorised use of transport for access. Thevadasen (2003) makes reference to a case study on the use of donkey drawn carts in the Northern Province of South Africa. The study reflects on the socio-economic benefits accrued by several community members, such as an average salary of R811 attained per cart operator. It is, therefore, recommended that feasibility studies be conducted in the Umbumbulu area to determine the advantages of such methods of using animal drawn vehicles for the poor community members, particularly women.

The poor generally have little influence in the political process and this makes it important to consult potential beneficiaries to make sure that interventions are designed to meet the needs of all members of society. It is thus recommended that consultation be done either directly with the beneficiaries or through non-governmental organisations. Accordingly, if road projects are to have a positive impact on poverty reduction, their design must be based on a clear understanding of the local situation; should incorporate the expertise, knowledge and perceptions of the community; and must substantially involve them in the projects implementation. It is further recommended that the poor be involved in the planning stages by consulting with communities on priority needs, allocating more expenditure at local government level to invest in more small-scale road programmes, using more labour-intensive methods, and by making use of the local labour and resources to construct and rehabilitate rural roads and other local infrastructure.

With regards to rural roads and poverty alleviation, the Eastern Cape CARNS report identified in Thevadasen (2003) reveals some important recommendations:

- As a result of too many departments being involved in delivery, there is a huge backlog in provision and maintenance of rural roads. This is mainly due to a lack of communication, local accountability and the lack of an integrated delivery approach. Consequently, it is recommended that all rural road responsibility should be held by the DoT. This can facilitate accountability, appropriate technical knowledge and capacity.
- Access roads are vital catalysts linking communities to formal road networks and social needs. An integrated and co-ordinated approach to strategic planning and setting up of work programmes must be adopted to liberate social, physical and economic isolation.
- Public participation involving all stakeholders as well as transparency in the planning phases are essential in the development process to avoid contempt and suspicion of government not acting in the interest of its people.

It was discovered that the Umbumbulu community is threatened by the HIV/AIDS pandemic and lacks basic health education and facilities. In this regard it is recommended that government should introduce HIV/AIDS communication campaigns into existing and new infrastructure projects, develop HIV/AIDS prevention and control programmes for transport, construction and maintenance workers employed by the government and include HIV/AIDS education in transport sector training programmes.

Women's transport needs are frequently ignored and gender biases are common in transport planning. Systematic procedures should therefore be put in place to give women a greater role in the planning and management of transport projects. Targeting women and affirmative action are suitable methods for bringing women into the planning and production processes of rural roads.

While it is important to evaluate the planning, provisioning, construction and maintenance strategies of rural roads on the livelihoods of poor rural communities and

their links towards poverty eradication, it is also imperative to ascertain the ecological impacts of road maintenance on the environment. Subsequently, it is recommended that further evaluations be taken in the following areas of ecological, economic and social concerns as identified by Wasike (2001):

- Ecological: The impact on flora and fauna, deforestation, disturbance of natural ecosystems, decrease in biodiversity, threats to exotic and non-indigenous species, depletion of scarce material resources, and regressive or progressive soil erosion.
- Economic: This refers to capital costs (design and construction), maintenance costs, flood damage costs, loss or degradation of agriculture or arable land, sterilisation of land for future use and land value reduction (designated borrows, severed farms).
- Social: This refers to severance or dislocation of local communities, adverse impacts on women, destruction of cultural antiquities, conflicts arising from changing land use/ownership of land, traffic accidents, health and safety (for example, danger to humans, especially, children, and wildlife from drowning in borrow pits) and construction impacts (Wasike, 2001).

Evidence generated from the data analysis demonstrates that the Zibambele programme has been highly successful in poverty alleviation and in maintaining good rural roads. It is thereby recommended that the Zibambele labour-based, rural road maintenance programme be put into effect in all rural regions and areas in South Africa. This will furthermore encourage the use of local labour-intensive methods and poverty alleviation in other sectors of development.

5.4 Conclusion

The study conducted in the Intinyane community in Umbumbulu comprised of secondary and primary data sources that were collected, analysed, interpreted and displayed in the form of figures and tables. The following research approach was adopted during the course of the study:

- The application of qualitative and quantitative methods to perceive the impacts and social dimensions pertaining to rural road maintenance.
- The formulation of survey questionnaires (for participants and non-participants) following the consultation of past and current documentation, media releases, journals, library books, policies and internet website papers.
- Compilation of a literature review that is appropriate to rural road maintenance and poverty alleviation locally, provincially and internationally. This was accomplished by researching rural road terminology, understanding the history of roads and their importance, examining current conditions of road networks and determining the positive impacts of rural road maintenance on households and communities.
- An evaluation of political history and marginalisation, road policies and strategies, and institutional arrangements.
- A case study approach was adopted to examine rural household awareness, perceptions and concerns that is associated with the Zibambele poverty alleviation, labour-based programme. A comparative analysis was undertaken, focusing on Zibambele participants and non-participants.

It was evident from the study that a sound road network is essential to a country's economic and social well-being. Additionally, it is clear from the research conducted in the Intinyane community in Umbumbulu that Zibambele is an innovative programme that concentrates on the reduction of poverty and the improvement of the quality of life of the poor. Well maintained roads play a significant role in economic development and are one of the essential pre-conditions for national economic growth. The Zibambele programme is a transparent illustration of best labour-intensive practice and can be described as a social and economic development programme through which rural road networks are maintained.

The Zibambele programme has created sustainable work opportunities for the poorest of the poor while maintaining rural roads that are regarded as life lines to rural communities. The Zibambele routine rural road maintenance programme provides ongoing work

opportunities that are sustainable to the country. The programme contributes to the social upliftment of the poor communities by providing training programmes that are designed to assist poor people in acquiring the knowledge and skills essential for a sustainable future for themselves and for their children. Zibambele contractors have been organised into saving clubs to promote collective savings into feasible wealth generating projects such as community gardening, sewing and craft work.

It is apparent that the Zibambele programme has put people to work who would normally be excluded from opportunities both because of their poverty status and because of their gender and education levels. There is a need to provide marginalised communities with access to the basic facilities such as education, health care, water and firewood. Thus, a multisectoral planning approach such as the Zibambele programme enhances the overall accessibility of poor communities and is most appropriate for developing rural areas and alleviating rural poverty. The conventional method of road network development must be substantiated by the provision of accessibility to basic facilities at the local level.

Furthermore, the authority and functions of local government should be exercised in a way that has the utmost impact on the social development of communities and on the growth of the local economy. Municipalities, therefore, need to have a clear vision for the local economy to maximise job creation and investment. Provision of basic community infrastructure is the central contribution made by local government to social and economic development. Local government can be able to successfully perform these responsibilities if it is given the necessary policy-making and decision-making powers to facilitate the implementation of workable programmes such as in the case of Zibambele.

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APPENDIX 1

**UNIVERSITY OF KWAZULU-NATAL
RURAL ROAD DEVELOPMENT AND POVERTY ALLEVIATION
CASE STUDY OF ZIBAMBELE ROAD CONSTRUCTION AND MAINTENANCE**

A. DEMOGRAPHIC PROFILE OF RESPONDENT (ZIBAMBELE PARTICIPANT)

1. Location of respondent _____

2. Gender of respondent

Male	1
Female	2

3. Marital Status

Married	Single	Divorced	Widowed	Other (specify)
1	2	3	4	5

4. Level of education

Primary	Secondary	Tertiary	No-school	Other (specify)
1	2	3	4	5

5. Age of respondent

>16-24	25-34	35-44	45-59	60 and over
1	2	3	4	5

6. Number of members in the household

Females	Males	Total

7. Household income sources

HOUSEHOLD INCOME SOURCES	CODES
N/A	0
Household farming	1
Own business	2
Agricultural wage labour/ farm worker	3
Informal activities (crafts, traditional medicine)	4
Non-agricultural wage labour	5
Forest utilization	6
Pension, welfare grants, etc	7
Professional	8
Other (specify)	9
No source of income	10

B. SOCIO-ECONOMIC PROFILE

1. What services are available for the households in your community?

SERVICES	CODE
N/A	0
Telephone	1
Water sources (borehole, tap, etc)	2
Electricity	3
Land for cultivation	4
Land for grazing	5
Toilet	6
Sources of fuel	7
Other (specify)	8

2. What other services would you like to have provided for the community?

3. How is the primary source of water that is used by the household accessed?

WATER SOURCE	CODE
N/A	0
Tap	1
Borehole	2
Nearby River/stream	3
Nearby community well/tank	4
Other (specify)	5

3.1 How do you access the source(s) identified above?

3.2 What is the distance traveled to obtain/collect or purchase the water source identified above?

DISTANCE	CODE
N/A	0
<1-2 km	1
2-4 km	2
4-8 km	3
8-10 km	4
>10 km	5
Other (specify)	6

3.3 Do you experience any difficulty obtaining/collecting the water source identified above?

4 What are the primary sources of fuel used for cooking, lighting and heating that are used in the household?

Source	Cooking	Lighting	Heating
N/A	0	0	0
Wood	1	1	1
Paraffin	2	2	2
Coal	3	3	3
Electricity	4	4	4
Gas	5	5	5
Generator	6	6	6
Candles	7	7	7
Other (specify)	8	8	8

4.1 How do you access the source(s) identified above?

4.2 What is the distance traveled to obtain, collect, purchase the primary source of fuel used by the household?

DISTANCE	CODE
N/A	0
<1-2 km	1
2-4 km	2
4-8 km	3
8-10 km	4
>10 km	5
Other (specify)	6

4.3 Do you experience difficulties in obtaining/ collecting/ purchasing the source of fuel?

RESPONSE	CODE
N/A	0
Yes	1
No	2
Sometimes	3
Not certain	4

4.3.1 If yes, what difficulties are those?

5. What type(s) of materials are used to build and maintain your home?

TYPE OF BUILDING MATERIAL	CODE
N/A	0
Brick	1
Blocks	2
Mud	3
Poles	4
Thatch	5
Other (specify)	6

6. What is the distance traveled to obtain/collect/purchase the building materials required by the household?

DISTANCE	CODE
N/A	0
<1-2 km	1
2-4 km	2
4-8 km	3
8-10 km	4
>10 km	5
Other (specify)	6

6.1 Do you experience difficulties in obtaining, collecting, and purchasing the building materials identified above?

RESPONSE	CODE
N/A	0
Yes	1
No	2
Sometimes	3
Not certain	4

6.1.1 If yes, what difficulties are those?

7. Does the household/community experience any of the following problems?

PROBLEM EXPERIENCED	CODE
N/A	0
Inadequate infrastructure e.g. roads, telephones	1
Lack of employment opportunities	2
Not enough land	3
Lack of access to saving clubs	4
Community structures not functioning properly	5
Environmental problems e.g. overgrazing, erosion, dry soils	6
Inadequate extension services	7
Any other problem (specify)	8

C. ACCESSIBILITY

1. Distance of household from closest road?

<100m	101-300m	301-500m	501-700m	701-900m	>1KM
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1.1 Name and description of the closest road? _____

2. How often do the household members use the road?

FREQUENCY	CODE
N/A	0
Daily	1
Once a week	2
Twice a week	3
More than twice a week	4
When necessary to use the road	5
Other (specify)	6

3. What type(s) of vehicles use the road?

TYPE OF VEHICLE	CODE
N/A	
Bicycle	
Car	
Bus	
Mini bus taxi	
Heavy vehicles e.g. trailers/trucks	
Animal drawn vehicles e.g. carts	
Other (specify)	

3.1 How often do the vehicles identified above make use of the road?

FREQUENCY	CODE
N/A	0
Several times in the day	1
Once a week	2
Twice a week	3
More than twice a week	4
All the times	5
Other (specify)	6

5. Would you rate the distance of the road from your household as being in close proximity or far from you household?

DISTANCE	CODE	REASON
N/A	0	
Easily accessible (< 5 minutes)	1	
Not very difficult (10 minutes)	2	
Difficult to access (>15 minutes)	3	
Other (specify)	4	

4. What is the name of the main town or city that you travel to for goods and services? _____

5. What modes of transport do you and your household members frequently use?

MODE OF TRANSPORT	CODE	FREQUENCY OF USE
N/A	0	
Foot	1	
Animal drawn cart	2	
Bicycle	3	
Bus	4	
Taxi	5	
Private vehicle	6	
Other (specify)	7	

6. Please indicate the cost, time, distance and type of transport used to access the following areas:

AREA	TYPE OF TRANSPORT	COST	TIME	DISTANCE
N/A				
Shopping center				
School				
Clinic/Hospital				
Market				
Church				
Other (specify)				

KEY:

1. Type of transport

1. Foot
2. Animal drawn cart
3. Bicycle
4. Bus
5. Taxi
6. Private vehicle
7. Other (specify)

2. Cost of transport

1. < R5
2. R5-R10
3. >R10
4. Other amount (specify)

3. Time taken to reach the area

1. <15 minutes
2. 15-30 minutes
3. 30-45 minutes
4. 45 minutes - 1hour
5. > 1 hour (specify)
6. Other (specify)

4. Distance to area

1. <1 km
2. 1-3 km
3. 3-5 km
4. 5- 7 km
5. 7-10 km
6. >10 km
7. Other (specify)

D. ZIBAMBELE ROAD MAINTENANCE AWARENESS

1. Are you aware of the Zibambele road maintenance and poverty alleviation programme?

RESPONSE	CODE
Yes	
No	

1.1 If yes, what are you aware of?

AWARENESS	CODE
N/A	0
Contracts awarded to the poorest households	1
Maintenance of a length of road	2
Upgrading of rural road	3
Poverty alleviating road maintenance program	4
Construction of a length of rural road	5
Other (specify)	6

2. Are you or any member of your household contracted to the Zibambele programme?

RESPONSE	CODE
Yes	1
No	2

2.1 If yes, state the age and gender of the member(s) in your household that are contracted to the road maintenance project.

Member	AGE	GENDER
1		
2		
3		
4		
Other (Specify)		

KEY:

1. Age of member	2. Gender
1. <16-24	1. Male
2. 25-34	2. Female
3. 35-44	
4. 45-59	
5. 60 and over	

2.3 What tasks are you required to carry out as part of the Zibambele programme?

TASK	CODE
N/A	0
Clearing the verges	1
Clearing debris off the road	2
Cleaning of debris from drainage systems	3
Rehabilitation and repairs to dilapidating roads	4
Building of new roads	5
Other (specify)	6

2.4 How many hours per day are you or the other member(s) of your household required to work on maintaining the roads?

1-2	2-3	3-4	4-5	5-6
6-7	7-8	8-9	9-10	>10 (specify)

2.5 How much would you say that the project pays you or the other member(s) of your household contracted to maintain the road?

INCOME	CODE
Confidential	1
No money is earned (INDICATE COMPENSATION)	2
<R200 per month	3
R200-R500 per month	4
> R500 per month (specify)	5
Other amount (specify)	6

3. How is the money earned from being contracted to the Zimbabwe programme spent?

	CODE
N/A	0
School Fees	1
Food	2
Shelter	3
Clothing	4
Farming	5
Medical treatment	6
Repairs to vehicles	7
Other (specify)	8

4.1. What are some of the advantages of being contracted to the Zimbabwe programme?

4.2. What are some of the disadvantages of being contracted to the Zimbabwe programme?

E. ZIBAMBELE MAINTAINED ROAD

1. What is the name of the length of road that your household is contracted to maintain:

2. Distance of household from the closest length of road that is being maintained:

<100m	101-300m	301-500m	501-700m	701-900m	>1KM
-------	----------	----------	----------	----------	------

3. How often is the maintained road used?

FREQUENCY	CODE
N/A	0
Daily	1
Once a week	2
Twice a week	3
More than twice a week	4
When necessary to use the road	5
Other (specify)	6

4. Have you noticed an increase of vehicles that are using the road after implementation of the road maintenance programme?

RESPONSE	CODE
Yes	1
No	2

4. What type(s) of vehicles use the maintained road?

TYPE OF VEHICLE	CODE
N/A	
Bicycle	
Car	
Bus	
Mini bus taxi	
Heavy vehicles e.g. trailers/trucks	
Animal drawn vehicles e.g. carts	
Other (specify)	

4.1 How often do the vehicles identified above make use of the maintained road?

FREQUENCY	CODE
N/A	0
Several times in the day	1
Once a week	2
Twice a week	3
More than twice a week	4
All the times	5
Other (specify)	6

5. How was the response of emergency vehicles such as police and ambulance services to your current location before the road could be maintained? Give a reason.

RESPONSE	CODE
N/A	0
Responded within a few minutes (<10 minutes)	1
Responded within 30 minutes	2
Responded between 30 minutes to 1 hour	3
Respondent in more than 1 hour	4
Other (specify)	5

5.1 Give a reason for the response selected above:

6. How would you rate the response from emergency vehicles to your current location after the road has been reconstructed and maintained?

RESPONSE	CODE	REASON
N/A	0	
Improved considerably	1	
Improved slightly	2	
Not much improvement	3	
No improvement at all	4	
Other (specify)	5	

7. Did rainy weather have an impact on the use of the road before the road could be maintained?

RESPONSE	CODE	REASON
Yes	1	
No	2	

8. Has reconstruction and maintenance of the new road improved access during rainy weather?

RESPONSE	CODE	REASON
Yes		
No		

F. ZIBAMBELE PARTICIPANTS PERCEPTIONS ON ZIBAMBELE AND POVERTY ALLEVIATION

1. Are you satisfied with the Zimbabwe road maintenance programme?

RESPONSE	CODE	REASON
Yes	1	
No	2	

2. Where you or your household members consulted about the Zimbabwe programme/project?

RESPONSE	CODE	REASON
Yes	1	
No	2	

3. How were you and your household members informed about the road maintenance programme?

WAY INFORMED	CODE
N/A	0
Through government Authorities	1
Traditional Authorities/Indunas	2
Local District Councilors	3
Social Gatherings	4
Word of Mouth from family/friends	5
Other (Specify)	6

4. How are houses selected and awarded Zibambele contracts?

5. Are you satisfied with the selection process? Give a reason.

RESPONSE	CODE	REASON
Yes	1	
No	2	

6. How would you rate the selection process?

RATING	CODE
N/A	0
Very Fair	1
Fair	2
Neutral	3
Unfair	4

7. How has the Zibambele road maintenance programme impacted on daily routines in your household?

ROUTINE	BETTER	WORSE	UNCHANGED	REASON
N/A				
Collection of firewood/water				
School Attendance				
Church				
Local clinics				
Mobile clinics				
Community centers				
Neighboring communities				
Travel to main town/city				
Visiting other residents				
Other (specify)				

8. What are some of the benefits that Zibambele offer to the community member?

BENEFITS	CODE
N/A	0
An income to the household	1
Savings club	2
Skills / training	3
Social gathering	4
Other (specify)	5

9. How has the maintenance contract of a length of road benefited you and your household?

10. What are some of the disadvantages of the Zibambele programme?

11. Please indicate the level of satisfaction with the following statements:

1. STRONGLY AGREE 2. AGREE 3. NEUTRAL 4. DISAGREE 5. STRONGLY DISAGREE

STATEMENT	CODE
Zibambele has changed my life for the better	
Zibambele makes me feel proud to be part of the community	
Being selected as part of Zibambele has given me a new hope in life	
I've acquired skills and knowledge through Zibambele	
I am now independent and can stand up for my own needs	
Working for Zibambele gives me a chance to voice my opinions on road construction and development	
Zibambele has provided me with access to credit institutions	
I can now save for starting my own business	
Zibambele has put food and other living essentials on my table	
Through Zibambele, roads are improved and access to markets, school, clinics, etc. are quicker and efficient.	
Zibambele provides economic as well as social upliftment	
Zibambele centers around the strengthening of women headed households	
My children can now afford to attend school and pay for fees.	

12. Do you think that the construction and maintenance of rural roads will help improve the development of the area?

RESPONSE	CODE	REASON
Yes	1	
No	2	

10. Have any other development projects started in the area after the Zibambele programme was launched? Yes/ No
If yes, what other projects are in operation in the area?

13. What are some of the problems generally facing your household?

14. What are some of the problems generally facing the entire community?

15. Do you think that there should be more government initiated labour-based projects in this community?

Yes	No
-----	----

16. If yes, give a reason for your response.

17. What type of projects would you like to have take place in your community in the future?

APPENDIX 2

**UNIVERSITY OF KWAZULU-NATAL
RURAL ROAD DEVELOPMENT AND POVERTY ALLEVIATION
CASE STUDY OF ZIBAMBELE ROAD CONSTRUCTION AND MAINTENANCE**

A. DEMOGRAPHIC PROFILE OF RESPONDENT (NON-ZIBAMBELE PARTICIPANT)

1. Location of respondent _____

2. Gender of respondent

Male	1
Female	2

3. Marital Status

Married	Single	Divorced	Widowed	Other (specify)
1	2	3	4	5

4. Level of education

Primary	Secondary	Tertiary	No-school	Other (specify)
1	2	3	4	5

5. Age of respondent

>16-24	25-34	35-44	45-59	60 and over

6. Number of members in the household

Females	Males	Total

7. Household income sources

HOUSEHOLD INCOME SOURCES	CODES
N/A	0
Household farming	1
Own business	2
Agricultural wage labour/farm worker	3
Informal activities (crafts, traditional medicine)	4
Non-agricultural wage labour	5
Forest utilization	6
Pension, welfare grants, etc	7
Professional	8
Other	9
No source of income	10

B. SOCIO-ECONOMIC PROFILE

1. What services are available for the households in your community?

SERVICES	CODE
N/A	0
Telephone	1
Water sources (borehole, tap, etc)	2
Electricity	3
Land for cultivation	4
Land for grazing	5
Toilet	6
Sources of fuel	7
Other (specify)	8

2. What other services would you like to have provided for the community?

3. How is the primary source of water that is used by the household accessed?

WATER SOURCE	CODE
N/A	0
Tap	1
Borehole	2
Nearby River/stream	3
Nearby community well/tank	4
Other (specify)	5

3.1 How do you access the source(s) identified above?

3.2 What is the distance traveled to obtain/collect or purchase the water source identified above?

DISTANCE	CODE
N/A	0
<1-2 km	1
2-4 km	2
4-8 km	3
8-10 km	4
>10 km	5
Other (specify)	6

3.3 Do you experience any difficulty obtaining/collecting the water source identified above?

4. What are the primary sources of fuel used for cooking, lighting and heating that are used in the household?

Source	Cooking	Lighting	Heating
N/A	0	0	0
Wood	1	1	1
Paraffin	2	2	2
Coal	3	3	3
Electricity	4	4	4
Gas	5	5	5
Generator	6	6	6
Candles	7	7	7
Other (specify)	8	8	8

4.1 How do you access the source(s) identified above?

4.2 What is the distance traveled to obtain/collect/purchase the primary source of fuel used by the household?

DISTANCE	CODE
N/A	0
<1-2 km	1
2-4 km	2
4-8 km	3
8-10 km	4
>10 km	5
Other (specify)	6

4.3 Do you experience difficulties in obtaining/ collecting/ purchasing the source of fuel?

RESPONSE	CODE
N/A	0
Yes	1
No	2
Sometimes	3
Not certain	4

4.3.1 If yes, what difficulties are those?

5. What type(s) of materials are used to build and maintain your home?

TYPE OF BUILDING MATERIAL	CODE
N/A	0
Brick	1
Blocks	2
Mud	3
Poles	4
Thatch	5
Other (specify)	6

6. What is the distance traveled to obtain/collect/purchase the building materials required by the household?

DISTANCE	CODE
N/A	0
<1-2 km	1
2-4 km	2
4-8 km	3
8-10 km	4
>10 km	5
Other (specify)	6

6.1 Do you experience difficulties in obtaining, collecting and purchasing the building materials identified above?

RESPONSE	CODE
N/A	0
Yes	1
No	2
Sometimes	3
Not certain	4

6.1.1 If yes, what difficulties are those?

7. Does the household/community experience any of the following problems?

PROBLEM EXPERIENCED	CODE
N/A	0
Inadequate infrastructure e.g. roads, telephones	1
Lack of employment opportunities	2
Not enough land	3
Lack of access to saving clubs	4
Community structures not functioning properly	5
Environmental problems e.g. overgrazing, erosion, dry soils	6
Inadequate extension services	7
Any other problem (specify)	8

C. ACCESSIBILITY

1. Distance of household from closest road?

<100m	101-300m	301-500m	501-700m	701-900m	>1KM
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1.1 Name and description of \ the closest road? _____

2. How often do the household members use the road?

FREQUENCY	CODE
N/A	0
Daily	1
Once a week	2
Twice a week	3
More than twice a week	4
When necessary to use the road	5
Other (specify)	6

3. What type(s) of vehicles use the road?

TYPE OF VEHICLE	CODE
N/A	
Bicycle	
Car	
Bus	
Mini bus taxi	
Heavy vehicles e.g. trailers/trucks	
Animal drawn vehicles e.g. carts	
Other (specify)	

3.1 How often do the vehicles identified above make use of the road?

FREQUENCY	CODE
N/A	0
Several times in the day	1
Once a week	2
Twice a week	3
More than twice a week	4
All the times	5
Other (specify)	6

5. Would you rate the distance of the road from your household as being in close proximity or far from you household?

DISTANCE	CODE	REASON
N/A	0	
Easily accessible (< 5 minutes)	1	
Not very difficult (10 minutes)	2	
Difficult to access (>15 minutes)	3	
Other (specify)	4	

4. What is the name of the main town or city that you travel to for goods and services?

4. What modes of transport do you and your household members frequently use?

MODE OF TRANSPORT	CODE	FREQUENCY OF USE
N/A	0	
Foot	1	
Animal drawn cart	2	
Bicycle	3	
Bus	4	
Taxi	5	
Private vehicle	6	
Other (specify)	7	

5. Please indicate the cost, time, distance and type of transport used to access the following areas:

AREA	TYPE OF TRANSPORT	COST	TIME	DISTANCE
N/A				
Shopping center				
School				
Clinic/Hospital				
Market				
Church				
Other (specify)				

KEY:

1. Type of transport

1. Foot
2. Animal drawn cart
3. Bicycle
4. Bus
5. Taxi
6. Private vehicle
7. Other (specify)

2. Cost of transport

1. < R5
2. R5-R10
3. >R10
4. Other amount (specify)

3. Time taken to reach the area

1. <15 minutes
2. 15-30 minutes
3. 30-45 minutes
4. 45 minutes - 1hour
5. > 1 hour (specify)
6. Other (specify)

4. Distance to area

1. <1 km
2. 1-3 km
3. 3-5 km
4. 5- 7 km
5. 7-10 km
6. >10 km
7. Other (specify)

D. ZIBAMBELE ROAD MAINTENANCE AWARENESS

1. Are you aware of the Zimbabwe road maintenance and poverty alleviation programme?

RESPONSE	CODE
Yes	
No	

1.1 If yes, what are you aware of?

AWARENESS	CODE
N/A	0
Contracts awarded to the poorest households	1
Maintenance of a length of road	2
Upgrading of rural road	3
Poverty alleviating road maintenance program	4
Construction of a length of rural road	5
Other (specify)	6

2. Are there any other member(s) of your household contracted to the Zibambele programme?

RESPONSE	CODE
Yes	1
No	2

2.1 If No, what are your reasons for not being contracted to the Zibambele programme?

3. Would you have liked to have been awarded a Zibambele contract?

RESPONSE	CODE	REASON
Yes	1	
No	2	

4. Do you think that being awarded a Zibambele contract could have made a positive impact on your present living conditions?

RESPONSE	CODE	REASON
Yes	1	
No	2	

5. Do you know of any other person(s) or member(s) of your community that have been awarded a Zibambele contract?

RESPONSE	CODE
Yes	1
No	2

5.1 If yes, please fill in the table below:

NUMBER OF PERSON(S)	GENDER	AGE
N/A		
1		
2		
3		
4		
Other (Specify)		

KEY:

- 1. Age of member**
1. <16-24
 2. 25-34
 3. 35-44
 4. 45-59
 5. 60 and over

- 2. Gender**
1. Male
 2. Female

E. ZIBAMBELE MAINTAINED ROAD

1. What is the name of the closest road to your home that is Zibambele maintained?

2. Distance of household from the closest length of road that is being maintained:

<100m	101-300m	301-500m	501-700m	701-900m	>1KM
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3. How often is the maintained road used?

FREQUENCY	CODE
N/A	0
Daily	1
Once a week	2
Twice a week	3
More than twice a week	4
When necessary to use the road	5
Other (specify)	6

4. Have you noticed an increase of vehicles that are using the road after implementation of the road maintenance programme?

RESPONSE	CODE
Yes	1
No	2

4. What type(s) of vehicles use the maintained road?

TYPE OF VEHICLE	CODE
N/A	
Bicycle	
Car	
Bus	
Mini bus taxi	
Heavy vehicles e.g. trailers/trucks	
Animal drawn vehicles e.g. carts	
Other (specify)	

4.1. How often do the vehicles identified above make use of the maintained road?

FREQUENCY	CODE
N/A	0
Several times in the day	1
Once a week	2
Twice a week	3
More than twice a week	4
All the times	5
Other (specify)	6

5. How was the response of emergency vehicles such as police and ambulance services to your current location before the road could be maintained? Give a reason.

RESPONSE	CODE
N/A	0
Responded within a few minutes (<10 minutes)	1
Responded within 30 minutes	2
Responded between 30 minutes to 1 hour	3
Respondent in more than 1 hour	4
Other (specify)	5

5.1 Give a reason for the response selected above:

6. How would you rate the response from emergency vehicles to your current location after the road has been reconstructed and maintained?

RESPONSE	CODE	REASON
N/A	0	
Improved considerably	1	
Improved slightly	2	
Not much improvement	3	
No improvement at all	4	
Other (specify)	5	

7. Did rainy weather have an impact on the use of the road before the road could be maintained?

RESPONSE	CODE	REASON
Yes	1	
No	2	

8. Has reconstruction and maintenance of the new road improved access during rainy weather?

RESPONSE	CODE	REASON
Yes		
No		

F. HOUSEHOLD MEMBERS PERCEPTIONS ON ZIBAMBELE AND POVERTY ALLEVIATION

1. Are you satisfied with the Zibambele road maintenance programme?

RESPONSE	CODE	REASON
Yes		
No		

2. Where you or your household members consulted about the Zibambele programme/project?

RESPONSE	CODE	REASON
Yes		
No		

3. How were you and your household members informed about the road maintenance programme?

WAY INFORMED	CODE
N/A	
Through government Authorities	
Traditional Authorities/Indunas	
Local District Councilors	
Social Gatherings	
Word of Mouth from family/friends	
Other (Specify)	

4. Do you know how households were selected and awarded the Zibambele contracts?

RESPONSE	CODE
Yes	1
No	2

4.1 If yes, how are the houses selected and awarded Zibambele contracts?

5. Are you satisfied with the selection process? Give a reason.

RESPONSE	CODE	REASON
Yes	1	
No	2	

6. How would you rate the selection process?

RATING	CODE
N/A	
Very Fair	
Fair	
Neutral	
Unfair	

7. How has the Zibambele road maintenance programme impacted on daily routines in your household?

	BETTER	WORSE	UNCHANGED	REASON
N/A				
Collection of firewood/water				
School Attendance				
Church				
Local clinics				
Mobile clinics				
Community centers				
Neighboring communities				
Travel to main town/city				
Visiting other residents				
Other (specify)				

8. What are some of the benefits that Zibambele offer to the community members?

BENEFITS	CODE
N/A	0
An income to the household	1
Savings club	2
Skills / training	3
Social gathering	4
Other (specify)	5

9. Do you think that the construction and maintenance of rural roads will help improve the development of the area?

RESPONSE	CODE	REASON
Yes	1	
No	2	

10. Have any other development projects started in the area after the Zibambele programme was launched? Yes/ No
If yes, what other projects are in operation in the area?

11. What are some of the disadvantages of the Zibambele programme for your household and community?

12. What are some of the problems generally facing your household?

13. What are some of the problems generally facing the entire community?

14. Do you think that there should be more government initiated labour-based projects in this community? Yes/No. Give a reason for your response.

15. What type of projects would you like to have take place in your community in the future?

THANK YOU FOR YOUR PARTICIPATION IN ANSWERING THIS QUESTIONNAIRE!!!