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AN EVALUATION OF THE SOCIAL AND ECONOMIC IMPACTS OF ADDITIONS AND IMPROVEMENTS TO RURAL ROAD INFRASTRUCTURE ON THEIR SURROUNDING COMMUNITIES

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A project report submitted to the Faculty of Engineering, University of the Witwatersrand, Johannesburg, in partial fulfillment of the requirements for the degree of Master of Science in Engineering.

Johannesburg, 1991

DECLARATION

I declare that this project report is my own, unaided work. It is being submitted for the Degree of Master of Science in Engineering in the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination in any other University.



.....

(Signature of Candidate)

....4.... day of ..June.... 1991

ABSTRACT

Traditionally ex-ante evaluation of road projects has taken little other than the direct economic effects of road projects into consideration. There has however been growing recognition of the importance of social and economic effects caused by road improvements and the importance of including them into the evaluation procedure.

The purpose of this dissertation is to determine the social and economic effects of road improvements on road users, local businesses and local communities. Surveys aimed at the targeted groups were undertaken along sections of the Libode and Sterkspruit Roads in the Republic of the Transkei. Respondents were questioned on a number of issues including the effect of the road on the development of the region, business activity, population movements and business location, travel behaviour, factors traditionally taken into account by ex-ante evaluation, agricultural and other informal activities, employment opportunites etc.

The results indicate that additions and improvements to rural road infrastructure largely have positive effects, benefitting road communities and businesses. In addition to the direct effects of road improvements [traditionally included in ex-ante evaluation] effects associated with the availability of transport for travel as well as the effect of the additional road or improvement on the accesssibility of the region should be included in future ex-ante evaluations.

By successfully incorporating the grass-root level effects identified by local communities into the evaluation process, decision makers, required to make long term decisions, yet elected to power in the short term by affected communities, can make sounder decisions for the benefit of the community in both the short and the long term resulting in improved and more effective planning.

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CHAPTER 1 : INTRODUCTION

Evaluation techniques of road projects in developing communities in South Africa traditionally apply some form of economic appraisal. It was hypothesised, however, that road projects have a wider range of effects on communities surrounding a road, than simple economic effects. Furthermore current appraisal techniques seldom incorporate the effects of road projects on communities into the evaluation procedure.

The author does acknowlege that road projects are often part of a larger and longer term development package required to further economic development. Grass-root level effects of projects are however important to political leaders, required to make long term decisions, as they are elected to power in the short term by affected communities. The objective of the study was therefore to identify the perceived effects of road improvements and additions to rural road infrastructure on surrounding communities so that these effects, perceived by the people, can be incorporated into the evaluation procedure so that similar projects in the future can be more effectively evaluated prior to project implementation.

Chapter 2 of this dissertation firstly deals with a historical review of the role of roads in economic development. This is paralleled with a historical discussion of evaluation techniques applied to road projects.

This is followed by a Chapter on the place and role of post-implementation evaluation in the transport planning process and a review of evaluation procedure. Chapter 4 then provides an over-

view of socio-economic effects as identified by other studies on the effect of additions and improvements to rural road infrastructure on surrounding communities.

A discussion of salient characteristics of the case study area likely to influence a post-implementation evaluation study initiates Chapter 5. The rest of the Chapter discusses the evaluation methodology, sample size, and process of undertaking the evaluation study.

Chapter 6 provides an indepth discussion into the results of the survey, and in Chapter 7 some conclusions and recommendations are given.

CHAPTER 2 : THE ROLE OF ROADS IN DEVELOPMENT

2.1. A DEFINITION OF TRANSPORT

The process and means of moving people and goods are normally referred to as transport. Transport is essentially composed of two basic components, namely - the way and the vehicle. Roads can be simply described as movement channels which link points in regional space. Vehicles are any means of carrying, conveying or transporting on the way. According to Howe et al (1984) the "fundamental issue ... in financing and planning of rural development programs [is] to view the movement of the poor as transport problems, both [in terms of] vehicle and track, rather than accessibility difficulties that can be solved by the provision of roads." Hathway (1985) contends that "as transport is a combination of road and vehicle, it is surprising that more emphasis has not been placed on the provision of vehicles to complement the investment in roads." The study of vehicles to complement the way is not within the scope of this dissertation, however the writer does acknowledge the importance of the vehicle in achieving accessibility objectives. The study specifically deals with the social and economic effects of improvements and expansions to road infrastructure.

According to Barwell et al (1985) "local transport system is the means to simplify the attainment of basic needs such as food, clothing, shelter, education and health." Hathway (1985) states that "transport is essential in meeting basic needs of the entire population" and explains further that the satisfaction of basic needs is a paramount priority for the individual. Basic needs are seen by Hathway (1985) to be comprised of two elements.

"First, they include certain minimum requirements of a family for private consumption : adequate food, shelter and clothing as well as certain household equipment and furniture. Second, they include essential services provided by and for the community at large, such as safe drinking water, sanitation, public transport and health, education and cultural facilities." Transport is rarely desired for its own sake; it is merely a means to the successful achievement of other ambiguous and often conflicting objectives, the type and intensity of transport required being dictated by the particular needs which it is being used to satisfy.

2.2. A CLASSIFICATION OF ROAD TYPES

A classification of the types of roads is necessary to determine exactly where the study is focussed. Roads differ in function and characteristics and, as a result, attempts to categorise roads tend to be somewhat arbitrary. The classification below is based on concepts suggested by Beenhakker et al (1987) and Devres (1980) and includes characteristics special to the Southern African situation. Map 3 indicates the classification in terms of the Transkei. The classification is based on a hierarchy of a nation's road network. Beginning this hierarchy are roads which are termed primary roads.

The main function of primary roads is to form the principal avenues of communication between major regions of a country, including connections between regional capitals and neighbouring countries. Similarly the main function of secondary roads is to form the principal avenues of communication for movements between regional capitals and adjoining regions and their capital centres; between regional capital centres and key towns; and between key towns. Tertiary roads are usually found in a rural type environment and are generally recognised as part of the in-

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tegrated road network connecting primary and secondary roads and connecting centres of substantial population and economic activity. Feeder roads are found in rural areas allowing no through flow traffic but channelling local traffic onto the higher road network and furthermore performing the function of serving minor population groups or small centres of economic activity. Further down the road network hierarchy are lower access infrastructure including tracks [single lane unimproved tracks normally associated with non-motorised forms of transport]; trails [narrow tracks] and paths [a narrow cleared way for walking traffic].

This paper is concerned about the evaluation of the impacts of improvement of secondary and tertiary road types. The most prominent difference between the evaluation of primary or national roads and the evaluation of secondary and lower order roads is that greater emphasis of transport economics [traffic generated, user cost savings etc] has been placed on primary roads while broader economic and social considerations have been traditionally of minor importance. An analysis of the literature indicates that the reverse is usually true in the analysis of lower order roads, where the impact is suggested to be much more diffuse, with induced changes in agriculture and non-agricultural production, health, education and other social and environmental effects. The impact of such roads in rural areas is discussed in greater detail in Chapter 4.

2.3. FUNCTIONS OF TRANSPORT

A number of functions of transport have been identified in the literature. The economic function of transport is essentially aimed at enlarging the utility and usefulness of goods, people and information by changing their location to where the utility is greatest in terms of place and time. This simply means that

transportation bridges the gap between producer and consumer. The satisfaction, benefit or quality of the movement must be equal to, or greater than, the cost and labour it entails.

The political function of transport is to achieve political unity, as well as providing accessibility of the entire population to the political services of a country, including administration, justice and the enforcement of law.

Transport plays an important role in defence and other strategic concerns. In the event of national emergency arising out of dispute with other countries [in both offensive and defensive occasions] transport facilities must be capable of assembling the material for defence, conveying goods to areas of production which may not be precisely the same as those in peace time, and speeding supplies and armed forces to areas of conflict.

Lastly, transport has an important social function by creating opportunities for individuals to obtain education, recreation and health services etc. The quality of the transport service and the cost thereof affect accessibility to social services and subsequently have an effect on settlement patterns.

The broad object of a transport system is therefore to assure the availability of fast, economical and safe transport, which reflects the developmental needs of a country, and to move goods, people and information without discrimination or waste in response to both public and private demand in the most efficient and economical way, consistent with other non-economic objectives such as health, convenience and national security.

From the short summary of the main functions of transport we can see that the role of a nation's or region's transport system often has competing and incompatible objectives. Transport policy

is intertwined with policy choices in other sectors and they all depend on overall national decisions. The functions of transport also have a number of secondary and spin-off effects. The primary and spin-off effects of roads on surrounding communities form the subject of this dissertation and a literature review of the known effects of road improvement on surrounding communities is contained in Chapter 4.

2.4. ECONOMIC DEVELOPMENT AND THE ROLE ROADS MAY PLAY IN THIS PROCESS

2.4.1. What is Economic Development ?

Amongst the most obvious general goals of any nation is that of economic progress and development. Economic development can be defined as the "process which makes people in general better off by increasing their command over goods and services and by increasing the choices open to them." [Elkan (1973)]. This is synonymous with saying that economic development means a rise in the standard of living in the not too distant future. What then are the dynamic forces of development and what role does transport play in the development process? The development process has been defined as the "set of changes in the economic structure required to sustain a continued increase in income and welfare" [Tomlinson (1989)]. The development process involves three sets of interrelated changes. These are changes in a country's productive capacity, in the use to which a nation puts its resources, and in various socio-economic transformations. Increases in productive capacity can be achieved via :-

" - investment in physical capital [machinery, infrastructure]
- investment in human capital [education, health, nutrition]
- the aquisition of knowledge [technological advance, research, and organisational capacity]" [Tomlinson (1989)].

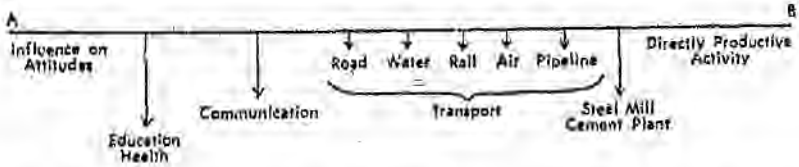
2.4.2. What Type of Investment is Transport Investment ?

Investment in transport infrastructure largely falls within the physical capital investment category which can have one of three consequences. An investment may have a positive effect where new, directly productive undertakings are the direct result of the new investment, a neutral effect where the investment does not lead to productive activities and subsequent increase in economic growth or a negative effect where the investment directly eliminates productive activities and slows the level of economic growth by diverting investment from efficient uses. Theoretically there is an optimum amount of transport capacity required for a specific stage of development. Investment in transport or transport capacity should be neither substantially above nor substantially below the optimum requirements. Excess capacity involves a misuse of limited and scarce resources and a lack of adequate capacity jeopardizes progress and may "impede the development of the overall national economy." [Rondinelli (1983)].

Economists have varying views on how physical capital investment [including transport infrastructure] causes economic growth and development. Wilson et al (1966) expressed that economic growth is, in many respects, a learning process, whereby the human factor aquires new skills, aptitudes, capabilities and aspirations. Owen (1987) concludes from World Bank data "that only about one third of the economic growth rates around the world can be attributed to capital formation and that much of the balance is due to improvement in the capabilities of human beings. Investments differ in the extent to which they affect both attitudes and technical productivity." Investments in directly productive facilities usually affect a far smaller number of people than investments in health, education or general communication. Figure

2.1 graphically represents the range of investments and their corresponding influences on the attitudes of individuals.

FIGURE 2.1 : INVESTMENT OPTIONS AND ATTITUDES [after Wilson et al (1966)]



From Figure 2.1 we can see that transport and particularly road transport lies intermediately on the scale between A and B. According to Wilson et al (1966) "... investment in transportation has a wider geographical dimension than almost any other [investment]." Wilson et al (1966) goes on to explain that transport investment and particularly roads, not only has an important role to play in physical capital formation needed for economic growth but also play a significant role in human capital formation which may be more important than pure physical capital investment. The education and other spill-over effects of road transportation appear to be greater than those of other modes of transport and other capital investments and this is especially significant at low levels of development. Maasdorp (1984) states that social overhead investment [of which transport is one element] creates investment opportunities in directly productive activities but "the provision of social capital must precede these activities which play the role of a trail-blazer in economic development." Thus road investments can be seen as not only investments in human and physical capital, but also offering one of the best avenues for the acquisition of entrepreneurial skills and other knowledge. Therefore economic planners in reality have a much broader range of investments and expenditure options than that implied in the traditional rate-of-return calculation.

In conclusion we can see that roads are not only investments in physical capital but also investments in human capital and knowlege acquisition. These three elements change productive capacity and this is one of the three main elements needed for positive economic development.

2.4.3. Road Transport as Performing a Leading Role in Development

Suggestions have been made that transport plays a leading role in development. According to Wilson et al (1966) "a more important reason for stressing the role of transport is the frequent claim that, at least in the early stages of development it is the key sector." Van der Wess in Howe et al (1984) concluded that the transition from a subsistence to an exchange economy required the creation of surplus transport capacity, that is transport leading development. In some cases however the preconditions for economic take-off are already present, and the building of transport facilities provides the spark that activates otherwise dormant economic potential. Heymann in Maasdorp (1984) however questions whether transport can in fact act as a development catalyst and "concedes that it affects the course of economic development but doubts whether it can call forth other economic development."

2.4.4. Road Transport as Indispensable to Development

Prior to 1960 the attitude towards transport as indispensable to economic development was widespread and transport was seen as a necessary ingredient of nearly every aspect of economic and social development. Rostows' stages development theory regards transport as the most powerful single initiator of the take-off of industrial development. Rostow (1960) stated that "... the preparation of a viable base for a modern industrial structure requires that quite revolutionary changes be brought about in two

non-industrial sectors : agriculture and social overhead capital, most notably in transport." The fact that a transport base was created prior to, or coincidental with, rapid growth in Western industrial nations has reinforced the high percentage of investment devoted to transport as well as the significance of transport to the development process. Transport improvement was often recommended as one way of tackling the problem of underdeveloped countries or regions. A number of more recent authors have expressed similar views of transport being indispensable to economic development. Haily in Howe et al (1984) states that "there seems to be no other type of development which can effect so speedy a change in the economic and social conditions of a backward country." Owen (1987) proposes that "advances in the technology of moving people and goods underlie much of the world's economic and social progress." and Viljoen (1985) states that "there is a close interdependance between regional development and transport." Copley in Dewar (1985) states that increased accessibility is automatically positive in developmental terms. Specifically, it is assured that increased accessibility promotes economic development by stimulating the operation of the "market forces". Gichaga in Marais (1987) is convinced that roads stimulate and accelerate development and economic growth in developing countries. He states "it is generally recognised that road building stimulates developments in developing countries especially in the rural agricultural areas ... and the rate of development of developing countries is a direct function of the efficiency of the transportation system in these countries." In conclusion we see that a large number of researchers see the only consequence of building a road to be the furthering of development - or perhaps continuing existing forms of social and economic development on a large scale.

This broad and uncritical view of the impact of roads on development is reflected in the attitude of the World Bank and the In-

ternational Development Organisation who essentially lend capital to developing countries and "provided in the period 1946 to 1964 2.3 billion ... [representing] 35% of all loans for projects in transportation" [Owen (1987)]. Similarly in the local context the Development Bank of Southern Africa allocated R 2251 million for bulk infrastructure project development [which includes transportation, water resources, energy and post and telecommunications development] for the 1989/90 financial year representing 46% of total funds [Annual Report of the Development Bank of Southern Africa 1989/90].

The correlation between mobility and economic progress can be seen in comparison between the gross national product per capita and transport facilities and traffic. Table 2.1. illustrates a clear relationship between per capita income and travel.

TABLE 2.1 : INDEX OF PER CAPITA GNP AND MOBILITY (FRANCE=100)
[after Owen (1987)]

Selected Countries	GNP per Capita	Travel Mobility	Freight Mobility
Switzerland	139	104	81
Sweden	119	96	151
Federal Republic of Germany	117	101	57
Belgium	109	88	117
Norway	106	55	107
United States	106	160	260
Netherlands	101	83	42
France	100	100	100
Canada	95	114	374
Australia	91	107	335
Japan	87	96	94
United Kingdom	63	78	47
Czechoslovakia	53	54	132
Italy	53	66	49
Spain	43	54	44
U.S.S.R.	40	34	229
Hungary	38	24	68
Venezuela	31	24	36
Yugoslavia	24	32	55
Argentina	24	32	114
Iran	32	10	10
Brazil	18	18	23
Mexico	15	14	42
Republic of Korea	15	8	16
Malaysia	14	11	26
Turkey	14	5	26
Ecuador	11	5	21
Colombia	11	6	47
Nigeria	6	5	5
Philippines	6	2	18
Egypt	5	5	13
Indonesia	3	3	5
Pakistan	2	3	10
China	2	3	16
India	2	5	26
Ethiopia	1	2	3
Bangladesh	1	2	3

2.4.5. The More Critical Evaluation of the Role of Transport

Analysis of roads in the mid-60's showed the effects of roads to be disappointing and literature of that period tends to suggest that transport does not play such an important role in development as previously thought, and authors expressed a much more skeptical attitude toward transport as an initiator of development. Authors of this school of thought generally expressed that increased accessibility is unlikely, in its own right, to stimulate development in depressed outlying areas, although it has the potential to accelerate the rate of development in areas where an existing economic dynamism occurs. In recent years the emphasis on transportation has declined as other aspects of development have gained recognition. "The decline has brought transport lending to less than 15% of the World Bank's total operation." [Owen (1987)]. In a similar trend the United Nation's Development Program has reduced expenditure on transport to within 12% of total expenditure. [World Development Annual Report (1988)]. Furthermore a number of authors have expressed that roads have little or no impact on economic development. According to Owen (1987) "transport was a response to pressures generated both from within and without instead of being a necessary precondition or even leading sector of economic development." The growth of most road networks is an irregular or sporadic but continued natural process of evolution from footpaths and trails to roads influenced by many specific economic, social and political forces. Skorpa et al (1974) believes "the role of transport investment in economic growth is not unique. Transport investment is no more an initiator of growth than any other form of investment or deliberate policy."

The set of circumstances surrounding any expansion of transport capacity remains critical and greater emphasis has been placed on this. Wilson in Howe et al (1984) suggests that there are

largely two factors that explain the variations of results in studies of transport and development. They are " firstly, the criteria of economic opportunity and secondly, the response to economic opportunity. The first depends on the quality and quantity of resources in the region served, the actual change in transport rates and services and commodity price levels. The second depends upon an awareness of opportunity and what may be broadly defined as attitudes towards economic change." Thus investments in transport may lead to little or no development because the other ingredients of successful farming or manufacturing were not available and not supplied. Response to road opportunities depend on the quality and quantity of resources, attitudes and other aspects of culture, social relationships, individual psychology and levels of well being.

2.4.6. The Multi-sector Package

Later development theory tends to suggest that transport is only one element in a multi-sectoral package that is necessary for the growth process, although transport was seen to form an integral part of the joint investment. Wilson et al (1966) refers to this package as "clusters of change [which] if they occur together will produce one kind of result, while if they occur separately or sequentially different results will occur." He concludes that for transport investment to be successful it must be part of this cluster of change. Evidence from studies by the World Bank conclusively shows that the negative effect of road investments was associated with a lack of complementary investments. Conversely the projects that were most successful in improving the lives of the rural poor involved carefully co-ordinated multi-sector investments. Road development with other investments are however seen as part of an initiating cluster of change and deserve recognition as one of the causal agents of economic and social change. Odier in Marais (1987) states that "it is impossible to

consider a road programme in isolation and that it must be integrated in an economic and social development plan. Roads are always a factor of development, but the development which may be expected from them only takes full effect if it is accompanied by parallel action in the same sphere or other spheres." Viljoen (1985) sums up the thinking of the Development Bank of Southern Africa on transport in development. "It is ... now generally accepted that the stimulus to growth requires a set of conditions of which transport capacity is but one." If rural development is to succeed in developing communities, it is apparent that integrated, carefully designed programmes which ensure the existence of all of the pre-conditions for success are necessary. Certainly, the provision of better and more extensive transport infrastructure undertaken in isolation from these other issues, is not sufficient to promote rural development.

2.4.7. An Overview of the Role of Roads in Development

A review of literature has proved that the relationship between transport and development has defied simple synthesis and remains inconsistent and paradoxical. In conclusion it can be stated that there is a close relationship between transport and development because mobility and access are the only means by which the ends in other sectors can be accomplished. Studies prove that in most cases, changes in the transportation system do have an influence on development and activities in adjacent communities. The literature generally accepts that road building and improvement must form one component of an integral package. The extent transport plays in development is ambiguous, although it is clear that road building and improvement have noticeable economic and non-economic impacts on the surrounding communities. These effects are discussed in greater detail in Chapter 4.

2.5. HISTORICAL REVIEW OF EVALUATION TECHNIQUES OF ROAD PROJECTS

The final part of this chapter discusses techniques for road choice which is paralleled by the historical review of the attitude and thinking of the role road projects play in the development process. This section is concerned with a brief overview of evaluation techniques of road projects and is not concerned with a detailed discussion of specific techniques. There are basically three phases of techniques that have been used for road choice. Chapter 3 discusses the role of evaluation in the overall planning process.

2.5.1. Engineering Techniques

The first of the three groups of techniques is the use of purely engineering criteria in the assessment of road needs based on a natural process which favoured areas of population density, and particularly those with a more advanced economic structure. Co-ordination of road planning with developmental goals was minimal. One of the first quantitative selection criteria for road planning and improvement was the Highway Sufficiency Rating of the Arizona State Highwy Authorities in 1946 which essentially determined the engineering characteristics which a road ought to have, given a certain amount of traffic.

2.5.2. Cost Benefit Analysis and Associated Techniques

The next group of techniques used in the evaluation of roads is the beginnings of simple cost-benefit analysis and associated techniques. Other techniques include cost-effectiveness, priority ranking, goals achievement matrix approach, planning balance sheet approach, optimization techniques and successive subsetting techniques. For a detailed discussion of each of the above techniques see Shaw (1991). Lending institutions generally

use cost-benefit or some other economic efficiency technique to determine project feasibility due to the inherent characteristics of such institutions. Justification of a project depends on demonstrating that it would result in economic benefit in excess of its costs, while the distribution of impacts and other non-economic effects are overlooked.

2.F 3. Quantitative Selection Criteria Prior to Cost Benefit Analysis and Associated Techniques

The last group of ante evaluation techniques is the introduction of generalised socio-economic indicators as pre-selection criteria prior to cost benefit analysis or other associated techniques. Social and non-economic criteria have been put forward to be used in the overall decision making framework but, up to now, have rarely been used in practice. There has been increasing recognition of social and other non-economic effects of road improvements but little has been done to include such impacts into the overall framework of decision making. This dissertation attempts to identify social and economic effects caused by road improvements and extensions in rural areas that could be sucessfully used in the evaluation stage to improve the planning and design of similar projects in the future. The increasing importance of incorporating non-economic criteria into the evaluation procedure has been emphasised by a number of authors.

Thomson in Howe et al (1984) concludes that non-economic considerations are important in transport planning. However "<u>such recognition was merely registered and had no influence on evaluation methodologies, which continue to give attention solely to economic aspects.</u>" Plumbe in Devres (1980) states that "<u>it might be better to focus on the qualitative changes rather than the level of production, income, or traffic as they are increasingly recognised as being as or more important.</u>" Both Wilson et al

(1966) and Skorpa et al (1974) recognise the importance of social and non-economic effects that road projects have. Wilson et al (1966) states that "in the final analysis this [non-economic impacts] may be more important than the direct economical benefits." Similarly Skorpa et al (1974) states that "the indirect or spillover effects of road transport are more important than the direct reductions in user costs and faster transit and the non-economic role of roads can be of overiding importance." Furthermore Steiner in Howe et al (1984) sums up by saying that "in the future planning of the world, the predominant factor to be taken into account would be man himself, and the number of men that may be benefited by the construction of any particular road, and not the number of vehicles it may carry." According to Alder in Howe et al (1984) one of the major reasons for excluding social and non-economic criteria is the lending institutions "because they are not a major consideration for lending by most sources of foreign finance, whose primary purpose is to stimulate economic development." The slight emphasis on non-economic effects has been attributed to the comparative recent emergence of these as development issues and the difficulty of incorporating them into the techniques that are readily used in road project appraisal. Social objectives are often left out on the grounds that they are difficult to measure in money terms. Theoretically methods of combining economic and social indicators into a single decision index have been largely rejected as too complex, and practically too expensive to be workable.

3.5.4. An Overview of Evaluation Techniques of Road Projects

Cost-benefit analysis or other economic effeciency techniques are generally used in the evaluation of rural road projects. This has been attributed to the inherent characteristics of lending institutions which need to justify that a project would result in economic benefit in excess of its cost. There has however been

growing recognition of the importance of social and economic effects caused by road improvements and extensions and the importance of including them into the evaluation procedure. Social impacts are employed in a number of developing nations as selection criteria for pre-economic appraisal. The final choice is often made purely by quantitative and economic criteria.

3.5.4. An Overview of Evaluation Techniques of Road Projects in the Transkei

Evaluation techniques of road projects in rural areas in the Transkei do not take social criteria into account but simply uses a modified form of cost benefit analysis based on suggestions of the National Institute for Transport and Road Research. According to the Transkei Transportation Infrastructure Development Plan formulated by Bergman and Partners (1983) roads considered for surfacing were based on vehicles per day, future development considerations and strategic and international considerations but "economic ranking was taken as the basis for the overall prioritization of the developmental programme." The report further states that "whilst traffic volumes are undoubtedly the most significant factors in road improvement assessment it was considered necessary however to assess the priority of each link in the network on a detailed financial cost benefit basis." The economic analysis consists primarily of the assessment of the benefits of road improvements in terms of road user and maintenance cost savings with respect to the initial capital of the improvements. Net present value and economic rate of return were used to rank links in priority order.

The Road Construction Priority Study prepared by Stewart Scott and Partners (1988) and currently used by the Transkei Government's Department of Works and Energy for road prioritization, states that, "in addition to the conventional highway cost-

benefit analysis consideration has also been given [albeit to a limited extent] to non-economic and developmental aspects of individual projects." In practice though the study does acknowledge that road improvements and additions lead to "spin-off or multiplier effects which stimulate secondary activity with benefits to the people" no social criteria are used to prioritize road projects which essentially use an economic technique. The cost benefit analysis technique compares the total, quantifiable cost of implementing each project with the similar costs of not implementing the project. The component costs of each scheme include road user costs [travel time savings and vehicle operating costs]; road maintenance costs and construction/rehabilitation costs. Priority decisions were therefore based on economic criteria.

The appraisal report board summary (1985) of the Development Bank of Southern Africa which is involved in much of the funding of road projects in developing regions states that the transport development objective for the Walaza Bridge to Lady Grey Road [Sterkspruit road] is to "facilitate economic development of the Hershel district of Transkei and is regarded as essential for the upliftment of the area and should act as a catalyst to stimulate development." The Transkei Government identified the Sterkspruit road as its highest priority in the appraisal stage. This is largely due to a political motivation to show inhabitants some visible sign that they are not being neglected. No social or environmental appraisal was undertaken but "the proposal to pave the road was subjected to conventional cost benefit analysis taking account of capital cost, residual value, road user costs and maintenance costs" [Appraisal Report (1985)]. The method of economic analysis used to appraise the Sterkspruit road is the method recommended by the South African Department of Transport. Furthermore according to the appraisal report (1985) "a complementary evaluation of the paving project has been carried out

according to the Visser warrant taking account of the relative costs of vehicle operation, road maintenance and construction of the paved surface."

Effects of improving the road were seen to be as a "diversion of traffic taking advantage of route shortening [through routing], regional redistribu ion of trips and extra local trip generation. Benefits taken into account include "savings in vehicle running costs, savings in road maintenance costs and savings in accident costs." The appraisal does recognise that the "upgrading does have other non-quantifiable advantages" but these are not taken into account and final decision to surface the road was based on cost benefit analysis.

According to the appraisal report board summary (1986) of the Development Bank of Southern Africa the development objective for the Libode to Mqwenyana Road is "to support the current and envisaged levels of economic activity in the eastern part of Transkei and surrounding areas." Furthermore the appraisal report states "the lack of an all weather road inhibits any possible future development" and construction would contribute towards the economic potential of agriculture, industry and tourism over the medium and longer terms. The above stated objective of the Libode Road is not obtainable through the construction of this section alone but rather through the upgrading of the whole of Route 61, together with a systematic development program which would establish a broader economic base for the region. Apart from broader developmental benefits, benefits of the road included "reduced facility maintenance costs, reduced vehicle operating costs, reduced travel time savings and reduced accidents". Benefits were compared to capital cost estimates and an internal rate of return calculated and according to the report the "project is beyond any doubt justified on economic and traffic volume grounds." Thus although social and developmental

benefits are recognised as important factors of road construction, the final decision to construct the road was based on economic analysis and financial appraisal. Furthermore route realignment decisions were based on economic and engineering considerations and no social or environmental appraisals were undertaken.

In conclusion we can see that the decisions of the Transkei Transportation Infrastructure Development Plan (1983), the currently used Road Construction Priority Study (1988) and the appraisal reports (1985 and 1986) of the Development Bank of Southern Africa are all based on economic appraisal. Some social, developmental and other non-economic effects of additions and improvements of road infrastructure on surrounding communities in rural area are recognised but are not included in the final decision making stage of the ex ante-evaluation stage of the planning process. Chapter 6 investigates the effects of road improvements within the South African context and indicates some effects that should be included in the ex ante-evaluation stage of the planning process so that the planning of similar projects can be improved in the future.

CHAPTER 3 : THE PLANNING PROCESS AND THE ROLE EVALUATION PLAYS IN THIS PROCESS

3.1. WHAT IS PLANNING ?

Planning is an extremely ambiguous and difficult word to define, and individual definitions of planning are abundant and varied. As a starting point we will look at a general meaning of planning. In the words of Mackaye in Bruton (1974) "every deliberate action must be conceived and rehearsed in the realm of thought before it can take place in the physical. It must be created before it can be done." From this we can deduce that planning is orientated predominantly towards the future, however it is involved with the past and the present. Friedman in Glasson(1974) fines planning as "primarily a way of thinking about social and economic problems; planning is deeply concerned with the relation of goals to collective decisions and strives for comprehensiveness in policy and program." Thus planning is concerned with deliberately achieving some objective, and it proceeds by assembling process into some orderly sequence. This sequence is generally known as the planning process.

3.2. THE PLANNING PROCESS

Although this study is specifically concerned with the transport planning process it cannot be analysed in isolation and must be analysed within the wider context of the overall planning process and national policy. This is because each sector within the economy is interrelated to every other sector and each sector is affected by factors unrelated to forces affecting the others. An economic development plan is a guide to all sectors and is deter-

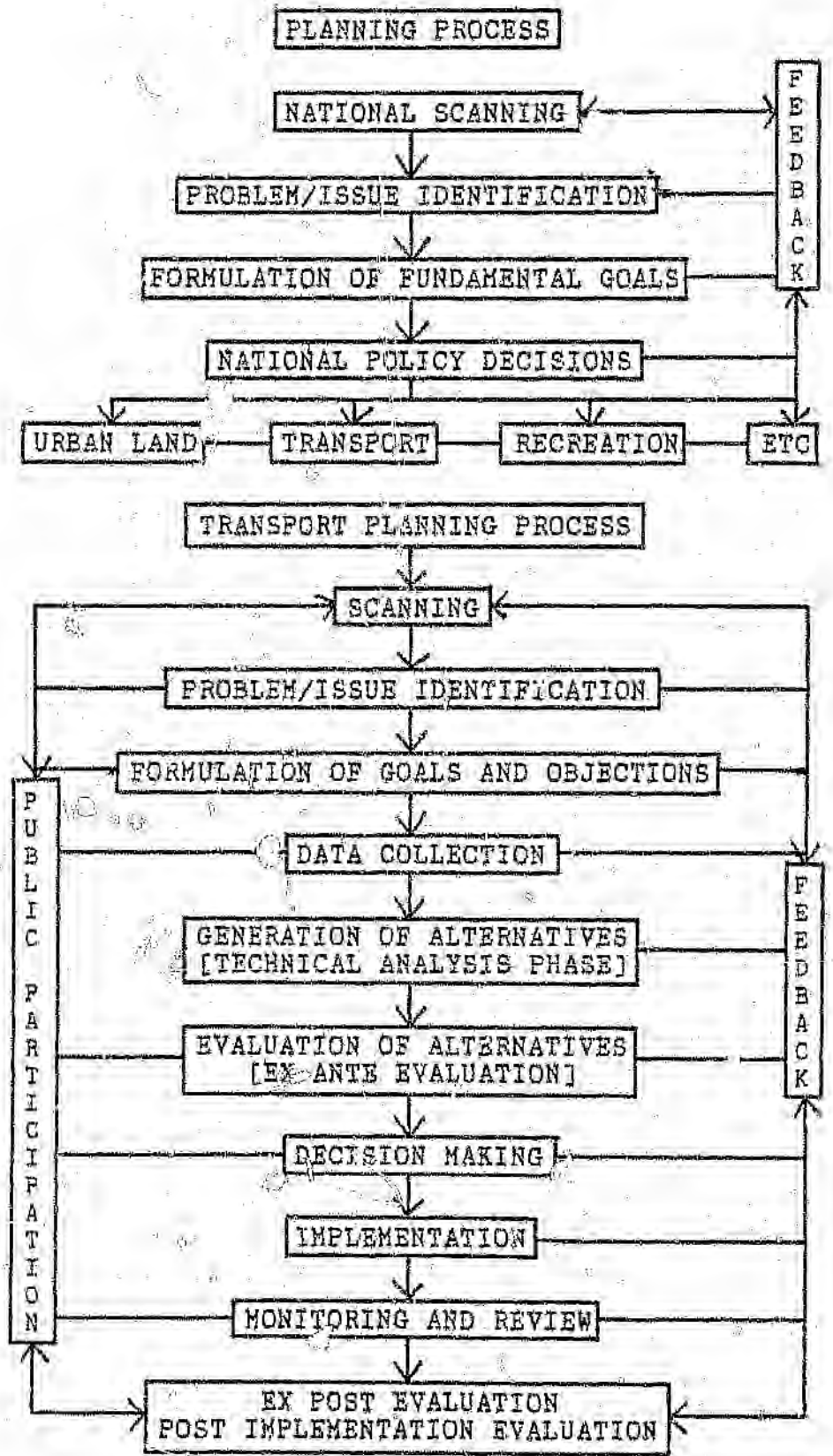
mined by national policies developed in response to a set of problems as seen by political leaders in power. Therefore transportation plans must be integrated into and prepared concurrently with general economic development plans so that they can best serve the goals of development. This will mean that a nation's transport goals and objectives will reflect, support and promote national policy.

Figure 3.1. illustrates a general representation of the rational model of the planning process by means of a flow diagram. The highlighted steps are those steps with which this dissertation is specifically concerned. Although this dissertation is not concerned with the development of the planning process a review of a general representation of the rational model of transport planning process is discussed below. Process is an important part of planning and according to Camphis (1979) "the characteristics of good planning coincide with an ideal process." The rational model of decision making was chosen as it is the fundamental base for the majority of currently practised transport planning methodologies. Methods not based on the model [eg. incrementalism, mixed scanning, advocacy etc.] gain clarity and meaning in terms of their contrariety to the model and many of these methods can complement the rational model rather than replace it.

3.3. THE TRANSPORT PLANNING PROCESS

[To be read in conjunction with Figure 3.1.]

FIGURE 3.1 : THE TRANSPORT PLANNING PROCESS



3.3.1. Public Participation and Feedback

Although feedback and public participation are not actual steps of the transport planning process they are important components which give credibility and add to the success of the process. Feedback is defined by the World Book Dictionary (1981) as "a process by which a system or device regulates itself by feeding back to itself part of its output." Feedback from each stage of the planning process into every other stage is necessary to clarify and assist the whole process and it is of particular importance in the post-implementation evaluation stage as without feedback, evaluation would be irrelevant. One of the objectives of evaluation is to feedback the experience into the planning process to improve the planning and design of similar projects in the future [see Section 3.3.11.]. Meaningful public participation can be defined as "that process which allows interest groups [or individuals] to share in, and contribute to the formulation of transport plans." [Lawrence (1989)]. This participation in reality involves a complicated and extensive interaction between ideas and facts throughout the planning process from defining a need for a particular problem to implementation and evaluation. The only stage where public participation is limited is in the technical analysis phase of the generation of alternatives stage of the planning process which basically involves modelling and impact prediction. Public participation has a particularly important role to play in the post-implementation evaluation stage where complex social and economic impacts are being investigated as a result of a road project.

3.3.2. Scanning

The initial and continuous stage of scanning makes certain that the planning authorities are aware of problems, trends and preferences. Scanning allows for an overall impression to be

gained without delving into detailed data collection of specific issues. Furthermore scanning gives clarity to problem identification and data collection.

3.3.3. Problem Identification

The objective of this stage of the planning process is to identify and define problems, opportunities and other issues that have been identified in the scanning stage of the planning process. The identified issues should be defined as broadly as possible so as not to constrain the set of possible solutions. Most road infrastructure projects are developed in response to a set of national policies which were determined to overcome problems, as seen by political leaders in power. [Section 3.2].

3.3.4. Formulation of Goals and Objectives

The formulation of goals and specific objectives are necessary in defining the desired state the transport project is intended to achieve and gives direction and meaning to the plan. Values have been defined by Barlow (1979) as "qualities which form the basic desires and drives governing human behavior." Goals [defined as broad statements of intent or "idealised end-states" [Barlow (1979)]] are derived from values in society and are operationalized by a set of more specific objectives [defined as "a statement about a desired factual state" [Barlow (1979)]] against which the performance of the alternative courses of action may be evaluated. There is considerable scope at this stage for meaningful public participation and involvement of the public will improve the credibility and acceptance of the plan. [Section 3.3.1.].

3.3.5. Data Collection

Data is collected in terms of the decided goals and objectives, and methods of achieving the desired ends. Data collection at this stage can form an important source of base-line data needed when comparisons are made in the post-implementation evaluation stage. Currently data collected prior to the evaluation of alternatives does not include a wide range of social, economic and environmental conditions and trends and therefore cannot be successfully used in a comprehensive post-implementation evaluation. Data needed for a successful evaluation are discussed in greater detail in Section 3.3.11.

3.3.6. Generation of Alternatives

Alternative courses of action are devised in response to the predetermined goals and objectives, and the opportunities and constraints emerging through data collection. Each alternative plan attempts to overcome problems identified and achieve established goals and objectives in a different way.

3.3.7. Evaluation of Alternatives/ Ex ante Evaluation

For each alternative that has been developed a set of predicted impacts are produced. Most impacts can be divided into economic, social, natural, manmade and political impacts. The Development Bank of Southern Africa applies strenuous financial, institutional, technical and economic evaluation and to a very limited extent environmental and social evaluations of each alternative plan. This dissertation, in terms of its objective, has been restricted to the social and economic effects of improvements and additions to road infrastructure in rural areas and the evaluation in terms of financial, institutional and technical/engineering aspects are not within the scope of this study. We have seen from Section 2.5.4. that economic evaluation predominates evaluation procedure of road projects in South

Africa. This is often due to the ease of measurement and subsequent analysis of economic data. Economic effects, generally given the most attention in road infrastructure plans, are vehicle operating and maintenance cost savings, time savings, accident savings and road construction and maintenance costs savings. Other economic indicators can include increased agricultural activity, increased home industry activity etc. Social and environmental impacts can also be included although they are often difficult to measure and even more so to analyse. This is however not grounds for excluding difficult social and economic effects as they possibly could be of greater significance than the traditional measures of the effectiveness and success of a rural road project. Chapter 4 provides the reader with a summary of all the known impacts road projects may have on surrounding communities.

3.3.8. Decision Making

During the evaluation stage of the transport planning process the impacts of each alternative are compared and a choice of a particular alternative is made. There are a large number of models available for decision making and they range from the rational comprehensive model to the political bargaining model.

3.3.9. Implementation

The chosen alternative is implemented and this phase covers the actual development or construction of the project to the point at which it becomes fully operational.

3.3.10. Monitoring and Review

Monitoring and review essentially take place during the actual construction or execution of a project and serve as a management

tool or information system, which enables corrections or alterations to be made. Monitoring and review is the ongoing collection of data to be used in tracking the performance of a transport plan over time to make sure it is still heading towards goal achievement. This is very important as goals are likely to change with time.

3.3.11. Post-Implementation Evaluation/ Ex Post-Evaluation

Post-implementation evaluation or ex post-evaluation forms the final step of the transport planning process. Post-implementation evaluation [the term to be applied to this concept in the rest of this dissertation] is the subject of this dissertation and a detailed discussion of post-implementation evaluation is given in Section 3.4.

3.4. POST-IMPLEMENTATION EVALUATION

3.4.1. A Definition of Post-Implementation Evaluation

Post-implementation evaluation entails the evaluation of a completed project and seeks to determine inter alia whether the objectives of the project have been achieved and to draw lessons from this experience that can act as feedback into the planning procedure to improve the planning and design of similar projects in the future. Furthermore evaluation can be used to effectively measure the impacts of a particular project on the surrounding community. This can influence future projects to concentrate on positive impacts usually through complementary projects [Section 2.4.6.]. In summary evaluation can be described as the methodical application of thorough scientific research procedures in order to access the impacts or effects of a project.

3.4.2. Phases of Post-Implementation Evaluation

Undertaking the post-implementation evaluation can be divided into the planning of evaluation, implementation of evaluation and the dissemination of the evaluation findings.

3.4.2.1. Planning of post-implementation evaluation

The planning phase of the evaluation stage involves the specification of the issues and topics the evaluation attempts to evaluate. Specification of the evaluation topic concerns the delineation of what is to be evaluated. This would include the delineation of the target population who are supposed to benefit from the project and the identification of project participants. A field test often ensures that all important issues which need to be addressed are identified. The next step in the planning of evaluation is the determination of the purpose and possible utilization of evaluation findings. Maximum utilization of evaluation findings would entail feedback of evaluation findings into the evaluation of alternatives stage of the planning process so that similar projects can be better planned in the future.

The identification of resource constraints, and a decision as to the feasibility of undertaking the evaluation are the final steps of the planning of the evaluation. Constraints of resources are identified in terms of finance, time and manpower.

From the field test and the identification of resource constraints the selection of an appropriate evaluation technique [usually involving surveys] is undertaken in order to obtain supportive and complementary data.

3.4.2.2. Undertaking the post-implementation evaluation

The undertaking of evaluation includes data collection, analysis and interpretation. Base-line surveys and post-implementation data collection form the most important aspects of impact evalua-

tion. Data collection can include interviews, observations, measurements, questionnaires or a combination of these and other methods. [Section 5.2.5. contains the methods of data collection in the Transkei case study.]

Once data has been collected it is analysed and interpreted. [Section 5.5 and Chapter 6 for the analysis and interpretation of the Transkei case study.]

3.4.2.3. Dissemination of post-implementation evaluation findings
Once evaluation has been completed, the evaluation is documented in an evaluation report and fedback into the transport planning process to improve the planning and design of similar projects in the future.

3.4.3. Post-Implementation Evaluation Design

3.4.3.1. Principles of post-implementation evaluation design of transport projects

The literature on evaluation identified a number of general principles and concepts on evaluation design and a summary of the more important concepts are provided below :-

The study must be long enough to include all the important changes in the community. This would normally mean an evaluation annually for several years. It is also important not to make evaluation studies too soon after investment is complete due to the long gestation period before certain developments emerge, ie. "there may have been insufficient time for some of its [the roads] effects to materialise." Howe et al (1984). One study suggested that it takes between three to five years for benefits to materialise, however according to another it was concluded that "roads had produced substantial immediate benefits." Howe et al (1984). The age of the road however has significant influence

on the impacts and will therefore be taken into consideration in road choice. Evaluation can however be undertaken anything between one and twenty years after completion of the project and depends on the nature of the project objectives.

The study should be continous over time to reveal the general trends in community development both before and after changes in the transport system. This essentially means the availability of good base line data revealing various trends prior to project investment and should be measured at regular intervals over an extended time period.

The geographic limits of the study must incorporate the entire community, including extraterritorial controls. According to Beenhakker et al (1987) "the zone of influence in remote areas is two to three kilometers on each side of a road where physical barriers do not restrict access." The important determinants of the limits of the zones of influence are speed and time which are influenced by terrain combined with the features of the access infrastructure. Factors extending the zone of influence include population density and economic activity [particularly urban centres] while physical barriers such as steep slopes, swamps and bodies of water limit the extent of the zone of influence.

The study should include both positive and negative economic and non-economic impacts in the short, medium and long term and should reveal the significant impacts of a road project which have the greatest importance for community development.

Local circumstances have a considerable effect on the manner in which new road construction and improvement influence economic and social change. For this reason it is not easy to predict the outcome of investment from experience gained elsewhere. Consequently Section 5.1. deals with an overview of the physical,

environmental, historical, social, and economic aspects of the Transkei which could have an influence on the type and intensity of impacts in the local area.

The changes that can be expected from road improvements are seldom as significant as those likely to result from making a route trafficable for the first time. The results will however be similar to those of a new road but with a great deal less magnitude and therefore less far reaching effects. "<u>.... the existence of some kind ot trafficable route is of major importance, its quality a second order consideration.</u>" [Bansal and Patil in Howe et al (1984)].

It is difficult to adhere to the strict guidelines as discussed above. The roads chosen for research in this project will however attempt to come as close as possible to the optimum situation. Due to practical, financial and time constraints a "one shot case study" will attempt to identify the impacts of road improvement projects on the surrounding communities. The study should however not be seen as a once-off study but rather as a pilot study which will provide valuable information into the direction of further long term and ongoing research in the evaluation of improvements and additions to rural road infrastructure.

3.4.3.2. Types of post-implementation design

A comprehensive discussion of evaluation design and its relative advantages and disadvantages is not within the scope of the dissertation. Comprehensive descriptions and analyses of different design advantages and disadvantages are provided by Nachmias (1979); Langbein(1980); Freeman, Rossi and Wright (1979); Rossi and Freeman (1985); Pietro ed (1984); Bernstein (1976); Meyers (1981); Lansing and Morgan (1977) and Burnstein et al (1985).

Figure 3.2 provides a simplified indication of survey design and a symbolic illustration of design methodology. The letter X symbolically represents the period in time when a project is implemented. The letter O symbolically represents the period in time when the implemented project is evaluated. An integer represents the number of times the implemented project is evaluated over time. Where evaluation occurs (O) preceeding an implemented project (X) it is attempting to establish conditions preceding project implementation. Conditions prior to project implementation would then be compared with conditions resulting from project implementation. Where evaluation occurs (O) without project implementation a control area is being established to suggest what would have happened if the project had never been implemented. Conditions in the control area are compared to conditions resulting from project implementation.

FIGURE 3.2 : SURVEY DESIGN METHODOLOGY [after Mastoroudes(1989)

"Survey Design	Symbolic illustration where X= implemented project, O = measurement of variable of survey
Expert opinion	None
Post project design	X O1
Pre project-post project	O1 X O2
Post project comparison or control group design	X O1 O1
Single interrupted time-series design	O1 O2 O3 X O4 O5 O6
Pre project-post project comparison group design	O1 X O2 O1 X O2
Solomon four-group design	O1 X O2 O1 O2 X O2 O2
Interrupted time-series comparison group design [one control group equivalent to target group] and control series design [using a number of similar but not equivalent groups to form a control group]	O1 O2 O3 X O4 O5 O6 O1 O2 O3 O4 O5 O6

Under the most desirable conditions evaluation should determine the magnitude of changes that have occurred over time because of project intervention. Furthermore a control sample must be surveyed so that continuous and ongoing comparisons may be made to eliminate the possibility of external trends. Figure 3.3 depicts the optimum case for the evaluation of rural roads. According to Dickey et al (1984) "it is one of the most rigorous forms of evaluation" and is recommended by Devres (1980) "in order to most accurately determine the nature and degree of [rural road projects] impacts."

This design requires data for an experimental area and a control area and these should be aquired prior to and subsequent to project implementation, and a comparison made. Baseline data provides the benchmark from which the changes associated with projects can be measured, enabling evaluation to go beyond general statements about aggregate impacts. Strengthening the prior and post evaluation approach would be the use of a control area to suggest what would have happened had the road never been built or improved. In this way influences external to the road can be isolated.

FIGURE 3.3 : OPTIMUM CASE OF EVALUATION OF RURAL ROADS

	EXPERIMENTAL	CONTROL AREA
ONGOING EVALUATION BEFORE	No road, or before improvements to existing road	No road or no improvements to existing road
ONGOING EVALUATION AFTER [EX-POST EVALUATION]	Road or improvement	No road or no improvement to existing road

CHAPTER 4 : A LITERATURE REVIEW OF THE EFFECTS ON SURROUNDING COMMUNITIES OF IMPROVEMENTS AND ADDITIONS TO ROAD INFRASTRUCTURE IN RURAL AREAS

From the previous chapter, two trends with respect to the introduction of roads into rural areas and the consideration of their impacts were discussed. Firstly there is increasing recognition of non-economic and spin-off effects of rural roads and secondly the recognition that transport is but one component of a comprehensive rural development project. Roads must rather be seen as the significant or primary factor associated with such impacts and not as the exclusive cause of such effects. This chapter consists of a discussion of effects of road projects traditionally taken into account by cost-benefit analysis as well as a wide range of social and economic effects rarely contained in any ex ante evaluation.

4.1. VEHICLE OPERATING COSTS

An improved road system enables higher speeds to be maintained, fewer gear changes to be made, and less braking to occur and therefore fuel savings result. On an improved surface there is less wear and tear on the suspension and body of the vehicle and tyres last longer. The amount of savings depends upon the type of vehicle, the way it is driven, the type of road surface, and the route alignment. As the way remains constant, basically, when one forecasts vehicle operating cost savings, what one needs to forecast is the number and type of vehicles which are likely to use the road investment, and their total savings. As vehicle operating costs reduce, an increasing number of passenger and goods vehicles begin to use the road. This encourages competi-

tion among both freight and passenger vehicles resulting in further savings for the user. According to Bridger in Developing World Land Transport (1987) "the more transport costs are reduced, the greater the impact of the road improvement." In a number of case studies [Howe et al (1984)], middlemen or transport monopolies absorb the savings and do not pass them on to the consumer and producer. Furthermore if transport costs represent a small percentage of total product costs any transport savings will usually have minimal impact on marketing and production activities as well as having minimal impact on personal mobility. According to Devres (1980) "a considerable proportion, probably the majority of rural dwellers, cannot afford to utilize payment-related transport, even when such services are available." The inability to use transport services has the effect of locking in the poorest sectors of the population and cutting them off from wider opportunities and facilities. Vehicle operating cost savings therefore benefit a relatively small number of people who are primarily the elite and better-off.

4.2. TRAVEL TIME

According to Bridger in Developing World Land Transport (1987)"time savings are likely to be of great significance." Dewar (1985) warns however that time savings may be small due to the low opportunity cost of time in rural areas. There are two forms of time savings - work time savings and leisure time savings. The savings can be made by individuals or, in the case of commercial vehicles, a faster turn-around time which leads to greater utilisation. The type of society and the location of the road will make it easier to determine whether leisure time savings are a justified addition and whether they are significant to add them to work time savings.

4.3. ACCIDENTS

A road investment which reduces accidents produces benefits. Insurance premiums on vehicles, lifetime earnings of individuals and hospital treatment costs amongst many others all help to quantify the benefits which arise from a reduction in accidents. According to Bridger in Developing World Land Transport (1987) "the literature is unclear to what extent an improved road system actually reduces accidents." New major roads that are fast to travel on can lead to accidents becoming more serious. The improvement of roads from gravel to bitumen surface has generally been shown to reduce the number of accidents significantly. [Dickey et al (1984)].

4.4. ROAD MAINTENANCE

Improvement of roads, especially from a gravel road to a surfaced road leads to road maintenance savings which can then be used more effectively elsewhere. Road maintenance is influenced by factors such as climate, topography, surface quality, type of vehicle use, speed of vehicle and particularly the frequency of use of the road by vehicles. According to Bridger in Developing World Land Transport (1987) maintenance cost savings "generally vary from 1% to 5% of the capital cost of a road." Prima facie there is a case in the short term for investing in a higher quality road than would be economically justified but the savings on maintenance costs are small in practice and a poorly maintained high quality road will in the long run be even more costly to repair if it is neglected.

4.5. AGRICULTURE AND SMALL SCALE MANUFACTURING

Small scale manufacturing and trading and subsistence and cash crop agriculture are a significant feature of rural areas and

"roads have a significant effect on the production and marketing of these activities." [Howe et al (1984)].

4.5.1. Agricultural Production

Roads are almost always assumed to lead to at least some increase in agricultural production. The effect of increases in production has been the traditional measure of rural road influence and rural development. According to Dewar (1985) "although improved transport infrastructure is necessary for improved productivity it is not a sufficient condition to increase the agricultural output of peasant farmers" and other complementary services are necessary for this to occur. The bringing of new land into cultivation or the intensification of land use caused by roads leads to production increases in subsistence and, of greater importance, in market crops. [Moore (1980); Hamilton (1980)]. Greater ease of obtaining inputs all contribute to increased levels of production. [Hamilton (1980); Dewar (1985)]. Spatial considerations of road impacts also suggest there is a direct correlation between distance from the road and level of productivity. [Wilson et al (1966)]. Production increases are clearly noticed where other complementary inputs are provided; the majority of the population did not previously live close to a road; transport is competitive and the cost of transport of agricultural produce is a high percentage of price. [Chisholm (1962)]. According to the Agriculture in Transkei, Research Report No 5 of the Bureau of Development Research and Training (1987) "in the Transkei, despite overcrowding and the limited amount of land allocated to each family for agriculture, significant amounts of cultivatible land lies unutilized or underutilized." One of the factors that emerges consistently for this anomaly is there is "inadequate infrastructure, either to get fertilizer to the land or to allow ploughing equipment to reach the land" [Dewar (1985)]. Furthermore the migrant system of-

fers better life styles to individuals than rural agriculture and acts as a strong disincentive to making a serious commitment to agriculture. In some case studies, [Devres (1980)] production declined or remained static and this was blamed on other complementary services that were not forthcoming rather than the road itself. In some cases road improvements open up areas to competition with more competitive regions to the disadvantage of the farmer. According to Dewar (1985) " this is particularly prevalent in the peripheral areas in South Africa [including Transkei] where small, fragile farming units, producing at best small erratic surpluses are forced into competition with large scale mechanised, and often subsidised farming enterprises from within the SA border." According to Howe et al (1984) "the more developed the existing agricultural system, the more significant and the faster was the response to road provision or road improvement within an area." In only one study, [Schroeder and Sister in Devres (1980)], a decrease in agricultural production was blamed directly on the building of a road where valuable land was taken out of production.

4.5.2. Crop Composition

A general conclusion from the literature expresses the notion that better roads provide easier and cheaper access to markets, encouraging a shift from subsistence cultivation to production of crops for a market and the growing of new crops specifically for the market. [Devres (1980); Howe et al (1984)]. Commercial agriculture requires greater inputs but results in higher yields and rates of return, thus favouring better off farmers. Land closest to roads and markets has the greatest tendency toward the switch to commercial farming but the rate and extent of the switch is influenced by numerous non-economic variables, for example perishability and the relative magnitude of transport cost savings. Therefore transport intensive crops and /or perishable

crops increase most favourably following construction or improvement of a road and the consequent lowering of transport time and costs. Roads seem to encourage a shift to some cash crops but in addition to roads, technological ability of farmers, government policy, outside entrepreneurship and complementary inputs are necessary for this to occur. [Howe et al (1984); Hamilton (1980); Chrisholm (1962)].

4.5.3. New Technology and Inputs

Roads increase access to agricultural markets and the outside world resulting in the exposure to and delivery of agricultural inputs such as fertilizer, insecticides and improved seed, extension visits and improved production techniques. [Howe et al (1984); Dewar (1980); Owen (1968)]. These inputs influence crop composition and facilitate increased agricultural yields, creating a surplus which can be directed to markets over the new roads. Agricultural technology often creates rural industries, providing inputs to, and processing of outputs from the agricultural sector, as well as influencing the utilization of energy from human energy, to animal and mechanised energy. The timing of delivery of agricultural inputs is critical and therefore the improvement of a road to an all-weather surfaced road has substantial consequences on the delivery of fertilizer as costs are significantly reduced and delivery is easier and more dependable. When vital inputs are guaranteed to be available at the correct time in the productive cycle farmers are willing to a greater extent to invest in inputs which result in better products. The largest problems in this regard are on feeder and access roads which are often impassable at critical periods [ie. during the rainy season] to vehicles for the delivery of inputs. The migrant labour system which is predominant in the Transkei has other important effects [Section 5.1.2.3] on agricultural activity.

4.5.4. Agricultural Extension Services and Service Institutions

The dissemination of agricultural innovation is facilitated in two main ways. One is through the physical exposure gained when farmers leave their local areas and are exposed to practices elsewhere. The other way is through agricultural extension services and service institutions. According to Anderson in Howe et al (1984) "rural roads encourage the establishment of government service facilities and private co-operatives [co-operatives in finance, marketing, production, purchasing and storing] and facilitate visits by government agricultural extension agents and other varieties of development assistance." Because of shortages of developmental assistance and due to roads increasing the accessibility of a region assistance is likely to be concentrated on those farmers and communities within easy vehicle access. [Devres (1980)]. Large numbers of areas in the Transkei are physically isolated from this type of influence and even if isolation is temporary, the efficacy of the system is greatly reduced when the rhythm of the visits is broken. According to Roberts (1980) many people view "roads as bringing government aid and development programs to take care of their problems" rather than creating an opportunity for self development. Contary to the above view Berger (1979) found no association between access and the formation of co-operatives and proposed that co-operative formation is a function of social structure. Local access may improve opportunities but other factors determine the extent to which this increased potential is realised.

4.5.5. Agro-industry and Small Scale Manufacturing

Roads are considered a primary stimulus to increased non-agricultural enterprises in rural areas. [Howe et al (1984); Owen (1968); Moore (1980); Devres (1980)]. Agro-industrial, industrial and commercial enterprises increase along the road cor-

ridor. According to Maasdorp (1984) "several writers have pointed out that road transport offers one of the best avenues for the acquisition of entrepreneurial skills on the part of the indigenous populations of lesser developed countries." Furthermore according to Dewar (1985) "roads act as economic lifelines in the process of informal manufacturing in South Africa's rural periphery." Increased availability of materials, access to markets for finished products and reduced transport costs further the expansion of home-industries and commercial enterprises. Main roads and particularly intersections are identified as places where products and produce can be successfully marketed. This is discussed in greater detail in Section 4.5.6. The stimulation of non-agricultural enterprises by roads has not been found to be entirely beneficial in all studies. Cottage industries can be hurt as they suffer from the competition offered by cheap manufacturing goods transported into the area because of improved road transport. [Dale (1978); Blair (1978)].

4.5.6. Marketing

Marketing encompasses both products made in home industries and agricultural produce. According to Owen (1968) roads are important in marketing activities and he states that "the lack of roads limited marketing exchanges significantly enough to hold back development of the whole region."

The marketing of produce is very closely associated with agricultural production. Road development leads to decreased transportation costs to and from markets, resulting in the extent of the market being expanded. In the Transkei roads are necessary to market outside a region due to the "ease of flooding the local market." [Dewar (1985)]. Furthermore decreased transport costs influence the nature and attributes of farm-to-market tasks undertaken in rural areas. As discussed previously in the chapter

agricultural inputs become more reasonable and dependable, resulting in integration of agricultural inputs into the agricultural cycle. The amount of commercial crops available for marketing increases with the opening of roads because of increased inputs; the ability to transfer produce to markets and areas of high demand, which means a greatly extended market for excess and superfluous goods; and reduced transportation costs [if passed through] mean higher profits for farmers, and act as an incentive for further production. The induced agricultural surplus is exchanged increasingly at spots alongside the road, at centralised [urban] markets and at the point of production. The transport system, type of goods and producer distance from the market govern, where and by whom the product will be sold. In terms of transit time, close proximity to markets encourages farmers to bypass the middleman and market their own goods in order to collect the entire profit from the sale. [Okada in Devres (1980)]. Producers at the end of the road [in terms of the market] as well as those further from the road will increasingly use middlemen. The degree to which transport cost savings are passed on to the consumer or producer is important in determining output and is often so small that they have no effect on consumer or producer behaviour. Middlemen's monopolistic control over transport often results in few savings being passed on to the producer. [Howe et al (1984); Dewar (1985)]. In this situation the primary benefits of road improvements programmes are reduced transport costs for middle-men and traders and few of these benefits are passed back to the rural producer.

Improved roads have a similar effect on the marketing of products produced in home industries as agricultural produce. The role of marketing of home made products is more important than in the case of agriculture since the products involved are more specialized and therefore require larger trade areas. Roads provide access to larger markets such as towns and villages, and passing

traffic is often critical to small scale manufacturers.

Transport infrastructure plays an important role in the marketing activities of rural communities in the Transkei. According to Dewar (1985) "road-side selling, pension pay-out points [on certain days], cross roads, bus stops, and schools are very important marketing points for people living in the homelands."

4.6. CONSUMPTION PATTERNS

The impact of new roads on the consumption of goods and services is generally positive, and this is attributed to greater access, more competition and lower prices. [Devres (1980); Berger (1979); Owen (1968)]. By raising incomes and lowering transport costs and thereby increasing contact with urban areas the introduction of imported goods, values and ideas is encouraged. Of importance is the increase in travel for non-work purposes, particularly for social and recreational activities. [see section 4.9.] Benefits from roads are not evenly distributed and better-off rural inhabitants are more able to fulfill their new consumer desires and needs. The ability of the poor to participate in these new consumption patterns is often marginal, increasing their frustration and/or directing their consumption away from basic material and nutritional needs towards unnecessary and needless desires. According to Dewar (1985) "in places which are tied to urban centres by good road links, there has been a swing away from the consumption of maize in favour of bread; in outlying areas, it is impossible to get fresh produce and the sale of maize predominates." Similarly, the pattern of milk consumption is affected in the same way.

4.7. HEALTH

Increased numbers of health clinics or visits by health personnel

are associated with road improvements. The majority of the literature tends to agree that health facilities usually increase more rapidly along roads than elsewhere. [Kaira (1983); Moore (1980); Devres (1980)]. Rural road improvements increase access to health centres and specialists for routine health services and "particularly for emergency assistance." [Berger (1979)]. According to Howe et al (1984) "access to medical and other facilities frequently emerges as the major perceived benefit of new roads that farmers identified." Although health trips do not show up profoundly on travel purpose studies [Bergman and Partners (1983)] "local community-based studies reveal that health is one of, if not the, primary generator of community movement" (Dewar 1985). Improved mobility may increase by-passing of lower order clinics and going directly to high order hospitals. Mobile clinics are often the only way isolated communities receive medical attention and the efficacy of this service is fundamentally tied to the road network. In the Transkei this service has nearly died away due to the conditions of rural roads. Better health depends more on environmental, educational and preventative measures rather than curative ones. Access to health facilites may lead to an emphasis on curative medicine to the detriment of preventative medicine. Medical personnel are reluctant to accept postings to isolated rural clinics, largely because of social reasons : the greater the degree of isolation, the bigger the problem becomes. The location of facilities on routes which enable a rapid escape during off-duty periods to towns and larger villages is an important compromise in this regard. According to Kaira (1983) "numerous studies indicate that there are many indirect or associated effects of rural roads on health and nutrition which may not be positive." Road improvements influence crop composition, [Section 4.5.2.] and this may indirectly affect health and nutrition as commercial production may decrease the amount of staple, traditional and nutritional products. Roads serve to spread diseases by exposing

previously isolated areas or sectors to foreign germs for which they have no immunity or curative methods. Similarly roads, by encouraging mobility and mixture of peoples and goods, can be transmitters of communicable diseases, and the greater the number of returning migrants the greater the probability of disease.

4.8. EDUCATION

Schooling is a significant generator of rural movement and there is much uncertainty in the literature concerning the impact of roads on education. [Kaira (1983); Howe et al (1984); Dewar (1985); Devres (1980)]. Roads however do facilitate access to secondary schools for both teachers and pupils and have a favourable impact on rural primary schools by lessening their isolation. [Kaira (1983)]. According to Dewar (1985) "the isolation of schools leads to greater absenteeism of pupils, particularly in extreme weather conditions due to long distances travelled to school usually on foot; and difficulty to attract teachers to remote outlying areas." The location of schools on all-weather roads which provide teachers access to towns and larger communities, particularly over weekends, is perceived to be an important advantage. Howe et al (1984) on the other hand found that there was little effect on education as a result of mobility. Roads facilitate the penetration of urban values into rural areas and education which may indirectly stimulate migration over the long term.

4.9 SHOPPING AND NON-ECONOMIC TRIPS

Economic expansion is often associated with more traffic which may influence personal mobility. Some of the most important consequences of the provision or improvement of a road is an increase in personal travel as opposed to transport of goods. The results of travel purpose surveys carried out by Bergman and

Partners (1983) in the Transkei, Copley (1985) in Northern Kwazulu and Ardington in Dewar (1985) in Northern Kwazulu are illustrated in Table 4.1.

TABLE 4.1 : TRAVEL PURPOSE SURVEYS [after Bergman and Partners (1983), Copley (1985) and Dewar (1985)]

Travel Purpose (%)	BERGMAN	COPLEY	DEWAR
Work/business	55	25	N/A
Social	27	12	N/A
Shopping	8	35	13
Health		13	43
Administration services		7	N/A
School		5	N/A
Other	10	3	
TOTAL	100	100	56

The above studies and other studies highlight the importance of non-economic activity related travel. [Kaira (1983); Howe et al (1984); Marais (1987)]. It has been shown that at every level of development people attach great importance to personal mobility. Travel range is normally determined by the relative location of the essential facilities and services to a dwelling. However, when shoppers require higher order goods than those available in local shops, they do not simply visit the closest facility which offers the good or service, but seek the larger urban centres, where prices are cheaper, more choices are available and where a full range of goods can be purchased. [Howe et al (1984)]. The choice of a transport mode depends, "amongst other things, on trip length, circumstances under which a trip is

made such as moving a heavy load, sickness, trading in perishable goods, and above all affordability of trarsport costs." [Kaira (1983)]. The ability to travel freely, not just for practical purposes but to visit friends and relatives, or for recreation, may not be a "basic need" but it is clearly desirable, particularly in societies where family ties are strong. [Dale (1978)]. According to Dewar (1985) long distance non-economic trips stem from "the migratory system developed in South Africa unweakened by urbanisation or long term migration: the low opportunity cost of time and the unavailability or poor geographical position of services in relation to those who need them." Better roads usually enhance social services, but less by bringing in additional services than by providing easier access to towns. Non-economic related travel can involve travel for health, religious, political, education, recreation, shopping and social purposes etc usually involving the movement to a larger village, district or town. A further reason for the dominance of passenger traffic, rather than freight traffic on new or improved routes has been attributed to a limited number of travellers substituting postal or telegraphic services for personal travel.

4.10. LAND VALUES, TENURE AND USE

In general a new road causes the value of the surrounding land to rise in direct proportion to its proximity to the road. [Blaikie (1977); Devres (1980)]. Rising land values together with a change in the population structure results in a change in land use patterns. Generally there is a move towards more intensive land utilization closer to the road in terms of agricultural, commercial and residential activity. Evidence suggests that the magnitude of the increase in land values has a positive relationship to density of population and type of road. According to Okada in Devres (1980), where shifts in ownership did not occur, land tenure was relatively open and equitable, little speculation

existed due to the high social value placed on land [and hence a reluctance to sell] or where specific development programmes counteracted these tendencies.

4.11. EMPLOYMENT

Rural roads create short-term employment opportunities, directly through the construction of the road itself and through related activities such as feeding and servicing of labour crews. [Howe et al (1984); Devres (1980)]. Short term employment is also increased by easing travel to short term/seasonal jobs in close proximity to home. Maximum short term employment is gained from labour intensive construction and this type of construction is also seen as a means of creating a support group for continued maintenance of the road project.

Roads promote medium and long-term employment of individuals by encouraging the acquisition of new skills and subsequent employability of those who worked on road construction and maintenance projects. [Howe et al (1984)]. Medium term employment is often promoted by commuting to nearby communities for casual work. Long term employment is promoted by the stimulation of regional production in agricultural production, commerce and industry. Importantly rather than giving up agricultural activities, roads lead villagers to supplement agriculture with miscellaneous cash earning projects. The diversification of economic activity and individual specialization causes changes to occur in the long term employment. The general disruption of the social and economic community structure can encourage emigration, particularly of young men, toward areas of greater employment opportunity [see Section 4.13]. According to Blaire (1978) and Devres (1980), roads may not contribute much to the solution of long term employment problem in rural areas, and short term employment is only available during periods of road construction.

4.12. SOCIAL CHANGES - NATIONAL INTEGRATION AND COMMUNITY DEVELOPMENT

Roads promote the concept of national integration by making remote areas and villages identifiable with a larger region and the national culture. According to Tomazinis in De Salvo (1973) "transport systems can promote or reduce a community's feeling of isolation from the rest of the region." Rural and urban areas are becoming more and more integrated - an integration based on transport and trade. Integration means a move away from village level subsistence and towards greater specialization between urban and rural areas. Integration results in the exposure of new values and ideas, services and consumer goods. Frequent contact with the outside world leads to an enlarged world view and increased interest and understanding of new institutions, services and technologies. A traditional way of life is often threatened by the changes associated with the introduction of road transport. Adverse social effects noted in the literature include increased accidents, teen-age rowdyism and alcoholism. [Devres (1980)].

Roads can threaten the integrity , bring about deculturisation or the actual eradication of entire ethnic groups. [Brooks in Devres (1980)]. This is mainly due to the lack of political and economic power of minority groups in society. The development of transport without corresponding development of protective measures has exposed the tribal economy to external forces over which they have no control. Tribal life has often been exposed to economic fluctuations and exploitation by more resourceful and better organised sectors of society. Women on the other hand, have found the provision of roads to be liberating, providing them more opportunities, more choice, and freedom from restraints of traditional society.

Roads often increase the availability of government services and political awareness of the community resulting in positive government village relations. [Hamilton (1980)]. Roads may also help in increasing the sense of community. Roads are often seen as initiators of other development by both government and village. Roberts (1980) states that "residents see roads as bringing government aid and programmes to take care of their problems." Active participation of the community in selecting, planning, building and maintaining roads increases the strength of government/village relations. Following road betterment schemes communities often build further facilities. Road improvements are often followed by additional government services - electricity, water and other extension services. This results in positive village- government relations and serves as a medium of communication which often results in a positive learning experience and exposure for both parties.

4.13. MIGRATION, DISPERSION AND URBANISATION

Traditionally , roads are seen as enabling and encouraging migration through cheaper and easier transport, more information on opportunities, more exposure to the affluence of outsiders and the possibility of a prompt return home. [Howe et al (1984)]. Oscillating migration and social visits are the two largest generators of long distance vehicular movement in the peripheral areas of South Africa. According to Marais (1987) "the wholesale building of roads through and in the national states could quite easily lead to even higher rates of migration to the larger towns and cities in the Republic." The provision of roads linking villages with larger towns has often served to reduce the effective distance between them and to encourage rural-urban migration. He goes on further to say that "one could therefore expect that migration towards job opportunities and existing services would be one of the results of easier access from the isolated areas to

large concentrations."

Low volume rural roads strengthen nearby towns as administrative, service and economic centres, promoting commuting for permanent or short-term work from surrounding areas. [Moore (1980)]. Improvements to the road network in the Transkei have enabled people to live beyond the town limits and to commute into town each day. This reason relates particularly to housing standards as high housing standards are maintained within town borders and are unaffordable to the vast majority, who instead choose to live outside the town border and commute to work everyday. In these cases where rural inhabitants can commute more easily and enjoy the benefit of nearby villages or towns without migration, the initial impact may be to discourage migration. In contrast rural arterial roads, by reducing the distance between countryside and urban centres, might increase migration because commuting would not be possible over the longer distances. In these cases one of the major consequences of migration is urbanisation.

The second school of thought sees the role of roads in migration as neither a necessary nor sufficient condition. [Okada in Devres (1980); Blair (1978)]. Ease of access to the major arterials makes the migration process easier and cheaper, but other factors, such as level of poverty and perceptions of life's chances are far more significant than physical access in determining whether or not migration occurs.

Another effect of roads on population movement is that of internal migration towards the road-side. [Howe et al (1984)]. Internal migration to roadside and urban outskirts settlements are usually made by groups which both lack and cannot ever hope to have access to available resources. It is often the children of such families that move closer to the roadside and consequently the age composition of such settlements is significantly lower

than internally located settlements.

4.14. ENVIRONMENT

Rural roads accelerate deforestation as a result of the expansion of agricultural land and the exploitation of wood for firewood and building. [Moore (1980)]. This leads to increased soil erosion, lowering of the water table, siltation, higher incidence of flooding and/or drought, and elimination of wildlife. Long term detrimental environmental effects occur as a result of bad farming practices such as overgrazing and the continual utilization of land without rotation. Of particular importance in the "homelands" is the system of perpetual migration which results in young and more educated people seeking work in the urban areas, leaving the weak, women and uneducated to continue farming practices which are often outdated and ineffective. New inputs such as fertilizer and pesticides contribute to chemical pollution which may become significant over time. Alternative road alignments often take productive land out of production. Furthermore the cumulative impact of many small developmental projects may be environmentally damaging. In an area which is visually attractive improvements of a road to all-weather-standards usually attracts large numbers of tourists. If not adequately planned for, large scale tourist activity in the long term can be environmentally damaging.

4.15 CONCLUSION

The literature suggests that additions and improvements to road infrastructure in rural communities have a wide range of effects that have traditionally been excluded from evaluation procedure. Furthermore it has been suggested by the literature that non-economic and social impacts are of greater importance to developing communities than economic effects. Little work has been done

on the effects of roads on surrounding communities in local circumstances and there is a clear need for further research.

CHAPTER 5 :- POST IMPLEMENTATION EVALUATION OF SPECIFIC ISSUES OF TWO ROADS IN THE TRANSKEI

5.1. SALIENT CHARACTERISTICS OF THE TRANSKEI THAT ARE LIKELY TO INFLUENCE A ROAD IMPACT STUDY

5.1.1. LOCATION AND LAND REGION CHARACTERISTICS INFLUENCING TRANSPORTATION

Transkei is situated in the south-eastern part of Southern Africa and covers a total of 4 365 263 ha. It borders the Indian Ocean in the south east, the Kingdom of Lesotho in the north and the Republic of South Africa in the south-west [Cape Province] and the north-east [Natal Province]. Transkei is divided into three portions :- the Hershel district bordering Lesotho; the Umzimkulu district in Natal and the main portion of Transkei separating the provinces of Natal and the Cape.

The location and physical characteristics of the Transkei influence transportation and have a number of important consequences. Transkei is essentially landlocked in the sense that it has "no port or adequate small craft launching sites." [Bergman and Partners (1983)]. Its economic future thus depends, to a considerable extent, on its political relations with neighbouring countries and the need to maintain essential land transport links. Significant traffic volumes along the main transport axis [N2] and the transnational throughroutes represent strong ties and integration of the Transkei economy with the Southern African economy. Furthermore distinct movements across the border represent migration and commuting [see Section 5.1.2.3]. This amplifies the already high traffic volumes along

the N2 and other transnational through routes. Consequently there is significantly higher traffic volumes on the main transport axis [N2] and the transnational through routes. Main and secondary routes do however assume great importance owing to the large percentage of rural dwellers. Physical characteristics separate the Transkei into three transport regions and the rural population has historically adapted to these physical constraints and in general there is not a strong inter-region transport demand except to Umtata which is characteristic of a primate city. Social services are centralised in urban areas which results in the generation of long distance trips. Traffic pattern studies indicate that traffic is primarily radial from rural areas to the nearest regional or main town indicating a natural need for people to have access to urban areas particularly for centrally located services. Apart from the nearby "satellite" towns, relatively little traffic is generated between other towns in the Transkei and Umtata.

5.1.2. POPULATION

5.1.2.1. Population Size

The de facto population [population resident in the Transkei], based on the 1985 census, increased by almost 40 percent between 1970 and 1985. The de jure population, which includes Transkeians resident in South Africa, was estimated at a much higher 3 610 565 in 1985 [Table 5.1]. A more important consideration than simple population size is that more than 95% of the de facto population lives in the rural areas. The population density based on the 1985 de facto population statistics is 67 people per square kilometre of land area.

TABLE 5.1 : DEMOGRAPHIC TRENDS IN THE TRANSKEI 1970-1985
[after Makanjee (1988)]

Population	1970	1980	1985
Rural [de facto]	1 725 083	2 493 713	2 783 694
Urban [de facto]	58 116	129 397	148 512
TOTAL [de facto]	1 783 199	2 623 110	2 932 206*
TOTAL [de jure]			3 610 565

* This 1985 census excludes 57 084 persons in educational and other institutions, 22 430 people unable to supply their ages, most migrants and non-resident Transkeians.

The importance of the large percentage of population resident in rural areas and the subsequent high densities in rural areas to the post-implementation evaluation study is that main and secondary routes assume great importance and have a significant effect on a large number of people. Furthermore, owing to the high population density and other constraints a relatively small sample of the population was surveyed in comparison to the total population living in the area. Section 5.3 discusses the sample size.

5.1.2.2. Demographic Structure

In any normal demographic structure of a nation one would expect to find an approximately equal distribution between male and female. The difference between normal male/female population distribution and actual distribution expressed as a percentage, is the male absenteeism coefficient.

TABLE 5.2 : MALE ABSENTEEISM COEFFICIENT FOR THE TRANSKEI
[after Zingel (1985)]

Age	Coefficient
< 14	1.0%
15 - 19	19.9%
20 - 24	59.2%
25 - 34	65.9%
35 - 44	62.2%
45 - 54	50.9%
55 - 64	40.9%
> 65	11.7%

From Table 5.2 we can deduce that there are a great many more females living in the Transkei particularly amongst the potentially economic active age groups. This can be ascribed to the fact that a large number of males in these age groups leave the Transkei in search of job opportunities elsewhere. In essence this would leave a large number of females, children, and elderly people in the rural areas. Therefore a random sample method of selection [the method used by the author for sample selection] would result in a large number of female and older people being selected. This however would represent the population resident in these areas. Furthermore the perceptions of the sample [made of a particular stratification] have important ramifications for the study.

5.1.2.3 Migrancy

Table 5.3 indicates the number of migrants and commuter workers in South Africa from the Transkei.

TABLE 5.3 : NUMBER OF MIGRANT AND COMMUTER WORKERS [after Makanjee (1988), Zingel (1985) and Southhall (1982)]

	1975	1980	1985
Migrants	303 000	345 116	342 000
Commuters	7 100	9 600	8 800

Migrancy is important to the survey in a number of respects. Firstly, as previously discussed the sample stratification will appear abnormal, but will be normal to the situation in the Transkei. Secondly, migrants and their friends and families make long distance trips resulting in strong cross-border movements. Thirdly, the highest contribution to household income of those living in the rural areas is in the form of remittances from migrant workers. Migrant remittances have important consequences on agriculture and other activities within the rural areas. The timing of agricultural inputs is vital. The unmethodical and often haphazard payment of remittances discourages investment in agriculture and has a resultant negative impact on agricultural activity within rural areas.

5.1.3 EMPLOYMENT AND LABOUR

Migrancy and commuting and their effects have already been discussed and employment and labour will be discussed in terms of the de facto population. 19% of the de facto population [557 119] of the Transkei were classified as economically active. Within the Transkei it is estimated that more than 63% of the economically active population are employed in the vibrant informal sector, which includes car washers, basket weavers, dagga merchants and workers in co-operatives. The importance of the informal sector as a contributor to household income has been

stressed here and elsewhere. The survey will therefore address the effects of roads on marketing and production of small scale manufacturing and other informal activity as well as formal business activity.

5.1.4. AGRICULTURE

About 17,5% [763 921 ha] of the Transkei's total surface area [4 355 000 ha] is potentially arable land and another 21,5 % is suitable for forestry. Even before independence, researchers noticed insufficiency of farming and the relative unimportance of farming as an economic activity. Table 5.4 indicates that only a small number of farms grow agricultural produce for commercial purposes. The sufficiency of farming in the Transkei is illustrated in Table 5.5.

TABLE 5.4 : TYPES OF FARMING ACTIVITIES IN THE TRANSKEI [after Leeuwenburg (1977)]

Type of farming	Number of households	%
No farming	62	8,4
Market only	1	0,1
Home use only	613	83,1
Home use and sale	62	8,4
TOTAL	738	100

TABLE 5.5 : SUFFICIENCY OF HARVEST TO FEED THE HOUSEHOLD [after Leeuwenburg (1977)]

Sufficiency	Number of households	%
Never adequate	467	67,3
Adequate in good years	165	23,7
Always adequate	62	9,0
TOTAL	694	100

According to Southhall (1982) "agriculture remains the most backward sector of the reserve economy and it is in consequent need of a revolutionary transformation [and] lacking at present even a subsistence economy." Cobbett (1987) confirms this view of all the homelands of South Africa by stating that "the black homelands of SA are notoriously underproductive in agriculture." Table 5.6 illustrates the unimportance of commercial and subsistence agricultural production in all the homelands and in the Transkei. This is due to a number of well documented reasons and will not be discussed in this dissertation. Emphasis is placed on the unimportance of agriculture and the subsequent unimportance of any positive or negative effects that additions and improvements to road infrastructure may have on agriculture. Trips related to agriculture were noted by Marais (1987) as being of "little significance." Subsistence agriculture does however supplement the earnings of the vast majority of households [Table 5.7] and for this reason the effects of road improvements on agricultural production and marketing will be investigated.

TABLE 5.6 :- COMMERCIAL AND SUBSISTENCE AGRICULTURAL PRODUCTION IN THE HOMELANDS (1985) [after Cobbett (1987)]

	Commercial R ,000	GDP %	Subsistence R,000	GDP %	Agric value per household
TRANSKEI	2 964	0,7	137 000	10.1	R 327
TOTAL FOR HOMELANDS	163 045	3,1	399 600	7,6	R 240

A study by Hawkins Associates (1980) identified physiographic regions based on altitude, topography, geology, soil types and vegetation. Physiographic elements reflect the agricultural potential of a particular region. According to Hawkins Associates (1980) in the Sterkspruit area "the cropping potential of this sub-unit is limited by the climate, relief and soils to semi-intensive mixed farming and semi-extensive livestock farming with some drought resistant crops." The report goes on to that the Libode area is "an exceptionally promising resource area [suitable for] intensive perennial crops and livestock." Thus agriculture will be expected to play a much greater role in the income of residents who live in the Libode area than inhabitants of the Sterkspruit region.

5.1.5 INCOME AND EXPENDITURE

Table 5.7 indicates that the largest contributor to average rural household income is in the form of migrant contributions. This is followed in importance by salaries and wages and agriculture. Income from informal money making activity assumes a much smaller role. A breakdown of household expenditure is provided in Table 5.8.

TABLE 5.7 : AVERAGE HOUSEHOLD INCOME 1979 [after Makanjee (1988)]

		RURAL	%
Salaries and wages	R	297	25,7
Agriculture	R	232	20,3
Domestic production	R	47	4,1
Own business	R	66	5,7
Pensions	R	78	6,7
Contributions received	R	316	27,4
Income from other boarders and lodgers	R	21	1.8
Other	R	95	8,3
TOTAL	R	1 152	100,0

TABLE 5.8 : HOUSEHOLD EXPENDITURE 1982 [after Makanjee (1988)]

Item	%
Food	43,4
Rent	15,0
Furniture	12,2
Clothing	8,0
Other	21,4

It can be assumed from the above two tables that expenditure based on meagre incomes is essentially on basic items. It also suggests that the communities in question will tend to have low trip generation rates and that a single trip will usually be made for more than one purposes.

5.1.6 REVENUE

The Transkei is financially dependant upon South Africa and has limited possibilities of reducing this dependence. According to Southhall (1982) the future Transkei "will have no alternative but to remain a supplier of [cheap] labour to South Africa. Furthermore the Transkei had little capacity for encouraging self-sustaining development in the future in either agriculture or industry." Figure 5.1 and Figure 5.2 demonstrate financial dependence on South Africa and demonstrate the extent to which these economies are an integral part of the central economy. Thus roads in the Transkei cannot be evaluated in isolation from South Africa but must be evaluated within the broader context of the Southern African socio-economic and political situation.

FIGURE 5.1 : COMPOSITION OF TRANSKEI'S TOTAL NATIONAL REVENUE
[after Makanjee (1988) and Southhall (1982)]

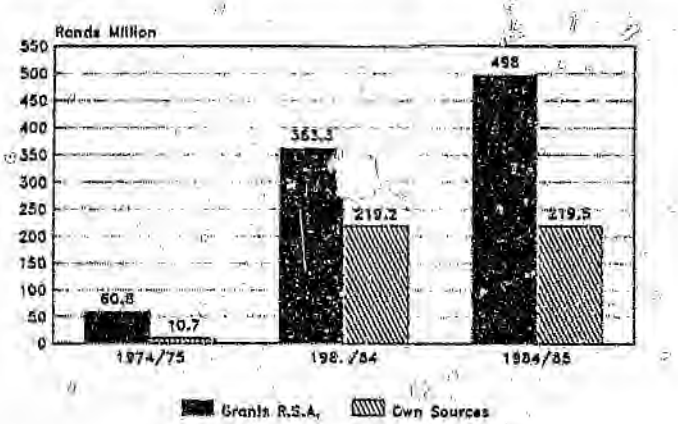
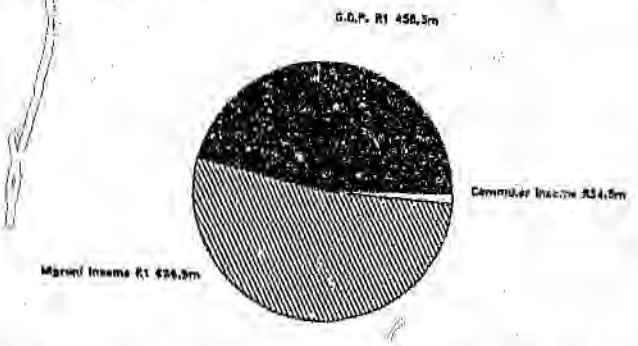


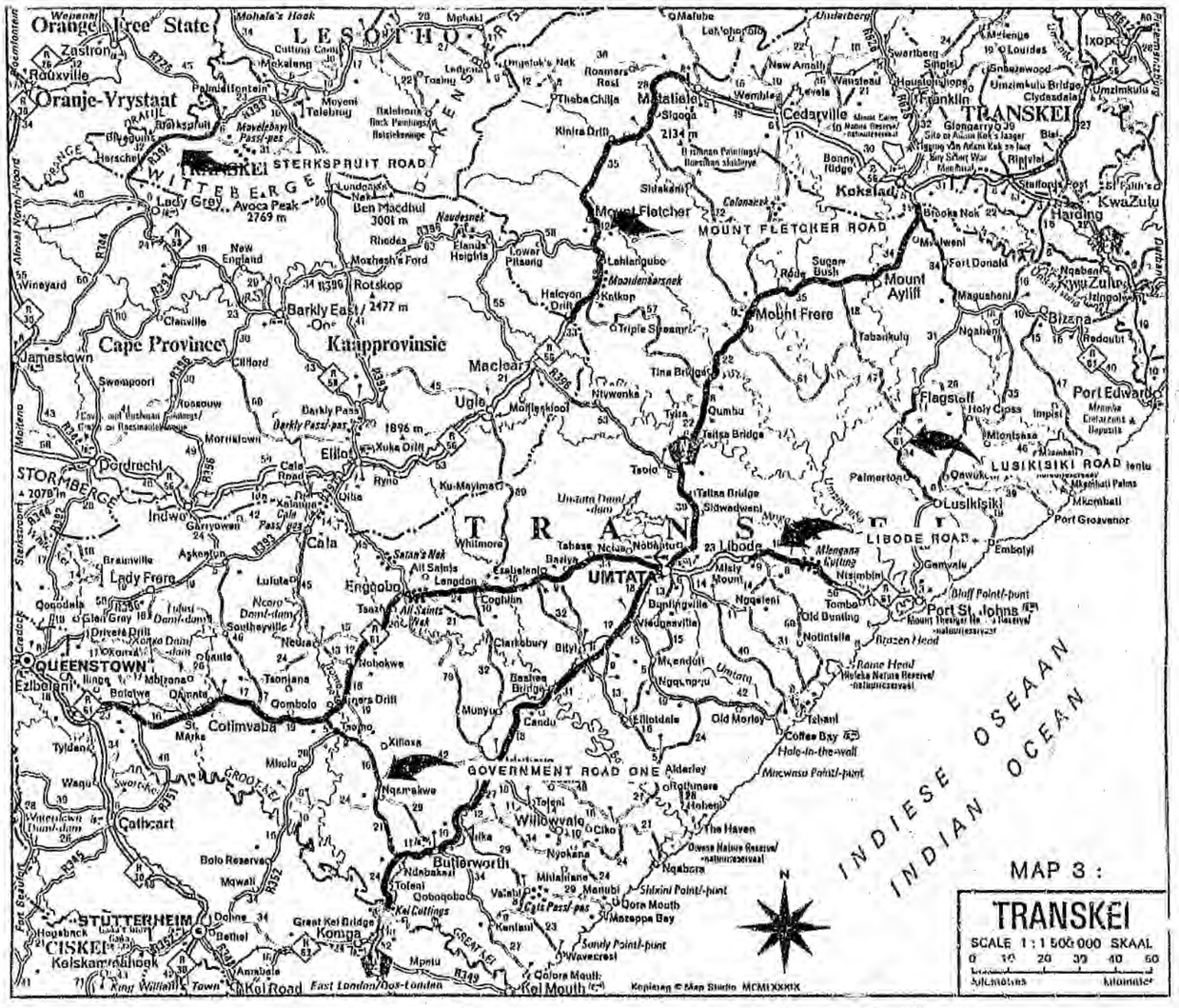
FIGURE 5.2 : GROSS NATIONAL PRODUCT OF THE TRANSKEI [after Makanjee (1988)]



5.2. PLANNING THE POST IMPLEMENTATION EVALUATION [The case study was undertaken under the constraints outlined in the literature and summarised in Section 3.4.]

5.2.1. Motivation for Choice of Particular Roads

The Republic of Transkei was identified by the author, supervisor of the project, Dr R.F. Del Mistro and members of the Development Bank of Southern Africa as the optimum area for the evaluation of impacts of rural roads on their surrounding communities due to the large number of recently completed projects and the large number of road projects in the planning and ex-ante evaluation stages of the planning process. A site visit to the identified study area took place on the 18th and 19th July 1989 in which feasible roads were examined by members of the Development Bank of Southern Africa; supervisor of the project, Dr R.F. Del Mistro; the author and associate researcher, Mr A.F. Shaw. Time constraints caused one of the five feasible roads to be only partially scrutinised. The roads under consideration were :-


Orange Free State
LESOTHO
Oranje-Vrystaat
TRANSKEI
STERKSPRUIT ROAD
WITTEBERGE
MOUNT FLETCHER ROAD
LUSIKISIKI ROAD
LIBODE ROAD
GOVERNMENT ROAD ONE
Cape Province
Kaapprovinsie
TRANSKEI
QUEENSTOWN
STUTTERHEIM
CISKEI
INDIESE OSEAAN
INDIAN OCEAN
PRIMARY ROAD
SECONDARY ROAD
TERTIARY ROAD
MAP 3 :
TRANSKEI
SCALE 1 : 1 500 000 SKAAL
Kopiereg © Map Studio MCMXXXIX

1. G605 - The tarred route from Lady Grey boundary through Hershel and Sterkspruit to Walaza bridge [termed the Sterkspruit Road in the text in future].
2. R61 - The tarred route from Libode through Mhlengana cuttings to Mgwenyana [termed the Libode Road in the text in future].
3. GR1 - The tarred route through Tsomo joining the R61 and the N2 [termed Government Road 1 in the text in future].
4. R61 - The untarred route from Matatiele through Mount Fletcher to Maclear boundary [Mount Fletcher Road].
5. R61 - The untarred route from Lusikisiki to Flagstaff [Lusikisiki Road].

Map 3 illustrates the location of the roads in the Transkei.

The case study is specifically aimed at post-implementation evaluation and the latter two roads do not meet this criteria and were eliminated on this basis. The other three roads all show characteristics that could be used in a post-implementation evaluation study. Due to resource constraints a limit of two roads needed to be identified for evaluation. Each of the roads has unique characteristics which can be summarised as follows :-

1. Sterkspruit Road :- a full range of social and economic activity in a remote area which mushroomed around the period the road was completed. These conditions will enable the researcher to test a large range of effects of road improvements and to test whether road improvements can initiate such economic activity.

2. Libode Road :- route re-alignment which by-passes original villages along the main route and brings previously isolated villages to the advantages/disadvantages of surfaced road conditions. This will allow the researcher to determine the social and economic effects of road re-alignment and the associated ad-

vantages and disadvantages.

3. Government Road One :- the age of the road construction allows the researcher to determine longer term effects as road impacts apparently have a long gestation period.

Government Road One was eliminated on the basis of insufficient funds. To verify the soundness of the elimination a test of the road's ability to attain important criteria was developed. The criteria were ranked according to their importance in regard to the evaluation study. [Criteria were ranked on a score of 3 for maximum importance and 1 for minimum importance.] Roads were scored on their ability to achieve the criteria with regard to the needs of the evaluation study. [Non-achievement of a particular criterion scored 0 and complete achievement of a criterion scored 3.] Figure 5.3 illustrates how the three roads were ranked in their ability to attain the important criteria for the choice of a road.

The final scores of the roads [based on criteria attainment] resulted in the roads being ordered into the following sequence of importance :-

1. G605 - Sterkspruit Road [56]
2. R61 - Libode Road [51]
3. GR1 - Government Road One [34]

The test verifies that the elimination of Government Road One was based on sound judgement and the two roads with the highest scores were chosen for further evaluation.

FIGURE 5.3 : ABILITY OF ROADS TO OBTAIN IMPORTANT CRITERIA

Criteria : {Importance of Criteria}		Govern-ment Road One		Sterk-spruit Road		Libode Road	
		Extent of Attainment	Sub Total	Extent of Attainment	Sub Total	Extent of Attainment	Sub Total
1.	Age of road (allowing for a more advanced level of impacts). {2}	3	[6]	2	[4]	0	[0]
2.	Availability of pre-project base data. {3}	1	[3]	3	[9]	3	[9]
3.	An established set of goals and objectives. {3}	0	[0]	3	[9]	3	[9]
4.	The possible use of this study as a pilot study to a more in depth DBSA study. {1}	0	[0]	2	[2]	2	[2]
5.	A full range of economics activity. {3}	2	[6]	3	[9]	2	[6]
6.	Urban characteristics. {2}	2	[4]	3	[6]	2	[4]
7.	Rural characteristics. {2}	3	[6]	1	[2]	1	[2]
8.	The ability of people to recall characteristics of the unimproved road. {2}	1	[2]	3	[6]	3	[6]
9.	Maximization of anticipated social effect. {3}	1	[3]	2	[6]	3	[9]
10.	The advantage of measuring the impacts on a new as opposed to an improved road. {1}	1	[1]	1	[1]	3	[3]
11.	The political priority of the road in the national framework. {1}	3	[3]	2	[2]	1	[1]
	TOTAL RANKING	34 3rd		56 1st		51 2nd	

Maximum score 69

Extent of Attainment of Criteria

Criteria

FIGURE 5.4 : THE STERKSPRUIT ROAD



FIGURE 5.5 : A TYPICAL ACCESS ROAD OFF THE STERKSPURIT ROAD



FIGURE 5.6 : THE LIBODE ROAD



FIGURE 5.4 : THE STERKSPRUIT ROAD



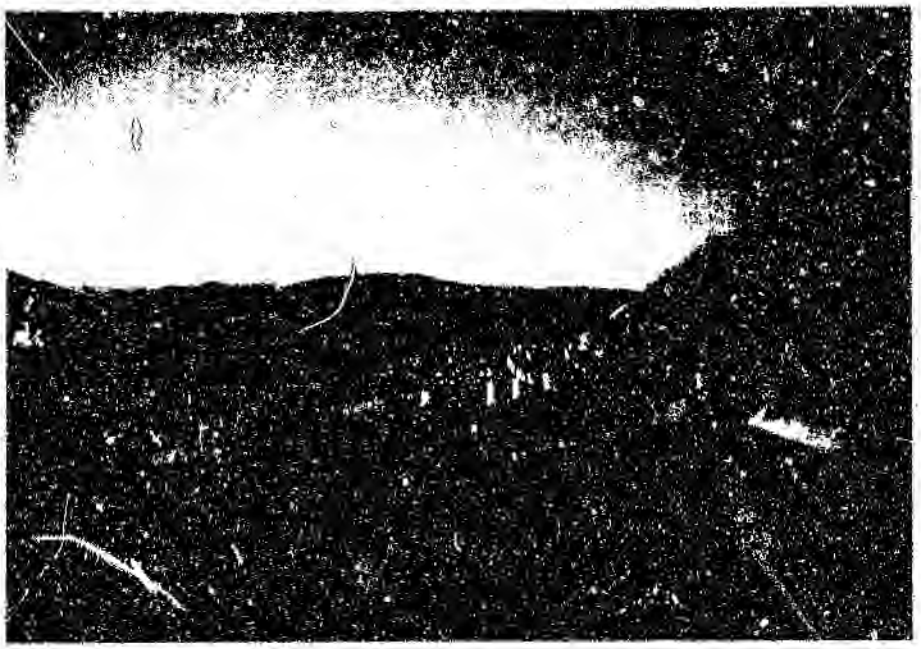
FIGURE 5.5 : A TYPICAL ACCESS ROAD OFF THE STERKSPURIT ROAD



FIGURE 5.6 : THE LIBODE ROAD



FIGURE 5.7 : THE LIBODE ROAD THROUGH THE MELENGANA CUTTING



5.2.2. Issues the Post-Implementation Evaluation Attempts to Address

The inherent characteristics of each of the roads chosen for further evaluation results in the study focus being divided. The primary issue to be investigated in the Libode Road is the effects of realigning of a major regional road on surrounding communities. The study will investigate the communities which are located alongside the new tarred road as well as communities located along the old gravel road. The primary issue to be investigated in the Sterkspruit Road is the effects of improving [surfacing] a major regional road on surrounding business and resident communities and to test whether road improvements can initiate or have an important role to play in the growth of economic activity.

Greater emphasis has been placed on the Sterkspruit road due to the primary considerations stated above where a full variety of

impacts can be investigated on the traveller, residents and business. For this reason greater survey resources were placed on the Sterkspruit Road. Furthermore the size of the Sterkspruit community and the fact that the Sterkspruit Road attained a higher score in criteria achievement further influenced this decision. Within the primary issues of both the Libode and Sterkspruit Roads, the evaluation attempts to address beneficiaries in three broad categories; namely travellers, local residents and local businessmen.

The first category attempts to clarify issues relating to the perceived effects of improvements and additions to road infrastructure on travellers. Issues that were dealt with under this category included :-

- mix of vehicle types
- the degree of local traffic as opposed to "through" traffic
- trip purpose and frequency thereof
- growth of individual movement over the past two years and perceived reasons therefor
- greatest perceived effects of improving the roads
- perceived effect of road improvements on travel costs
- perceived effect of road improvements on travel time
- perceived effect of road improvements on accidents and types thereof
- perceived effect of road improvements on vehicle maintenance
- importance of the reliability of roads to travellers

The second category attempts to clarify issues relating to the perceived effects of improvements and additions to road infrastructure on local residents. Issues that were dealt with under this category included :-

- movement of population into the area and perceived reasons

thereof
- perceived effect of road improvements on agricultural production, trade in agricultural production and agricultural extension officers
- perceived effect of road improvements on product production and trade in product production
- involvement of local residents in road construction and attitudes towards future local road maintenance
- perceived growth of traffic on improved roads and perceived reasons therefor
- growth of individual movement over the past two years and perceived reasons therefor
- trip purpose of residents and frequency therefor
- importance of reliability of roads to local residents
- frequency of travel to higher order towns and reasons therefor
- perceived expectations of road improvements
- greatest perceived effects of road improvements on the individual and community
- perceived effect of road improvements on influx of people and the perceived changes thereof
- perceived preference to live in a certain area and perceived reasons therefor
- perception of differences in relation to where one lives
- perceived effect of road improvements on government services and perceived types thereof
- perceived effect of road improvements on employment opportunities and perceived types thereof
- public involvement prior to and during road construction and types thereof
- perceived effect of road improvements on travel costs
- perceived effect of road improvements on travel time
- perceived effect of road improvements on accidents and perceived types thereof
- perceived effect of road improvements on maintenance of other

roads within the region
- perceived most important and least important effects of road improvments

The third category attempts to clarify issues relating to the perceived effects of improvements and additions to road infrastructure on local business. Issues that were dealt with under this category included :-

- movement of business into the area and perceived reasons thereof and the effect of the road on business location
- perceived effect of road improvements on customer travel length
- perceived expectations of improving the road
- greatest perceived effects of improving the road on the individual and community
- perceived effect of road improvements on economic activity within the area and reasons thereof
- perceived effect of road improvements on government services and perceived types thereof
- perceived effect of road improvements on where residents and shop owners do the majority of their shopping
- perceived effect of road improvements on the frequency of delivery service and the perceived reasons thereof
- perceived effect of road improvements on the quality of delivery service and the perceived reasons thereof
- importance of reliability of roads to local business
- perceived effect of road improvements on the profitability of business and reasons thereof
- perceived effect of road improvements on cost
- perceived effect of road improvements on the ability of existing businesses to compete with outsiders and perceived reasons therefor
- perceived most important and least important effects of road improvements

The evaluation attempted, although unsuccessfully, to address number of further issues, namely:-

- actual movement of population within the study area
- actual effects of road improvements on accidents within the study area
- actual effects of road improvements on maintenance within the region
- perceived effects of how much respondents [business, travell and resident respondents] were prepared to pay towards the cost of the road improvements
- perceived types of businesses that grew/developed as a result of the road improvement
- perceived types of businesses that decreased/declined as a result of the road improvement
- perceived type of government investment the government should have invested in the area if respondents were consulted prior to the road investment

5.2.3. Testing of Questionnaires

During a further visit to the Transkei [12 - 25 November 1989 the three questionnaires were tested on the local population the team who were also used to undertake the origin-destinat survey. After thorough analysis of completed questionnaires discussion with the survey team problems were identified and questionnaires were changed accordingly. The surveys were ther tested to a limited extent on inhabitants of developing communities near Johannesburg.

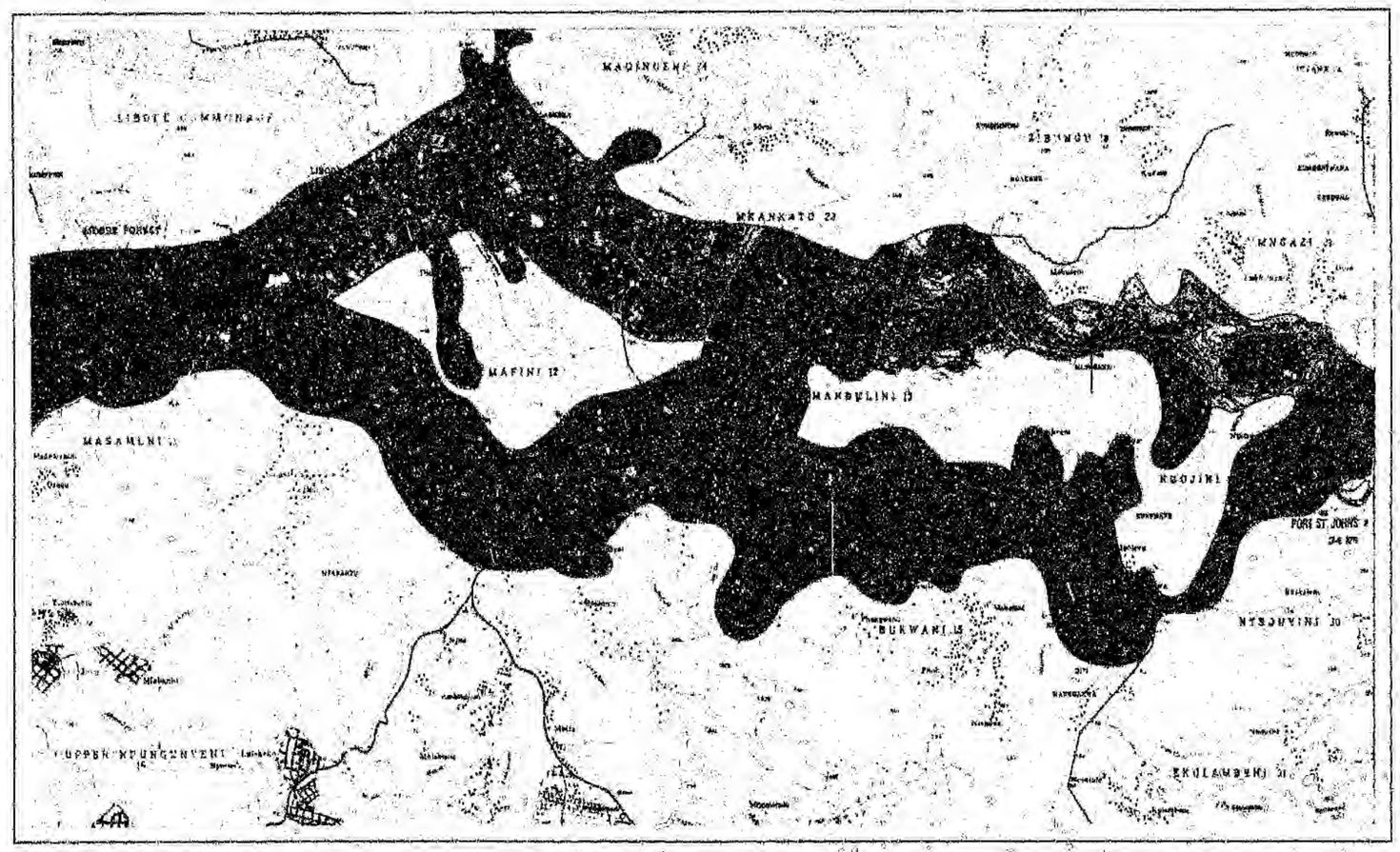
5.2.4. Delineation of Target Population

Dr Francos, a statistician of the University of the Witwatersrand, Johannesburg, was consulted to ensure the resid

impact survey was statistically sound. The literature suggested areas of primary impact based on physical barriers, population and economic activity sites. The area of the zone of influence was assumed to be one kilometre on each side of the road where it was not restricted by physical obstructions or extended by population density or economic activity. The attraction of economic activity or population was assumed to be a maximum of two kilometres on each side of the road. Households within this area of impact were identified and chosen through a random sample method. Map 1 and Map 2 illustrates the areas of impact and the number of households chosen from each village of the two roads.

5.7.5. Methods of Data Collection

Finance, time and manpower constrained both the sample size and data collection processes. An appropriate sample size was determined with Dr Francos of the University of the Witwatersrand together with the financial, time and manpower constaints. Interviewer-administered questionnaires were the main source of data collection. The interviewer-administered questionnaires were administered by 12 workers of the Bureau of Development Research and Training of the University of Transkei, Umtata. This was supplemented by observation and measurement [origin-destination study and population movement study]; interviews [this mainly included decision makers and operators of the existing situation] and conventional data collection [this mainly includes the reading of research reports before and after project implementation].



Map 1

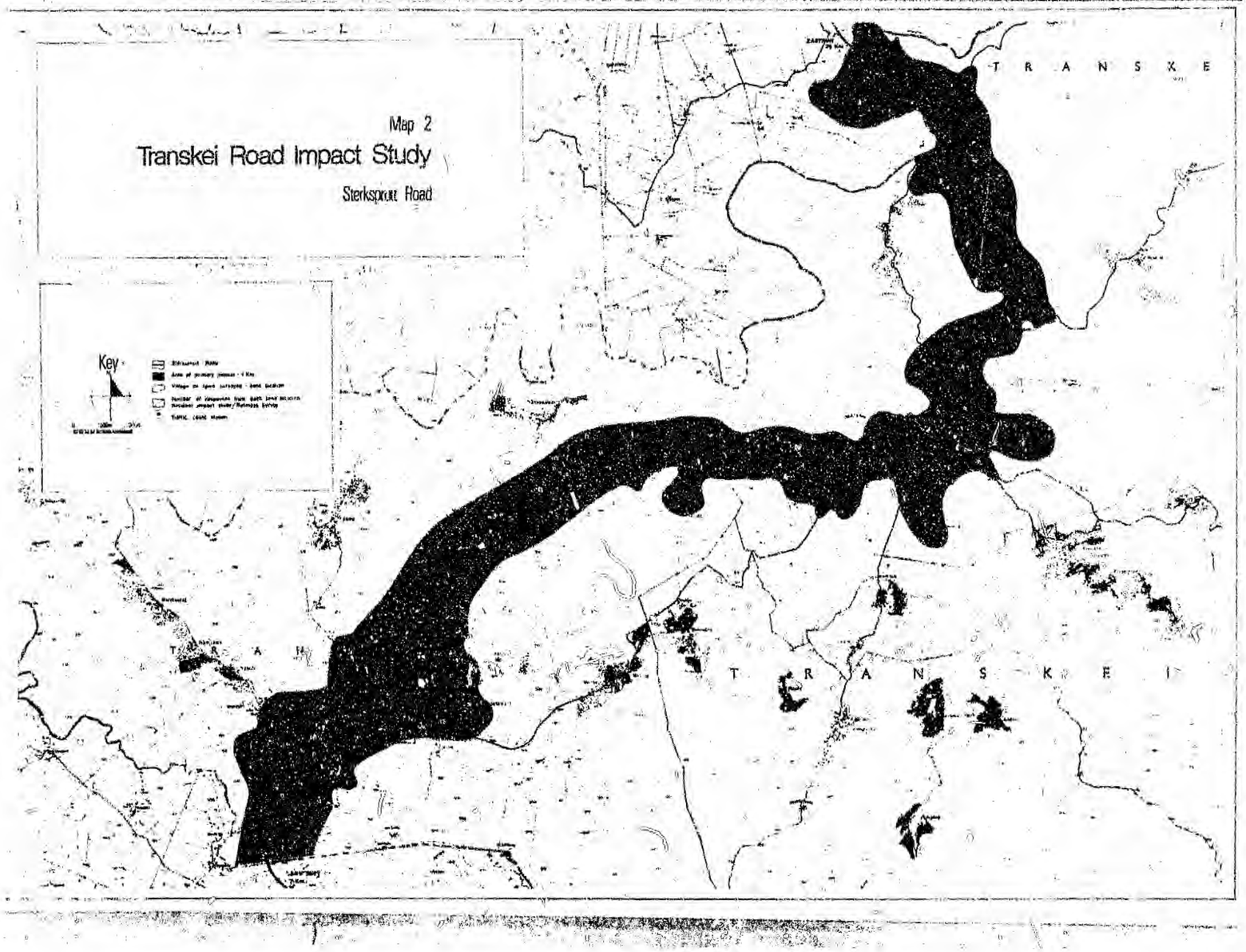
Transkei Road Impact Study

Libode Road

Map 2

Transkei Road Impact Study

Sterksprout Road



5.3. UNDERTAKING THE POST-IMPLEMENTATION EVALUATION

The actual implementation of evaluation took place in two phases. The first phase of evaluation took place between the 12 - 25 November 1989. Data collected in this period included interviews with selected persons and the origin-destination study. Furthermore the questionnaires were tested to identify any problems. The origin-destination surveys were run during the middle of the week [Tuesday and Thursday] and during the middle of the month so as to ascertain average traffic flows. On both roads twelve hour [6:00am to 6:00pm] counts were attempted, but in both cases unsatisfactory weather obstructed the full counting session. It was therefore possible to get an eleven hour count on the Libode road and a seven hour count on the Sterkspruit road.

The second phase of data collection took place between 19th February and 3rd March 1990 and involved administering the three questionnaires on both the Libode road and the Sterkspruit road. Further interviews were undertaken and other data collected. The Libode resident survey, business survey and travel purpose survey took place between Wednesday 21 February 1990 and Friday 23 February 1990. The extent of the study and the zone of influence is graphically represented on Map 1 together with the zone locations and number of resident surveys and business surveys within each zone location. The Sterkspruit resident survey, business survey and travel purpose survey took place between Monday 26 Febuary 1990 and Friday 2 March 1990. The extent of the study and the zone of influence is graphically represented on Map 2 together with the zone locations and number of resident surveys and business surveys within each zone location.

Attempts were made to survey all businesses within the zone of influence of each road. The size of the two business surveys are found in Table 5.10 and Table 5.11. Due to time, manpower and

financial constraints the residents survey size and the travel purpose survey size are relatively small compared to the total population living within the zone of influence and people travelling along the road. The stratification of the travel purpose survey was based on the origin-destination study and other information gathered from the literature. The size of each travel purpose survey for each road is found in Table 5.10 and Table 5.11. Aerial photographs, which were taken of the Transkei during 1982, were used to determine the number of households by means of counting the number of building structures to stratify the resident impact surveys. Sometimes a household has more than one building structure and similarly a number of households may live in a single building structure. This is however the exception and not the norm. According to Transkei Development Information published by the Development Bank of Southern Africa (1987) "households range from one or two people [sometimes unrelated if they are elderly] to very large composite family groups of up to 22 persons." The average household size was determined from regional household statistics based on the 1985 population survey and statistics supplied by the Department of Local Government and Land Tenure published by the Development Bank of Southern Africa (1987). The Libode Road forms the boundary between two regional districts within the magisterial district of Libode. The two regional authority statistics have therefore been averaged.

TABLE 5.9 : FAMILY SIZE PER HOUSING UNIT

Maluti regional authority
Magisterial district of Sterkspruit
1985 population survey : 17,3
Department of local government and land tenure : 11,1
Average : 14,2 individuals per housing unit

Nyanda regional authority
Magisterial district of Libode
1985 population survey : 13,1
Department of local government and land tenure : 8,9
Average : 11 individuals per housing unit
Magisterial district of Nggeleni
1985 population survey : 9,7
Department of local government and land tenure : 8
Average : 8,9 individuals per housing unit
Total average : 10 individuals per housing unit

The size of the resident survey for each road and the representative proportions of households and residents the survey reflects is listed in Table 5.10 and Table 5.11.

TABLE 5.10 : SURVEY SIZE OF THE LIBODE ROAD

Resident survey
Total resident survey size : 176
Total housing units - Old road : 1120
Total housing units - New road : 1218
Total housing units [households] : 2338
Number of individuals per household : 10
Total population : 23 380
Survey size as a percentage of total population : 0,75%

Business survey
Total business survey size : 22

Travel purpose survey
Total travel purpose size : 81

TABLE 5.11 : SURVEY SIZE OF THE STERKSPRUIT ROAD

Resident survey
Total resident survey size : 275
Total housing units [households] : 3281
Number of individuals per household : 14,2
Total population : 46 590
Survey size as a percentage of total population : 0,59%
Business survey
Total business survey size : 51

Travel purpose survey
Total travel purpose size : 106

5.4. PROBLEMS EXPERIENCED DURING POST-IMPLEMENTATION EVALUATION DATA COLLECTION

The survey team was proficient in two languages - English and Xhosa and therefore the questionnaires were not required to be translated into Xhosa. A language difficulty was experienced in the Sterkspruit area between interviewers and respondents. More time was allocated to overcome these complications and generally the survey was conducted without great difficulty. Translation difficulties and complications did occur due to the specific nature of the survey and the inability of the local population to understand certain concepts, and particularly those specific to transportation. The majority of translation complexities were however overcome by a thorough training session on the questionnaire before interviewers went out into the field. Furthermore, interaction on a daily basis with interviewers ensured that any difficulties experienced in the field were overcome.

Ethnic and political differences are found throughout the Transkei. The survey team showed feelings of preference to work in pairs to ensure personal safety, particularly in the Libode area. These feelings were based on previous work experience within the area. To ensure further safety interviewers worked in male/female pairs. The constraint of working in pairs did not detract from the overall number of questionnaires that were administered as the interviewers introduced themselves as a pair but administered the questionnaire separately when personal safety was perceived.

The interviewing team expressed that care must be exercised in the selection of respondents since young people tend to be ignorant of things around them whilst elderly people seldom cheat on their answers. This finding did not influence the stratification of the survey as the population consists of a large propor-

tion of elderly people. Thus a true representation of perceptions was attained without stratification modification.

During the test session the resident impact study was identified as physically too long as respondents were reluctant to respond to what "appeared" to be a long questionnaire. A suggested way to overcome this problem was to make the questionnaire physically shorter in terms of presentation of the questionnaire but retaining all the questions. This was succesfully achieved when administering the questionnaire.

People [including business people] were identified as being "lazy" and the best answers are obtained from simple yes/no type answers and other simple questions. Similarly it stands to reason that questions requiring in-depth thought will get the worst answers and therefore these types of questions should be avoided wherever possible. As the study attempted to explore perceived effects the questionnaire designer was left with little choice other than open-ended questions. To ensure the validity of the open-ended questions their importance was stressed to interviewers and simplified as much as possible. Results from these type of questions therefore do not detract from the questionnaire and were relatively consistent from interviewer to interviewer.

Difficulties were experienced in the management of the team due to the large number of interviewers and the large area in which the survey was administered. This was mainly overcome by end-of-day interaction sessions, spot checks on interviewer pairs throughout the day and constant monitoring of completed questionnaires.

As already discussed a large number of the questions asked were open-ended questions. As it is impossible to deal with every

specific answer, answers of a similar nature had to be categorised. Any sort of categorisation reduces the actual meaning of a response. Furthermore although interviewers had explicit instructions to write exact answers, the translation process would encourage interviewers to categorise to a limited extent. In an attempt to analyse the actual responses a large number of categories were established.

The author acknowledges that any information exchange may result in variation or error. For this reason information exchanges were kept to an absolute minimum. Three exchanges of information did occur from the point where data was collected to the point where it was processed and interpreted.

A number of issues the survey attempted to address were not successful. These issues were identified in Section 5.2.2. This problem could have been overcome by a more thorough testing of the questionnaires and analysis of results.

A large amount of data sought by the author was not available and therefore a comparison between actual effects and perceived effects cannot be made. Although many people that were contacted were very helpful little data was extracted from them as few records of past data are kept. This in effect means that any data sought by a researcher in developing countries must be collected by himself often making it a very expensive process.

5.5. POST IMPLEMENTATION EVALUATION FINDINGS

The Libode and Sterkspruit road evaluation findings are presented separately question by question, in terms of the origin-destination survey, travel purpose survey, business impact survey and resident impact survey. Appendix A contains examples of copies of the questionnaires and the processed results of each

questionnaire. The findings of the study are discussed in Chapter 6.

CHAPTER 6 : EVALUATION FINDINGS

6.1 INTRODUCTION

This chapter consists of the presentation and discussion of evaluation findings of the Libode and Sterkspruit Roads. The chapter is divided into four further parts, each part dealing with major issues as identified in Section 5.2.2. The first section deals with the results of the origin-destination survey. The second section deals with the travel purpose survey. The third section deals with the resident impact study and the final section deals with the business impact survey. The findings of each of the studies are presented in Appendix A. The tables found in Appendix A are coded in the following manner :- "A" represents Appendix A; "L" represents the Libode Road; "S" the Sterkspruit Road; "OD" symbolises the origin destination study; "T" represents the travel purpose survey; "B" represents the business impact study and "R" represents the resident impact survey. Apart from the origin-destination study the number following this coding replicates the question in the appropriate questionnaire.

In the rest of the chapter when an "A" precedes the code of a table, the table is not reproduced but can be found in the appropriate place in Appendix A. In a number of cases tables are graphically illustrated in the form of a chart. The tables used to produce such a chart are referenced and found in Appendix A. To attain uniformity throughout the findings, tables are represented in terms of number of respondents and the percentages of the sample they represent. The reader must however be consious

of small samples representing large precentages [for example, the results of the business survey of businesses located along the gravel road in the Libode region, discussed under section 6.5.], which may have the tendency to misinform the reader.

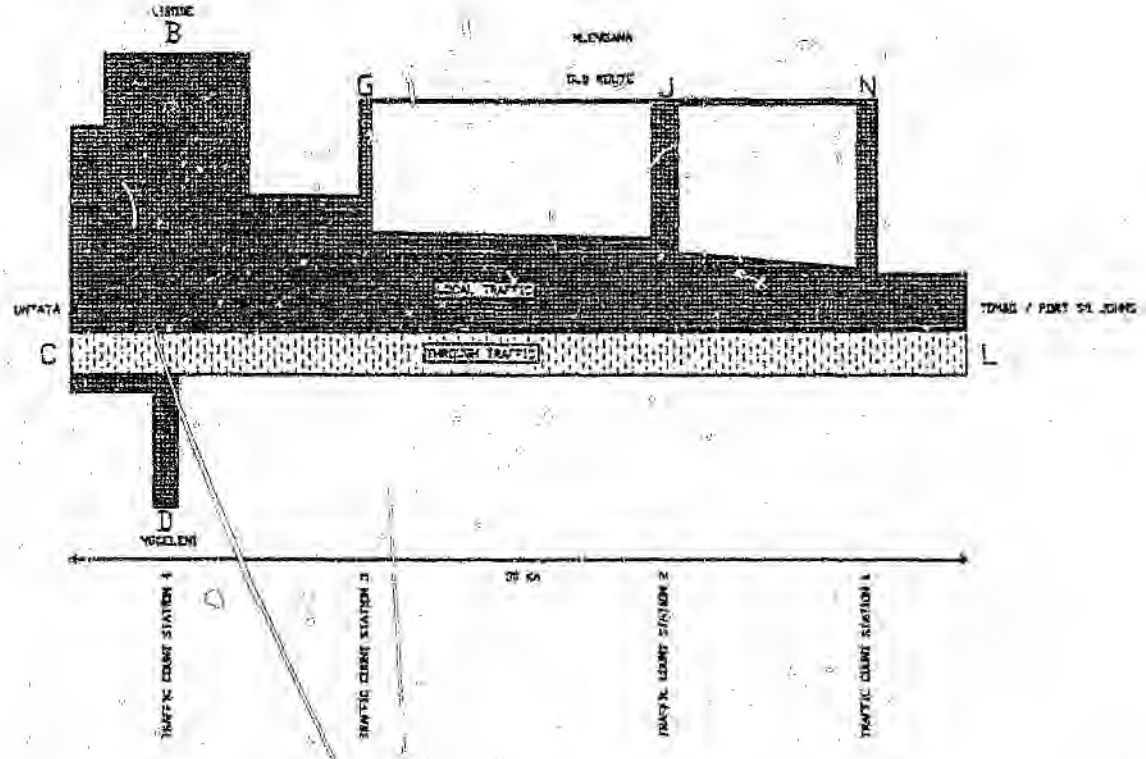
Each section of this chapter has been presented in a consistent format. The section is divided up into a number of topics which the questionnaire attempted to address. Within each subject matter a summary of the literature is provided for ease of reference. This is followed by the presentation and discussion of the findings in terms of the Libode Road first and the Sterkspruit Road findings second. This was done to ensure that the impact of the road in the Libode region on residents living along the tarred road and residents living along the gravel road was addressed as well as allowing the findings of the impacts of the tarred road in the Libode region to be compared and discussed in conjunction with the findings of the Sterkspruit Road.

6.2 ORIGIN-DESTINATION SURVEY

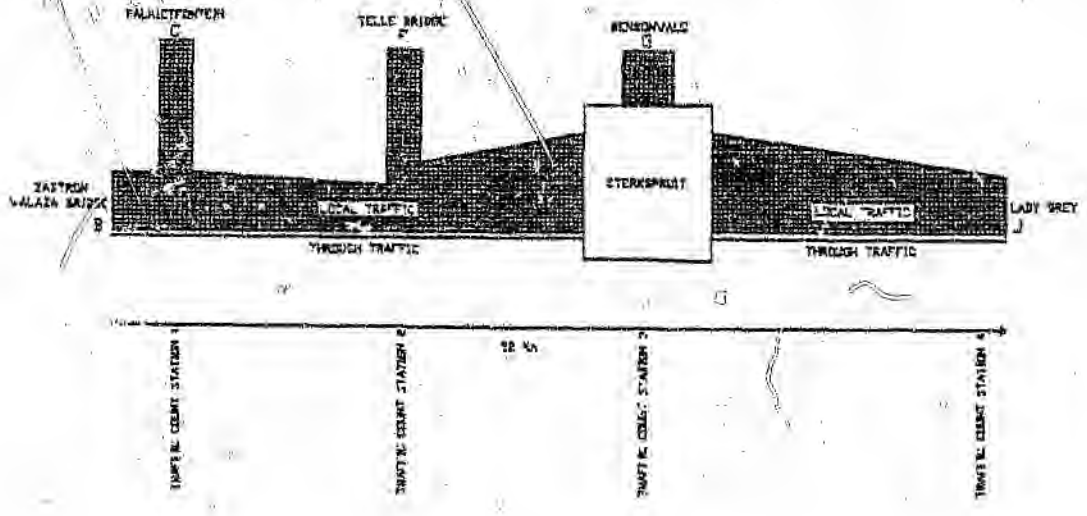
6.2.1 Results of the Origin-destination Survey

The original data of the origin-destination matrix and those adjusted by the Furness method to take unaccounted vehicles into account for the Libode and Sterkspruit Roads are presented in Appendix A. Furthermore, Map 1 and Map 2 show the respective position of vehicle count stations on the Libode and Sterkspruit roads and Figures 6.1 and 6.4 ar) graphic representations of two the origin destination surveys. Each block represents two way movement from two particular areas. Black represents local traffic and white "through" traffic.

6.1 Traffic Intensity on the Libode Road [ALOD1.1.2]



6.4 Traffic Intensity on the Sterkspruit Road [ASOD1.2]



a. Libode Road

Figure 6.1 clearly indicates that few vehicles are using the old gravel road [G through J to N]. This essentially means that traffic previously using the gravel road has been attracted to the tarred road. A limited amount of traffic does however, feed off the tarred road, to communities located along the gravel road but within a short distance of the tarred road. Section 6.4 and Section 6.5 respectively discuss the effects of the tarred road on residents and businesses located on the tarred road and those located along the gravel road.

Another important finding graphically illustrated in Figure 6.2.1 is the unimportance of "through" traffic as a contributor to total traffic flow. At the point where the least amount of local traffic is found it still accounts for more than 50% of total traffic.

Figure 6.2 indicates that there is generally a constant flow of traffic throughout the day with a limited peak during mid-morning and mid-afternoon and a small trough during the mid-day period.

FIGURE 6.2 : FLOW OF TRAFFIC OVER TIME - LIBODE ROAD [ALOD3]

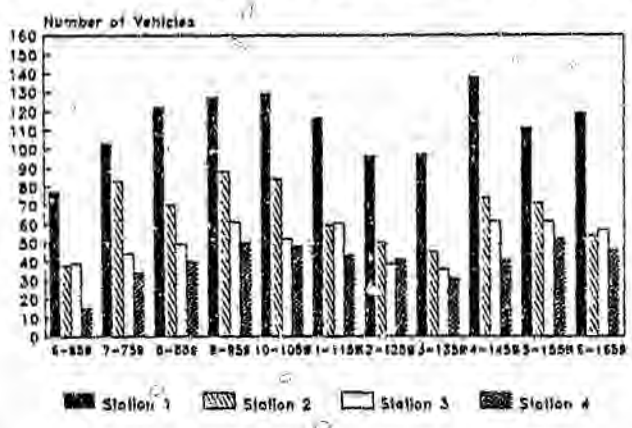
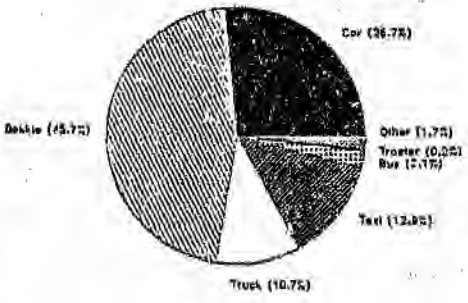


Figure 6.3 illustrates the modal split of vehicles using the road. Only 26,7% of vehicles using the road are cars. In con-

trast 71,6% of vehicles using the road are vehicles associated with work - 15% of vehicles are associated with work related to the transport of people and 56,6% of vehicles are associated with work related to the transport of goods or other work activities. This further suggests that vehicle make-up is of local origin.

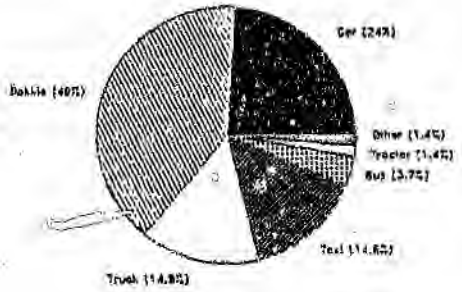
FIGURE 6.3 : MODAL SPLIT OF VEHICLES USING THE LIBODE ROAD
[ALOD2]



b. Sterkspruit Road

Figure 6.4 graphically illustrates the unimportance of "through" traffic as a contributor to total traffic. Furthermore traffic is concentrated towards the town of Sterkspruit. Figure 6.5 illustrates modal split in terms of vehicles using the road.

FIGURE 6.5 : MODAL SPLIT OF VEHICLES USING THE STERKSPRUIT ROAD
[ASOD2]



24% of vehicles using the road are cars. In contrast 74,6% of vehicles using the road are vehicles associated with work - 18,3%

of vehicles are associated with work related to the transport of people and 56,3% of vehicles are associated with work related to the transport of goods or other work activities. This suggests that vehicle make-up is of local origin.

c. Discussion

Regional roads in developed communities have traditionally been constructed to satisfy internodal or town to town traffic. The findings above suggest that this does not hold true. The flow of traffic on the Libode Road and particularly the Sterkspruit Road is significantly of local origin and destination. The negligible "through" routes on the Sterkspruit Road as compared to the Libode road can be attributed to the longer distance under observation. This suggests that the objective of regional roads in developing communities must serve more than internodal traffic, in fact it should serve local traffic. The large proportion of local traffic suggests the design philosophy [in terms of speed, layout, construction material, etc] of rural regional roads should be investigated and appropriate guidelines established. Furthermore the effect of local traffic on traditional transport modelling in developing communities should be investigated.

6.2.2 Summary

- the tarring of the Libode Road has attracted an increasing number of vehicles resulting in minimal flows on the gravel road.
- through traffic is an unimportant contributor to total traffic flow on both the Libode and Sterkspruit Roads.
- the majority of vehicles using both roads are work related vehicles suggesting local origin and local destination.
- there is a relatively constant flow of vehicles over time with a limited peak during mid-morning and mid-afternoon and a small trough during the mid-day period on the Libode Road.

6.3 TRAVEL PURPOSE SURVEY

6.3.1 Stratification

Tables ALT1, ALT2, AST1 and AST2, respectively, show the stratification of the Libode and Sterkspruit roads' travel purpose questionnaire in terms of types of vehicles in which respondents were travelling and the st cus of the respondents in relation to the vehicle. The findings were analysed in terms of the status of the respondent in ation to the vehicle. If inconsistencies between the three groups did not occur the results are presented as one sample.

6.3.2 The effect of the road on travel

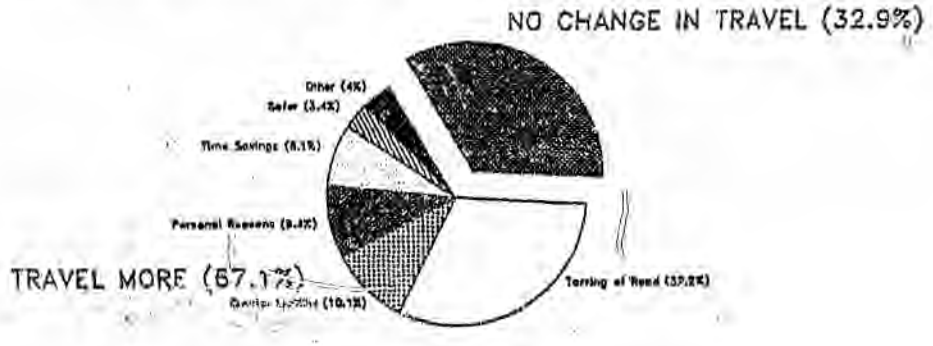
a. Literature review

Improvements to rural road i' istructure result in an increase in vehicle volumes and trave An important consequence of the provision or improvement of a road is the increase in travel for non-economic related activities. [Section 4.1 and Section 4.9]

b. Libode road

Travellers were asked if they had increased the frequency of their trip making since the road had been tarred and the reasons thereof. Figure 6.6 illustrates the results.

FIGURE 6.6 : PERCEIVED CHANGE IN THE NUMBER OF TRIPS PER PERSON - LIBODE ROAD [ALT6/7]



67,1% of travellers said they travelled more frequently. The reasons for increase in such travel are all related directly to the road except for one [personal reasons]. Apart from the general response of increased travel due to the tarring of the road 10,1% of travellers identified the availability of transport as a reason for increase in travel frequency. Other reasons identified by travellers included time savings (8,1%) and accident reductions (3,4%).

Travellers were also asked the purpose of their trip. The results are illustrated in Table 6.1.

TABLE 6.1 : PURPOSE OF TRAVEL - LIBODE ROAD [ALT4]

	Driver		Passenger		Paying Passenger	
	No.	%	No.	%	No.	%
Work	29	70,7	4	26,6	2	8
Social	3	7,3			2	8
Shopping	6	14,6	9	60	11	44
Religious			0		1	4
Education	1	2,4	0		2	8
Health			1	6,7	5	20
Government	2	4,9	1	6,7	2	8
TOTAL	41	100	15	100	25	100

An obvious conclusion is that driver, passenger and paying passengers travel for different purposes. 70,7% of drivers were travelling for the purpose of work. The only other significant purpose of travel made by 14,6% of drivers was for the purpose of shopping. The most important purpose involving 60% of passengers in travel is shopping. Work purpose trips follow in order of importance made by 26,6% of passenger road users. 44% of paying passengers were travelling for the purpose of shopping. This is followed in importance by 20% travelling for health purposes. Trips of lesser importance made by 8% of paying passengers are government trips, work trips, social trips and education trips.

As we have already seen drivers, passengers and paying passengers travel for different reasons. Information on the frequency of travel was also extracted. A trip was defined as the one-way trip being made by the traveller for a particular purpose. Table 6.2 indicates the average frequency for each trip purpose for the three groups of road users.

TABLE 6.2 : FREQUENCY OF TRAVEL - LIBODE ROAD [ALT5]

	Driver*	Passenger	Paying Passenger
Work	12,6	12,25	20
Social	4		2
Shopping	14,7	5,6	3,2
Religious			
Education	20		20
Health		4	2,4
Government	5	8	7

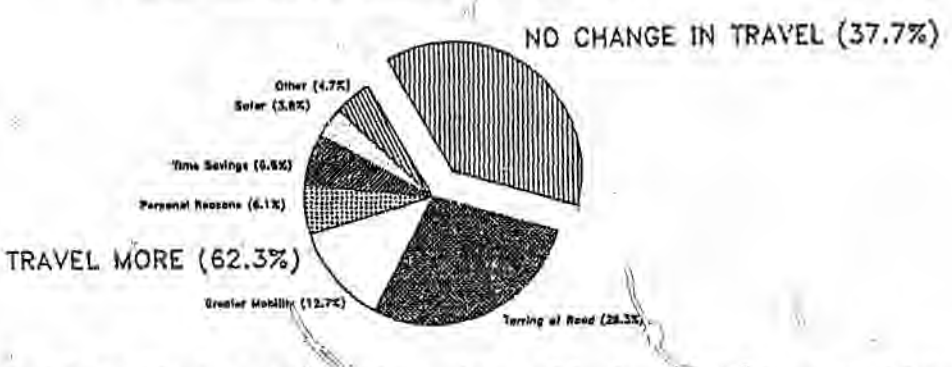
Again it is obvious that the frequency of the various road users is different. Although only 2,4% of drivers travel for the purpose of education it is the most frequently made trip, made 20 times per month. Shopping trips are made 14,7 times per month, work trips are made 12,6 times per month, government trips 5 times per month and social trips 4 times per month. Passengers travel less frequently than drivers. Although the work trip frequency remains relatively the same as drivers at 12,25 times per month, shopping trips are made 5,6 times per month, health trips 4 times per month and government trips 8 times per month. Paying passengers travel the least frequently out of the three road user groups. Shopping trips were made 3,2 times per month, health trips were made 2,4 times per month. Trips made by a smaller proportion of paying passengers were work and education trips [20 times per month] and social trips [twice a month].

c. Sterkspruit Road

Travellers were asked if they had increased the frequency of

their trip making since the road had been tarred and the reasons thereof. Figure 6.7 illustrates the results.

FIGURE 6.7 : PERCEIVED CHANGE IN THE NUMBER OF TRIPS PER PERSON - STERKSPRUIT ROAD [AST6/7]



62,3% of travellers said they travelled more frequently. The reasons for increase in such travel are all related directly to the road except for one [personal reasons]. Apart from the general response of increased travel due to the tarring of the road 12,8% of travellers identified the availability of transport as a reason for increase in travel frequency. Other reasons identified by travellers included time savings (6,6%) and accident decreases (3,8%).

Travellers were also asked the purpose of their trip. The results are illustrated in Table 6.3.

TABLE 6.3 : PURPOSE OF TRAVEL - STERKSPRUIT ROAD [AST4]

	Driver		Passenger		Paying Passenger	
	No.	%	No.	%	No.	%
Work	40	67,8	2	12,5	3	9,7
Social	6	10,2	2	12,5	5	16,1
Shopping	6	10,2	10	62,5	16	51,6
Religious			1	6,3		
Education	1	1,7			1	3,2
Health					4	12,9
Government	6	10,2	1	6,3	2	6,5
TOTAL	59	100	16	100	31	100

An obvious conclusion is that road users travel for different purposes. 67,8% of drivers were travelling for the purpose of work. Other significant purposes of travel made by 10,2% of drivers were for shopping, government and social purposes. The most important purpose involving 62,5% of passengers in travelling was for the purpose of shopping. Work and social purpose trips made by 12,5% of passengers followed in order of importance. 51,6% of paying passengers were travelling for the purpose of shopping. This was followed in importance by 16,1% travelling for social purposes and 12,9% for health purposes. Trips of lesser importance are work trips (9,7%) and government trips (6,5%).

Travellers were also asked the frequency of their trip purpose. Table 6.4 indicates the average frequency for each trip purpose for the three groups of road users.

TABLE 6.4 : FREQUENCY OF TRAVEL - STERKSPRUIT ROAD [AST5]

	Driver*	Passenger	Paying Passenger
Work	17,6	14	0,4
Social	1,8	1,5	0,4
Shopping	5,3	8,1	3,3
Religious		8	
Education	20		0,33
Health			1,25
Government	5,3	4	1

Again it is obvious that the trip frequency of the various road users is different. Drivers tend to travel much more frequently than their counterparts. Apart from 1,7% of drivers who make 20 education trips per month the work trip [made by 67,8% of drivers] which is made 17,6 times per month is the trip made most frequently by drivers. This is followed by shopping and government trips which are made 5,3 times per month. The most frequent trip of passengers is the work trip which is made 14 times per month. Other frequently made trips for passengers are

shopping which is made 8,1 times per month and religious trips [made 8 times per month]. The most frequently made trip of paying passengers is the shopping trip which is made 3,3 times per month. This is followed by health trips which are made 1,25 times per month and social trips which are made 0,4 times per month.

d. Discussion

Findings above indicate that travellers tend to travel more frequently since the road has been tarred. The reasons for the increase are generally related to the road and the effects thereof. One of the most important reasons noted for the increase is that of the availability of transport to travel. Furthermore this is noted as the most important effect of the road improvement by Libode Road travellers [Figure 6.8] and as the third most important effect by Sterkspruit Road travellers [Figure 6.9]. Surfaced road conditions attract vehicles [Section 6.2], some of which are passenger vehicles. The ability to travel is therefore increased. Patronage of passenger services increases the frequency of vehicles often by increasing the fleet size. This results in greater traffic volumes and the above system perpetuates itself.

It is suggested by the author that paying passenger trips are representative of trips made by the bulk of local residents. This is mainly due to low incomes and consequent low car-ownership rates in rural areas. This would suggest that the frequency of trips made by residents [Tables ALR21 and ASR21] and paying passengers [Tables ALT5 and AST5] should be comparable. When the two surveys are compared it is evident that residents say they travel more frequently than travellers say they travel. This is probably because multi-purpose trips form the majority of trips made in rural areas and in this way residents overemphasise their trip generation rates. Respondents of the travel purpose survey were however asked to provide the major

trip purpose and therefore it is a truer representation of trip purpose and frequency thereof.

6.3.3 The greatest effects of the road on the traveller

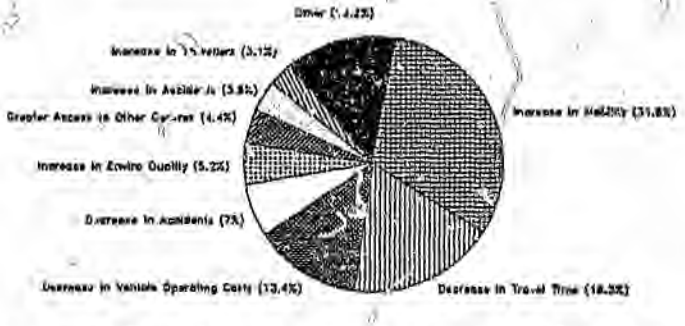
a. Literature review

Improvements or additions to rural road infrastructure not only have a wide range of effects but also immediate and long term effects as well as both positive and negative effects. Although the literature does accept that not all groups benefit, it generally accepts that the benefits of road improvements outweigh the costs. [Chapter 4].

b. Libode Road

Figure 6.8 graphically represents the greatest effects of the road on the traveller and reflects the relative importance of the effects of the road improvement on the traveller.

FIGURE 6.8 : THE GREATEST EFFECTS OF IMPROVING THE LIBODE ROAD [ALT8/16]



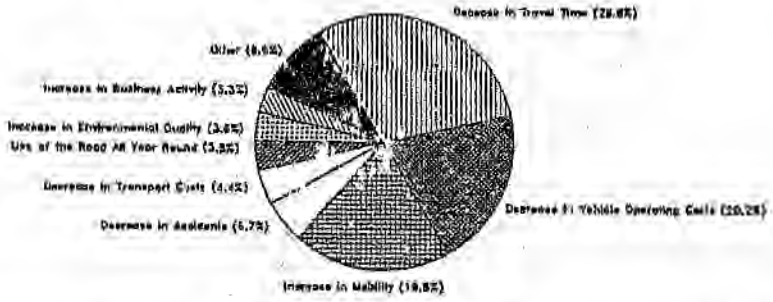
31,7% of travellers identified an increase in mobility as the greatest effect of the road improvement. This is followed in importance by a decrease in travel time (18,3%), a decrease in vehicle maintenance (13,3%) and a decrease in accidents (7%). A range of other effects were also identified. Each of these effects and others are discussed in greater detail in the following sections. Travellers of the Libode Road clearly benefited from the road improvements. 90,2% of all travellers identified the

greatest effect of the road improvement as beneficial. Only 5,1% identified negative effects and 4,7% a neutral effect.

c. Sterkspruit Road

Figure 6.9 graphically represents the greatest effects of the road on the traveller and reflects the relative importance of the effects of the road improvement on the traveller.

FIGURE 6.9 : THE GREATEST EFFECTS OF IMPROVING THE STERKSPRUIT ROAD [AST8/16]



29,8% of travellers identified a decrease in travel time as the greatest effect of the road improvement. This is followed in importance by a decrease in vehicle maintenance (20,2%), an increase in mobility (19,8%)and a decrease in accidents (6,7%). A range of other effects were also identified. Travellers on the Sterkspruit road clearly benefited from the road improvement. 96,9% of all travellers said that the road improvement had a beneficial effect. Only 1,3% noted a negative effect, 0,5% a neutral effect and 1,3% no effect.

d. Discussion

It can be concluded from the evidence above that travellers benefited from the road improvements. It can be also seen from the comparison of Figure 6.8 and Figure 6.9 that the four greatest effects are the same with little variations in the order of importance. Of greater importance is the fact that three of the four effects [accidents, vehicle maintenace and time] are effects taken into account by techniques currently used in ex

ante evaluation of road projects by transportation and economic planners in South Africa. Furthermore an increase in traffic was indirectly identified as an increase in mobility - in essence the availability of traffic for the use of travel. Moreover no other important effects were identified that current techniques do not incorporate. It can therefore be concluded that techniques currently used in South Africa incorporate the greatest effects of road improvements as identified by the traveller.

6.3.3.1 The effect of the road on travel time

a. Literature review

Improvements to rural road infrastructure tend to reduce travel times [Section 4.2].

b. Libode road

Table 6.5 clearly shows that the majority of travellers (98,7%) experienced travel time reductions since the road has been tarred. Furthermore 8,1% of travellers stated the reason for making more trips since the road has been tarred was because of travel time reductions [Figure 6.6]. Travel time savings were ranked by 18,3% of travellers as the most important effect of the road improvement [Figure 6.8].

TABLE 6.5 : THE EFFECTS OF THE LIBODE ROAD ON TRAVEL TIME [ALT12]

	No.	%
Road results in time savings	77	98,7
Road results in no time savings	1	1,3
No response	3	
TOTAL	81	100

c. Sterkspruit road

Table 6.6 clearly shows that the majority of travellers (96,1%) experienced travel time reductions since the road has been tarred. Furthermore 6,6% of travellers stated the reason for making more trips since the road has been tarred was because of travel time reductions [Figure 6.7]. Travel time savings were

ranked by 29,8% of travellers as the most important effect of the road improvement [Figure 6.9].

TABLE 6.6 : THE EFFECT OF THE STERKSPRUIT ROAD ON TRAVEL TIME [AST12]

	No.	%
Road results in time savings	98	96,1
Road results in no time savings	4	3,9
No response		
TOTAL	106	100

d. Discussion

The results of the above discussion clearly indicate that road improvements result in travel time savings which cause increases in travel frequency [Section 6.3.2].

6.3.3.2 The effect of the road on vehicle maintenance

a. Literature review

Improvements to rural road infrastructure tend to reduce vehicle maintenance costs. [Section 4.1]

b. Libode road

Table 6.7 clearly shows that 97,1% of travellers who are drivers said that the road results in vehicle maintenance savings. A decrease in vehicle maintenace costs was ranked as the most important effect by 13,3% of travellers [Figure 6.8].

TABLE 6.7 : THE EFFECTS OF THE LIBODE ROAD ON VEHICLE MAINTENANCE [ALT18]

	No.	%
Road results in vehicle maintenance savings	34	97,1
Road results in no vehicle maintenance savings	1	2,9
No response	5	
TOTAL	40	100

c. Sterkspruit road

Table 6.8 clearly shows that 98,2% of travellers who are drivers said that the road results in vehicle maintenance savings. A decrease in vehicle maintenace costs was ranked as the most important effect by 20,2% of travellers [Figure 6.9].

TABLE 6.8 : THE EFFECT OF THE STERKSPRUIT ROAD ON VEHICLE MAINTENANCE [AST18]

	No.	%
Road results in vehicle maintenance savings	56	98,2
Road results in no vehicle maintenance savings	1	1,8
No response	2	
TOTAL	59	100

d. Discussion

The findings above clearly indicate that bituminization results in vehicle maintenance savings. Vehicle maintenance and other vehicle operating savings resulting from tarred road conditions lead to the attraction of operators to these roads. An increase in vehicles carrying passengers results in an increase in the mobility for local residents. This was discussed in greater detail in Section 6.3.2.

6.3.3.3 The effect of the road on accidents

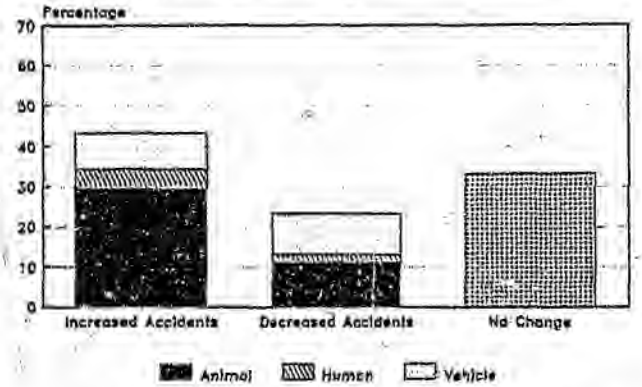
a. Literature review

Improvements to rural roads from a gravel surface to a bitumin surface reduce the number of accidents. The severity of accidents may increase due to higher levels of speed that are attainable. [Section 4.3].

b. Libode road

Figure 6.10 graphically illustrates the perceived effect of road improvements on accidents. 33,3% of travellers said there was no change in accidents while 43,2% said there was an increase in accidents and 23,5% said there was a decrease in accidents.

FIGURE 6.10 : THE EFFECT OF THE LIBODE ROAD ON ACCIDENTS
[ALT13/14.1/14.2]



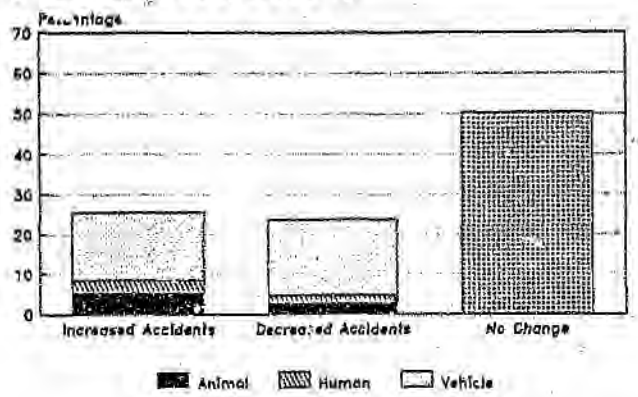
Also evident from this chart is that animal and vehicle accidents are involved in the majority of accidents while human accidents assume smaller roles in total accidents. This could be attributed to the fact that the Libode region is an agriculturally productive region and is well stocked with animals. A decrease in accidents is however ranked by 7% of respondents making it the fourth most important effect of the road improvement [Figure 6.8]. On the other hand an increase in accidents is ranked by 3,8% of travellers as the most important effect thereby making it the largest single negative effect of the road improvement [Figure 6.8]. 3,4% of travellers attribute a decrease in accidents as the reason for their increase in travel since the tarring of the road [Figure 6.6].

c. Sterkspruit road

Figure 6.11 graphically illustrates the perceived effect of road improvements on accidents. 50,5% of travellers said there was no change in accidents while 25,7% said there was an increase in accidents and 23,8% said there was a decrease in accidents. Also evident from this chart is that vehicle accidents are involved in the majority of accidents while both animals and humans assume smaller roles in total accidents. A decrease in accidents is however ranked by 6,7% of respondents as the fourth most important effect [Figure 6.9]. 3,8% of travellers attribute a

decrease in accidents as the reason for their increase in travel since the tarring of the road [Figure 6.7].

FIGURE 6.11 : THE EFFECT OF THE STERKSPRUIT ROAD ON ACCIDENTS [AST13/14.1/14.2]



d. Discussion

It can be concluded that travellers are undecided whether improved road conditions result in increased accidents or decreased accidents or have no effect on accidents. Findings of the resident impact survey reveal similar results. Further investigation into the effect of road improvements on accidents is therefore necessary.

6.3.3.4 The effect of the road on transport costs

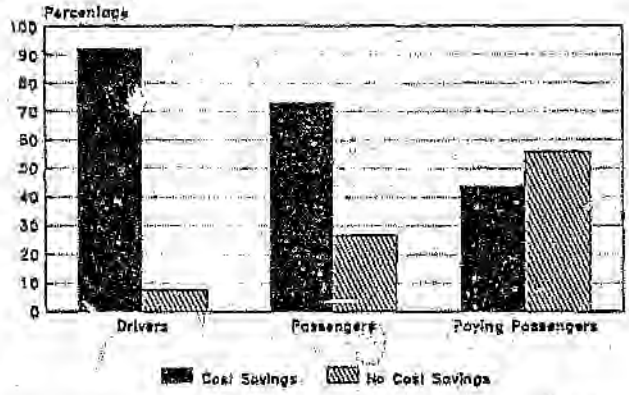
a. Literature review

Improvements to rural road infrastructure reduce vehicle operating costs in terms of vehicle maintenance and fuel savings. Vehicle operating cost savings do however benefit a relatively small number of people. [Section 4.1].

b. Libode road

Figure 6.12 graphically illustrates travellers who experienced cost savings as a result of the road improvement. Of great importance are the differences in opinion of the various road users.

FIGURE 6.12 : THE EFFECT OF THE LIBODE ROAD ON TRANSPORT COSTS [ALT9]



92,3% of drivers experienced cost savings while fewer passengers (73,3%) and even less paying passengers (44%) experienced cost savings. Table 6.9 compares savings in cost with preparedness to pay towards the cost of road construction.

TABLE 6.9 : PREPARDENESS TO PAY TOWARDS ROAD CONSTRUCTION COSTS OF THE LIBODE ROAD [ALT10/9]

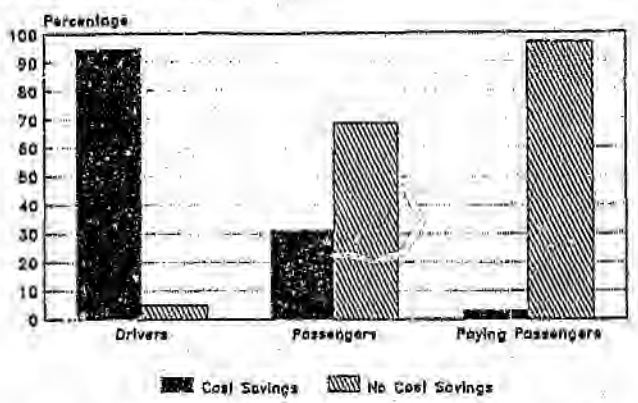
	Road Results In Cost Savings		Road Results In No Cost Savings	
	No.	%	No.	%
Prepared to pay	51	65,7	3	3,8
Not prepared to pay	6	7,7	18	22,8
No response	1			
TOTAL	58	73,4	21	26,6

89,5% of travellers experiencing cost savings were prepared to pay towards the cost of road construction. More importantly are the 14,3% of travellers who experience no cost savings but are prepared to pay towards the cost of road construction.

c. Sterkspruit road

Figure 6.13 graphically illustrates travellers who experienced cost savings as a result of the road improvement.

FIGURE 6.13 : THE EFFECT OF THE STERKSPRUIT ROAD ON TRANSPORT COSTS [AST9]



Of great importance are the differences in opinion of the various road users. 94,9% of drivers experienced cost savings while fewer passengers (31,3%) and even less paying passengers (3,2%) experienced cost savings. Table 6.10 compares savings in cost with preparedness to pay towards the cost of road construction.

TABLE 6.10 : PREPARDENESS TO PAY TOWARDS THE CONSTRUCTION COSTS OF THE STERKSPRUIT ROAD [AST10/9]

	Road Results in Cost Savings		Road has no Cost Savings	
	No.	%	No.	%
Prepared to pay	63	92,6	24	64,9
Not prepared to pay	5	7,4	13	35,1
No response	—	—	1	—
TOTAL	68	100	38	100

92,6% of travellers experiencing cost savings were prepared to pay towards the cost of road construction. More importantly are the 64,9% of travellers who experience no cost savings but are prepared to pay towards the construction cost of the road.

d. Discussion

It can therefore be concluded that cost savings are experienced when travelling on surfaced roads as opposed to gravel roads. It is clear from a comparison of the two findings above that vehicle operators are experiencing the greatest cost savings. In the

Libode region, cost savings tend to be passed on to the consumer to a limited extent. In the Sterkspruit region cost savings are not passed on but are absorbed by vehicle operators. This supports evidence in the literature that although roads reduce transport cost, these cost savings benefit relatively few people. On both roads users experiencing cost savings are prepared to pay towards the construction costs of the roads. While only 14,3% of Libode travellers not experiencing cost savings are prepared to pay towards the construction of the road 64,9% of Sterkspruit travellers are prepared to pay. This suggests that surfaced roads have effects over and above that of cost savings and for which respondents are willing to pay.

6.3.4 Extent of the reliability of roads

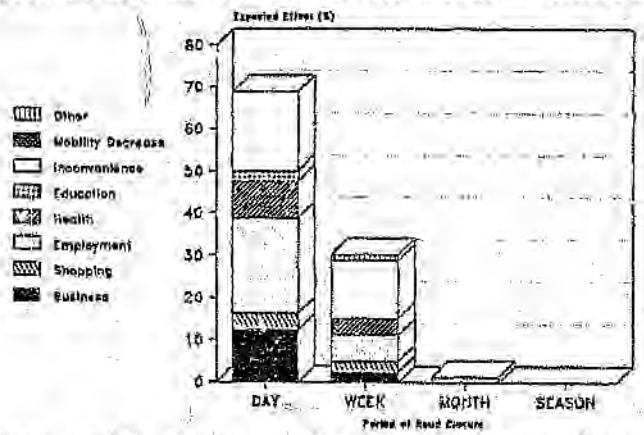
a. Literature review

No known literature

b. Libode road

Figure 6.14 graphically illustrates the reasons for inconvenience of road closure over a period of one day increasing to a period of one season of the year.

FIGURE 6.14 : INCONVENIENCE OF ROAD CLOSURE - LIBODE ROAD [ALT17]



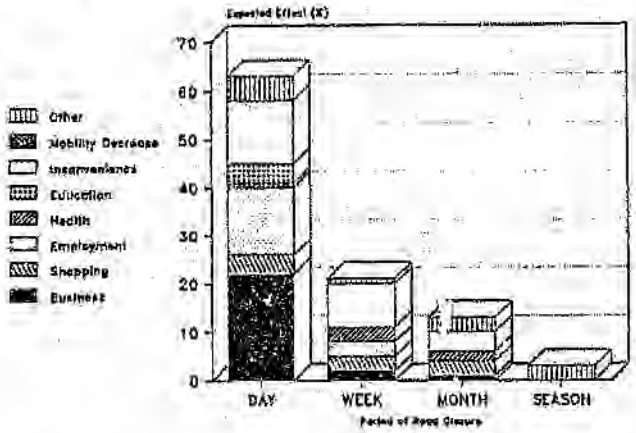
68,8% of travellers said they would be inconvenienced if the road was closed for one day. The main reasons for the inconvenience were related to business (12,5%) or work purposes (22,5%). 100% of travellers would be inconvenienced for one or another reason if the road in question was closed for a period of one month of the year. Overall reasons for inconvenience were for business (15%), employment (28,8%), shopping (6,3%), health (12,6%) and education reasons(2,5%).

c. Sterkspruit road

Figure 6.15 graphically illustrates the reasons for inconvenience of road closure over a period of one day increasing to a period of one season of the year. 61,8% of travellers would be inconvenienced if the road was closed for one day. The main reasons for the inconvenience were related to business (21,6%) or work purposes (13,7%). 95,1% of travellers would be inconvenienced for one or another reason if the road in question was closed for

a period of one month of the year. Overall reasons for inconvenience were for business (24,1), employment (16,6%), shopping (9,7%), health (5,9%) and education (3,9%).

FIGURE 6.15 : INCONVENIENCE OF ROAD CLOSURE - STERKSPRUIT ROAD
[AST17]



c. Discussion

It can be concluded from evidence above that a reliable road is very important to travellers particularly for business and work purposes. Other reasons of lesser importance for a reliable road are for health and shopping purposes.

6.3.5 Summary

- road users benefit from the road improvements.
- the major benefit identified by travellers as a result of road improvements is the availability of transport for travel which results in increased frequency of travel.
- travellers largely identified effects that are taken into account by techniques currently used in ex-ante evaluati of road projects by transportation planners in South Africa.
- vehicle drivers were the group identified as the most frequent travellers. Paying passengers [representative of the bulk of trips made by local residents] travel least frequently.
- trip purpose of paying passengers is largely for shopping and health purposes. Drivers are largely travelling for work pur-

poses.
- travellers experienced travel time savings.
- the road improvement results in vehicle maintenance savings
- the effect of the road on accidents is unclear
- surfaced road conditions result in cost savings. These savings are however absorbed by operators and are rarely passed on to the consumer.
- a reliable road is very important to travellers particularly for business and work purposes and to a lesser extent for health and shopping purposes.

6.4 RESIDENT IMPACT SURVEY

6.4.1 Stratification

Table ALRi through to Table ALRiii and Table ASRi through to Table ASRiii respectively, show the stratification of the Libode and Sterkspruit Roads' resident impact questionnaire in terms of age, sex and family status. The Libode Road was analysed in terms of the new tarred road and the old gravel road. This was to determine the effects on communities located alongside the tarred road and gravel road on the realignment and improvement of the Libode Road. In the analysis of findings in terms of the tarred and gravel roads, the locational advantages and characteristics in certain areas of the gravel road, warranted specific analysis and therefore the gravel road zone of influence was further delineated into what is termed the "intermediate zone of influence". When the intermediate zone is not discussed separately it is incorporated into the gravel road. The findings are therfore presented in terms of the tarred road and gravel road [and sometimes the intermediate road].

The Sterkspruit Road was analysed in terms of four groups delineated in terms of age and sex. Table ASR i/ii illustrates the four groups. This was to determine the effect of road improvements on various groups within rural society. In the analysis stage of the data collection process each question was therefore analysed in terms of the four groups. Only where differences in opinion or inconsistencies occur are the results presented in terms of the four groups. Where little differences occurred or where inconsistencies were not noticeable the data is presented as one sample.

A large proportion of older females dominate the sample. This is due to reasons already discussed in Section 5.1.2.2. Table ALRv

and Table ASRv respectively identify the number of surveys administered in each zone location in the Libode and Sterkspruit regions. Map 1 and Map 2 identify the zone locations and the respective number of surveys administered within each zone location. Map 1 delineates between the three zones of influence in the Libode region. Map 2 indicates the zone of influence of the Sterkspruit Road.

6.4.2 Day to day activites in which inhabitants are involved

a. Literature review

Not appropriate.

b. Libode Road

i. Libode tarred road

Table 6.11 summarises the activities that take up most of the time of tarred road residents.

TABLE 6.11 : DAILY ACTIVITIES OF RESIDENTS - LIBODE ROAD [ALR2]

Activity	New Road No.	New Road %	Old Road No.	Old Road %
Agriculture	45	48,9	54	71,
Money Making	3	3,3	7	9,2
Agriculture and money making	2	2,2	5	6,6
Household chores	14	15,2	4	5,3
Formal employment	9	9,8	3	3,9
Unemployed	19	20,7	3	3,9
No response	6		2	
	98	100	78	100

51.1% of residents are involved in agriculture [48,9% in agriculture and 2,2% in agriculture and money making]. 5,5% of residents are involved in informal money making activity [3,3% in money making and 2,2% in money making and agriculture]. 9,8% of inhabitants resident along the tarred road are involved in some type of formal employment while 20,7% said they were "formally" unemployed. Formally unemployed can be defined as those respondents seeking employment in the formal economy. The

main activity of the remaining 15,2% is that of household chores.

ii. Libode gravel road

Table 6.11 also indicates the type of activities that take up most of the time of gravel road residents. The main activity of 77,6% of residents is agriculture [71,1% in agriculture and 6,6% in agriculture and money making]. 15,8% of residents are involved in informal money making activity [9,2% in money making and 6,6% in money making and agriculture]. Only 3,9% of inhabitants resident along the gravel road are involved in some type of formal employment while a further 3,9% said they were "formally" unemployed. The remaining 5,3% are involved in household chores.

iii. Discussion

The involvement and potential involvement of tarred road residents in formal employment and the extent of residents involved in household chores indicates that tarred road residents are involved in the formal economy to a greater extent than gravel road residents who rely on agriculture and informal money making activities. The above findings suggest that improved roads encourage local inhabitants away from a subsistence economy to a more formal economy. Furthermore the findings of Sections 6.4.2.1 and 6.4.2.2 indicate that the tarred road residents are to a greater extent geared towards commercial activity in terms of agriculture and money-making suggesting greater participation in the formal economy.

c. Sterkspruit Road

Table 6.12 summarises the day-to-day activities that take up most of the time of Sterkspruit Road residents. 24% of residents are involved in agriculture [21,2% in agriculture and 2,8% in agriculture and money making]. 11,6% of residents are involved in informal money making activity [8,8% in money making and 2,8% in money making and agriculture].

TABLE 6.12 : DAILY ACTIVITIES OF RESIDENTS - STERKSPRUIT ROAD

[ASR2]

	Young Male		Young Female		Old Male		Old Female		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%
Agriculture	9	24,3	14	17,3	12	25,5	18	21,2	53	21,2
Money making activity	4	10,8	10	12,3	3	6,4	5	5,9	22	8,8
Agriculture/ money making	1	2,7	2	2,5			4	4,7	7	2,8
Household Chores	2	5,4	40	49,4	5	10,6	44	51,8	91	36,4
Formal Employment	11	29,7	3	3,7	7	14,9	5	5,9	26	10,4
Unemployed	10	27	9	11,1	20	42,6	9	10,5	48	19,2
Student			3	3,7					3	1,2
No response	4		8		4		9		25	
TOTAL	41	100	89	100	51	100	94	100	275	100

Young people are involved to a greater extent than old people in informal money making activities. 19,4% of residents are formally employed and a further 19,2% are "formally" unemployed. Males dominate in the employment and potentially employed category. 36,4% of residents are involved in daily household chores. Females tend to dominate this activity category.

d. Discussion

Agriculture as a daily activity is much more important to Libode road residents. This can be attributed to agricultural potential of this area [Section 5.1.4]. The impact of the road improvement on agriculture in the Sterkspruit area will therefore be much smaller than the effect on agriculture in the Libode area. A similar percentage of residents are involved or potentially involved in the formal economy. A larger proportion of residents dependent on the money economy [probably reflecting the high de-

pendence on remittances] is noticeable in the Sterkspruit region.

6.4.2.1 The effect of the road on agriculture

a. Literature review

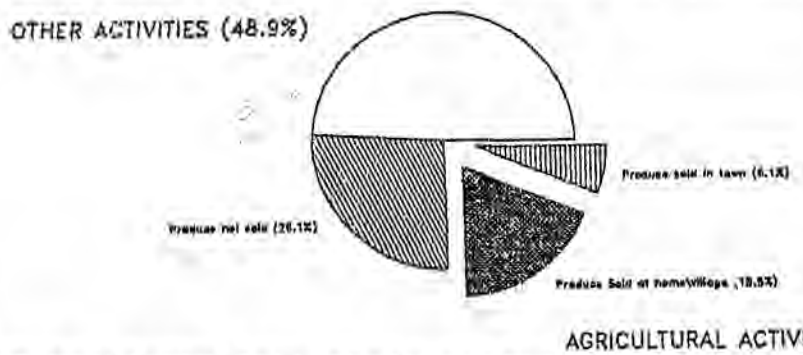
Improvements to rural road infrastructure result in increases in agricultural production due to greater access to markets, agricultural inputs and extension services. Increases in agricultural production often are associated with a change of crop composition to cash crops. [Section 4.5]

b. Libode Road

i. Libode tarred road

The findings of day-to-day activities in which residents are involved [Section 6.4.2] show that 51,1% of residents are involved in agriculture. Figure 6.16 illustrates the extent of commercial farming and places where produce is sold.

FIGURE 6.16 : THE EFFECT OF THE LIBODE ROAD ON AGRICULTURE
[TARRED ROAD RESIDENTS][ALR2/3/4.1]



25% of residents sell their produce - 18,5% at home or within the village and 6,5% sell their produce in town. The reason for selling, categorised into town and home/village, is illustrated in Table 6.13. Reasons for choice of selling at home or in the village are identified as a good market (47,1%), the size of the produce is too small to substantiate selling at another place (41,2%), the inability to sell elsewhere (5,9%) and no trading

licence (5,9%).

TABLE 6.13 : PLACE OF PRODUCE SALE AND REASON THEREFORE - LIBODE ROAD [ASR2]

Reasons	New Road Home/ Village No.	%	Towns No.	%	Old Road Home/ Village No.	%	Towns No.	%
Good Market	8	47,1	6	100	5	35,7	1	100
Size of produce too small	7	41,2			6	42,9		
No trading licence	1	5,9			1	7,1		
Unable to sell at other places	1	5,9	—	—	2	14,3	—	—
TOTAL	17	100	6	100	14	100	1	100

BLE 6.14 : REASON FOR NOT SELLING PRODUCE - LIBODE ROAD [ALR5]

	New Road No.	%	Old Road No.	%
Production sufficient for self consumption only	18	78,3	34	79,1
Shortage of farming land	4	17,4	9	20,9
Other	1	4,3	-	
No response	1		1	
TOTAL	24	100	44	100

The reason identified for selling in town was a good market. Reasons for not selling [Table 6.14] were that only sufficient for self consumption was produced (78,3%) or land for further production was not available (17,4%). Table 6.15 illustrates the actual effect of the road improvement on agriculture. 18,5% of respondents located alongside the tarred road felt that the road had improved agricultural production. This represents 36,2% of respondents who are involved in agricultural activities who percieve an increase in agricultural production as a result of the road [Table ALR6].

TABLE 6.15 : THE EFFECT OF THE LIBODE ROAD ON AGRICULTURAL PRODUCTION [ALR2/3/6/7]

	New Road(N=92)				Old Road(N=76)			
	Produce sold		Produce not sold		Produce sold		Produce not sold	
	No	%	No	%	No	%	No	%
Increase	13	14,1	4	4,4	4	5,3	2	2,6
No change	10	10,7	20	21,7	11	14,5	41	54
Decrease								
No response							1	1,3
TOTAL	23	25	24	26,1	15	19,7	44	57,9

TABLE 6.16 : REASONS FOR AN INCREASE IN AGRICULTUREAL PRODUCTION - LIBODE ROAD [ALR7]

Reason	New Road No.	New Road %	Old Road No.	Old Road %
Greater ease of inputs	9,5	55,9	2	33,3
Greater access to markets	5,5	32,4		
Greater involvement with agricultural extension officers	1	5,9	3	50
Other	1	5,9	1	16,7
TOTAL	17	100	6	100

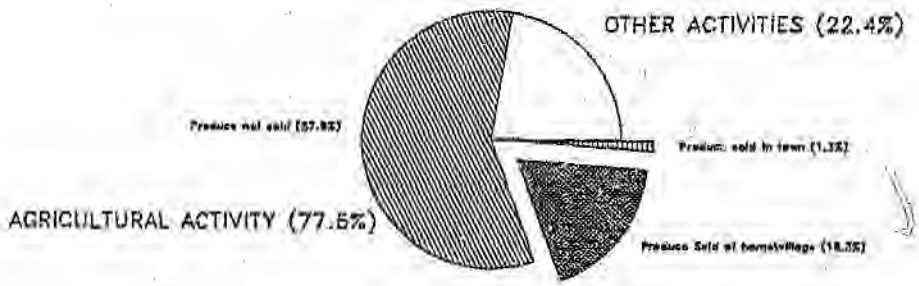
The reasons for the increase are illustrated in Table 6.16. Of the respondents who experienced an increase, 55,9% said it was because of greater ease of inputs, 32,4% because of greater access to markets and 5,9% because of greater involvement with agricultural extension officers. The effectiveness of extension programmes is somewhat unsatisfactory as only 37,8% of residents involved in agriculture said that agricultural extension officer relations had improved [Table ALR8].

ii. Libode gravel road

The findings of day-to-day activities in which residents are involved [Section 6.4.2] show that 77,6% of residents are in-

volved in agriculture. Figure 6.17 illustrates the extent of commercial farming and places where produce is sold. 19,7% of residents sell their produce - 18,3% at home or within the village and 1,3% sell their produce in town.

FIGURE 6.17 : THE EFFECT OF THE LIBODE ROAD ON AGRICULTURE
[GRAVEL ROAD RESIDENTS][ALR2/3/4.1]



The reason for selling, categorised into town and home/village, is illustrated in Table 6.13. Reasons for choice of selling at home or in the village are identified as a good market (35,7%), the size of the produce is too small to substantiate selling at another place (14,3%), the inability to sell elsewhere (14,3%) and no trading licence (7,1%). The reason identified for selling in town was a good market. Reasons for not selling [Table 6.14] were that only sufficient for self consumption was produced (79,1%) or land for further production was not available (20,9%). Table 6.15 illustrates the actual effect of the road improvement on agriculture. 7,9% of respondents felt that the road had improved agricultural production. This represents 10,2% of gravel road respondents who are involved in agricultural activities who perceive an increase in agricultural production as a result of the tarring of the road [Table ALR6]. The reasons for the increase are illustrated in Table 6.16. Of the residents who experienced an increase 33,3% said it was because of greater ease of inputs and 50% because of greater involvement with agricultural extension officers. The effectiveness of extension

programmes is somewhat unsatisfactory as 33% of residents involved in agriculture said that agricultural extension officer relations had improved [Table ALR8].

iii. Discussion

It is evident from the findings above that although many more of the gravel road respondents are involved in agriculture fewer are involved in selling their produce and even fewer in selling in a market type environment [selling in town]. On the other hand fewer tarred road respondents are involved in agriculture but those involved in agriculture are involved to a greater extent in commercial farming. Although tarred road farmers benefited to a greater extent relatively few farmers experienced increases in agricultural production as a result of the road improvement. The reasons given for the increase all relate to advantages directly related to the road [ease of inputs, greater access to markets and greater involvement with agricultural extension officers]. It can be concluded that relatively few agricultural benefits resulted from the road improvement but of those benefits the majority were experienced by respondents located along the tarred road.

c. Sterkspruit Road

The findings of day-to-day activities in which residents are involved [Section 6.4.2] show that 24% of residents are involved in agriculture. Figure 6.18 illustrates the extent of commercial farming and places where produce is sold. 5,3% of residents sell their produce - 4,9% at home or within the village and 0,4% sell their produce in town.

FIGURE 6.18 : THE EFFECT OF THE STERKSPRUIT ROAD ON AGRICULTURE [ASR2/3/4.1]

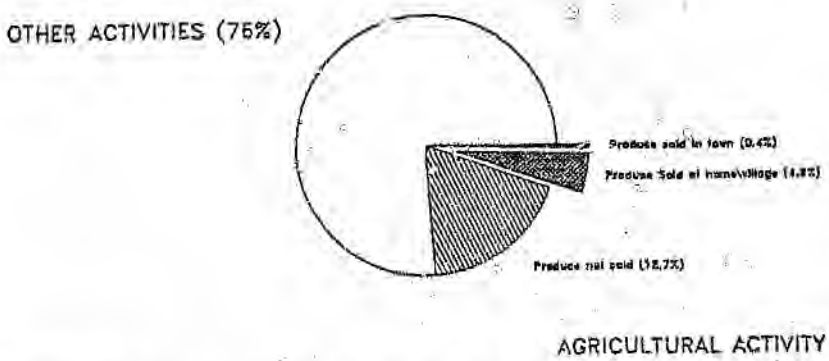


TABLE 6.17 : PLACE OF PRODUCE SALE AND REASON THEREFORE - STERKSPRUIT ROAD [ASR4.2]

Reasons	Home/Village		Town	
Good market	3	25	1	100
Size of produce too small	7	58,3		
Unable to sell at other places	2	16,7		
TOTAL	12	100	1	100

TABLE 6.18 : REASON FOR NOT SELLING PRODUCE - STERKSPRUIT ROAD [ASR5]

Reason	No.	%
Production sufficient for self consumption only	25	56,8
Shortage of farming land	4	9,1
Inadequacy of farming land	12	27,3
No market to sell produce	3	6,8
No response	2	
TOTAL	46	100

The reason for selling, categorised into town and home/village, is illustrated in Table 6.17. Reasons for choice of selling at home or in the village are identified as a good market (25%), the size of the produce is too small to substantiate selling at another place (58%), and the inability to sell elsewhere (16,7%). The reason identified for selling in town was a good market. Reasons for not selling [Table 6.18] were that only sufficient for self consumption was produced (56,8%), shortage of farming land (9,1%), inadequacy of farming land (27,3%) and no market at which to sell produce (6,8%).

Table 6.19 illustrates the actual effect of the road improvement on agriculture. 0,4% of residents felt that the road had improved agricultural production and a further 0,8% felt the road had decreased agricultural production.

TABLE 6.19 : THE EFFECT OF THE STERKSPRUIT ROAD ON AGRICULTURAL PRODUCTION [ASR2/3/6/7]

N=250

	Produce sold		Produce not sold	
	No	%	No	%
Increase	1	0,4		
No Change	12	4,8	44	17,6
Decrease			2	0,8
TOTAL	13	5,2	46	18,4

This represents 7,7% of respondents who are involved in agricultural activities who perceive an increase in agricultural production as a result of the road improvement [Table ASR6]. The reason for the increase in agricultural production was because of

greater ease of inputs and the reason for a decrease in agricultural production was because of an increase in accidents involving livestock. The effectiveness of extension programmes is somewhat unsatisfactory as only 5,3% of residents involved in agriculture said that agricultural extension officer relations had improved [Table ASR8].

d. Discussion

It is evident from the findings above that the effects suggested by the literature did not occur. Improved road conditions, particularly in the Sterkspruit region, have little effect on agriculture. This can be attributed to the unimportance of agricultural activity to family income [Section 5.2.4] and the low agricultural potential of the area under consideration.

6.4.2.2 The effect of the road improvement on money-making

a. Literature review

Improvements to rural road infrastructure have noticeable positive economic impacts on business [Section 4.5.5].

b. Libode Road

i. Libode tarred road

The findings of day-to-day activities in which respondents are involved [Section 6.4.2] show that 5,5% of respondents are involved in money making activities. Figure 6.19 illustrates the extent of informal money making activities and places where produce is sold. All residents involved in money making activities sell their products - 2,3% at home or within the village and 2,3% sell in town. The reason for selling, categorised into town and home/village, is illustrated in Table 6.20. All products were sold at the chosen places because of good markets. Table 6.21 illustrates the actual effect of the road improvement on money making. Only 4,3% of respondents felt that the road had improved money making activity. This represents 80% of tarred road residents who are involved in money making activities who perceive an increase in business as a result of the tarring of

the of the road [Table ALR13].

FIGURE 6.19 : THE EFFECT OF THE LIBODE ROAD ON MONEY MAKING ACTIVITY [TARRED ROAD RESIDENTS][ALR2/10/11.1]

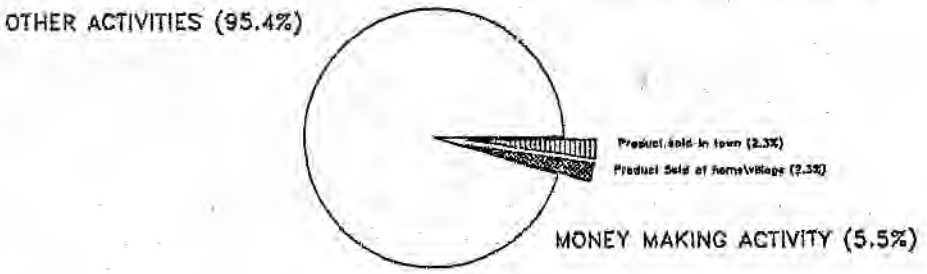


TABLE 6.20 : PLACE OF PRODUCT SALE AND REASON THEREFORE - LIBODE ROAD [ALR11.2]

	New Road				Old Road			
	Home/ Village		Town		Home/ Village		Town	
	No.	%	No.	%	No.		No.	%
Good market	2,5	100	2,5	100	4	57,2	5	100
Other					3	42,9		
No response	—	—	—	—	1	—	—	—
TOTAL	2,5	100	2,5	100	8	100	5	100

TABLE 6.21 : THE EFFECT OF THE LIBODE ROAD ON MONEY MAKING ACTIVITY [ALR2/10/11.1/13]

	New Road (N=92)		Old Road (N=76)	
	No	%	No	%
Increase	4	4,3	1	1,3
No change	1	1,1	12	15,8
Decrease	—	—	—	—
TOTAL	5	5,4	13	17,1

The reasons for the increase are illustrated in Table 6.22.

TABLE 6.22 : REASON FOR AN INCREASE IN PRODUCT PRODUCTION - LIBODE ROAD [ALR14]

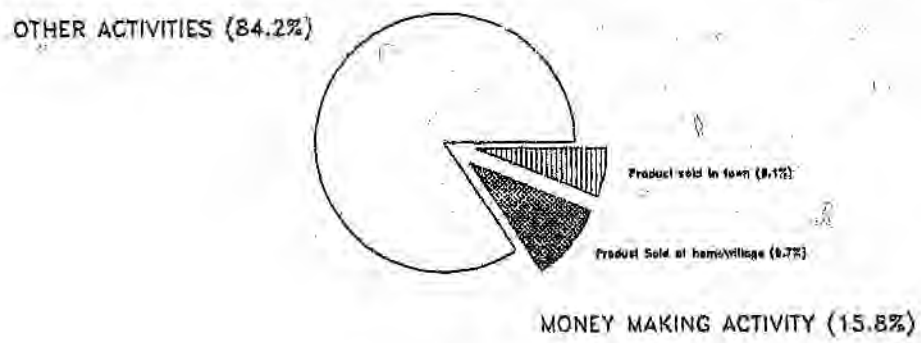
Reason	New Road No.	New Road %	Old Road No.	Old Road %
Traffic increases have resulted in customer increases	2	50	1	100
Greater ease of inputs	2	50	-	-
TOTAL	4	100	1	100

Of the respondents who experienced an increase in production 50% said increases were directly related to additional customers due to greater traffic volumes and 50% said it was because of greater ease of inputs.

ii. Libode gravel road

The findings of day-to-day activities in which respondents are involved [Section 6.4.2] show that 15,8% of gravel road respondents are involved in money making activities. Figure 6.20 illustrates the extent of informal money making activities and places where produce is sold. All respondents involved in money making activities sell their products - 9,7% at home or within the village and 6,1% in town. The reasons for selling, categorised into town and home/village, are illustrated in Table 6.20.

FIGURE 6.20 : THE EFFECT OF THE LIBODE ROAD ON MONEY MAKING ACTIVITY [GRAVEL ROAD RESIDENTS][GR2/10/11.1]



All products were sold in town as it was identified as a good market place. 57,1% of products were sold in villages because it was identified as a good market. The remainder were sold at the village for personal reasons. Table 6.21 illustrates the actual effect of the road improvement on money making. Only 1,3% of respondents felt that the road had improved money making activity. This represents only 7,7% of gravel road respondents who are involved in money making activities who perceive an increase in production as a result of the road [Table ALR13]. The reasons for the increase are illustrated in Table 6.22. All residents who experienced an increase in production said increases were directly related to additional customers resulting from increases in traffic.

iii. Discussion

The findings above suggest further that gravel road residents are involved in the informal economy. Of greater importance is the effect of the road on product production. A large proportion of tarred road residents involved in money making experienced an increase in product production while only very few gravel road residents experienced the same effect. Therefore, although the literature suggested [Section 5.2.3] that very few inhabitants are involved in the informal sector and few benefits due to the road improvement accrued to the informal sector, the majority of benefits were experienced by residents located along the tarred road.

c. Sterkspruit Road

The findings of day-to-day activities in which residents are involved [Section 6.4.2] show that 11,6% of residents are involved in money making activities. Figure 6.21 illustrates the extent of informal money making activities and places where produce is sold. All residents involved in money making activities sell their products - 1,6% sell at home or within the village and 10% in town.

FIGURE 6.21 : THE EFFECT OF THE STERKSPRUIT ROAD ON MONEY MAKING ACTIVITY [ASR2/10/11.1]

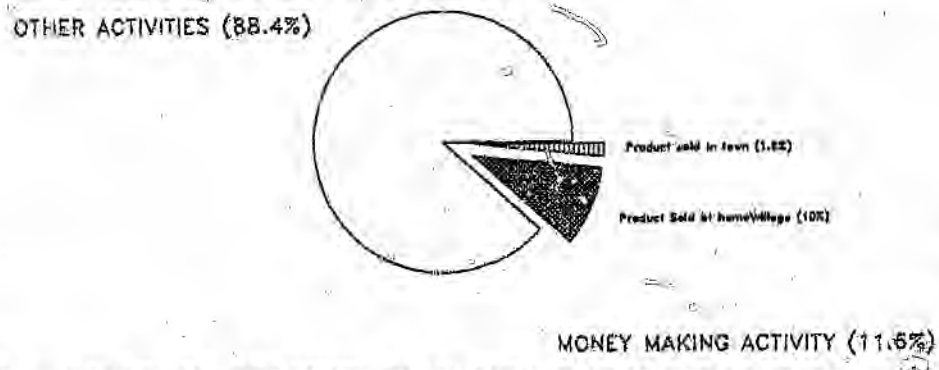


TABLE 6.23 : PLACE OF PRODUCT SALE AND REASON THEREFORE - STERK - SPRUIT ROAD [ASR11.2]

	Home/Village No.	Home/Village %	Town No.	Town
Good market	11	45,8	1	33,3
Product not easily transportable	7	29,2		
Unable to sell at other places	3	12,5		
Other	3	12,5	2	66,7
No response	1		1	
TOTAL	25	100	4	100

The reason for selling, categorised into town and home/village, is illustrated in Table 6.23. 33% of products were sold in town because it was a good market. The reasons why products were sold at home or in the village were because the location was a good market (45,8%), the product was not easily transferable (29,2%) and residents were unable to sell elsewhere for various reasons (12,5%). Table 6.24 illustrates the actual effect of the road improvement on money making.

TABLE 6.24 : THE EFFECT OF THE STERKSPRUIT ROAD ON MONEY MAKING ACTIVITY [ASR2/10/11.1/13]

	N=250 No	%
Increase	4	1,6
No Change	25	10
Decrease	—	—
TOTAL	29	11,6

Only 1,6% of respondents felt that the road had improved money making activity. This represents only 13,8% of respondents involved in money making activities who experienced an increase in product production as a result of the road [Table ASR13]. The reasons for the increase are illustrated in Table 6.25.

TABLE 6.25 : REASONS FOR AN INCREASE IN PRODUCT PRODUCTION - STERKSPRUIT ROAD [ASR14]

	No.	%
Traffic increases have resulted in customer increases and greater mobility	3	75
Greater ease of inputs	1	25
TOTAL	4	100

75% of money making residents who experienced an increase in product production said increases were directly related to additional customers resulting from increases in traffic.

d. Discussion

As suggested by the literature [Section 5.1.3] few residents were involved in informal activities. The effect of the road on informal money making activities was therefore small and the road has done little to benefit residents involved in informal activity or to encourage informal activity. Formal businesses lo-

cated in the major centres within the Libode and Sterkspruit regions did however benefit from the road improvements [Section 6.5.4].

6.4.3 The expected effects and the greatest effects of the road on residents

a. Literature review

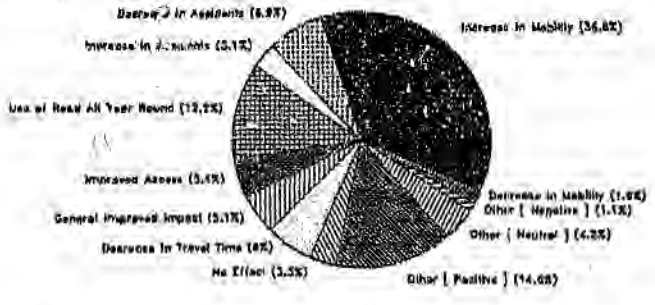
Improvements or additions to rural road infrastructure not only have a wide range of effects but also immediate and long term effects as well as both positive and negative effects. Although the literature does accept that not all groups benefit, it generally accepts that the benefits of road improvements outweigh the costs. [Chapter 4]

b. Libode Road

i. Libode tarred road

Figure 6.22 graphically represents the greatest effects of the road on residents located along the tarred road and reflects the relative importance of the effects of the road improvements on residents.

FIGURE 6.22 : THE GREATEST EFFECTS OF IMPROVING THE LIBODE ROAD [TARRED ROAD RESIDENTS][ALR27/29]



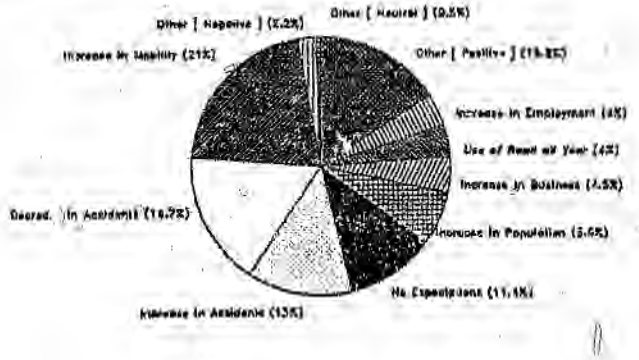
36,8% of residents identified an increase in mobility as the greatest effect of the road improvement. [This is the subject of the discussion of the following section.]. This is followed in importance by the use of the road throughout the year (12,2%),

a decrease in accidents (6,9%), a decrease in travel time (6%), improved access (5,1%) and general improvements (5,1%). A range of other effects were also identified. Table ALR50(NEW) ranks a selected number of impacts as identified by the literature in terms of the most important effects and least important effects. The most important effect ranked by 50% of residents is reduced travel time. Reduced travel time is followed in importance by the use of the road throughout the year (17,9%) and greater access to medical facilities (14,3%). The least important effect ranked by 20,7% is an increase of population into the area, followed by the use of the road throughout the year (15,5%), reduced travel costs (12,1%) and better employment opportunities (12,1%).

Residents located alongside the tarred road clearly benefited from the road improvement. 90,4% of all residents said that the road improvement had a beneficial effect. Only 5,8% noted a negative effect [the main reason being increased accidents (3,1%)], 3,3% no effect and 0,5% neutral effects.

Figure 6.23 indicates the expected effects following the road improvements.

FIGURE 6.23 : THE EXPECTED EFFECTS OF IMPROVING THE LIBODE ROAD
[TARRED ROAD RESIDENTS][ALR28]

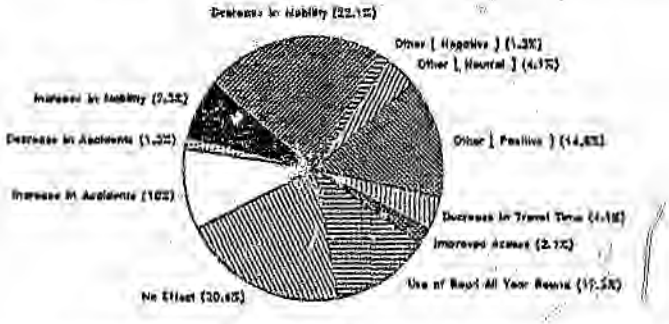


2\.% of residents expected an increase in mobility following the road improvement. This is followed by 16,7% expecting a decrease in accidents, 13% expecting an increase in accidents and 11,4% expecting nothing. Expectations of lesser importance included an increase of population (6,5%), increase in business (4,5%), the ability to use the road throughout the year (4%), and an increase in employment (4%).

ii. Libode intermediate road

Figure 6.24 graphically represents the greatest effects of the road on residents located along the intermediate road and reflects the relative importance of the effects of the road improvements on residents.

FIGURE 6.24 : THE GREATEST EFFECTS OF IMPROVING THE LIBODE ROAD [INTERMEDIATE ROAD RESIDENTS][ALR27/29]



22,1% of residents identified an decrease in the mobility as the greatest effect of the road improvement. This is followed in importance by 20,4% of residents indicating that the road improvement has no effect on them, the use of the road throughout the year (12,5%), an increase in mobility (7,5%), and a decrease in travel time (4,1%). A range of other effects was also identified. Table ALR50(INTERMEDIATE) ranks a selected number of impacts as identified by the literature in terms of the most important effects and least important effects. The most important effect ranked by 40% of residents is increased agricultural activity. The least important effect ranked by 20% is an increase

of population into the area and better employment opportunities, followed by the use of the road throughout the year ranked by 12%.

Approximately half of the residents located alongside the intermediate road benefited from the road improvement. 46,2% of all residents said that the road improvement had a beneficial effect. 33,4% noted a negative effect and a further 20,4% experienced no effect from the road improvement.

FIGURE 6.25 : THE EXPECTED EFFECTS OF IMPROVING THE LIBODE ROAD
[INTERMEDIATE ROAD RESIDENTS][ALR28]

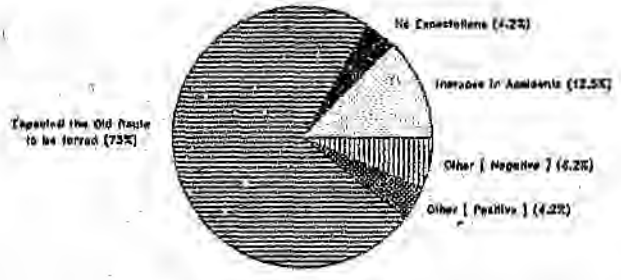


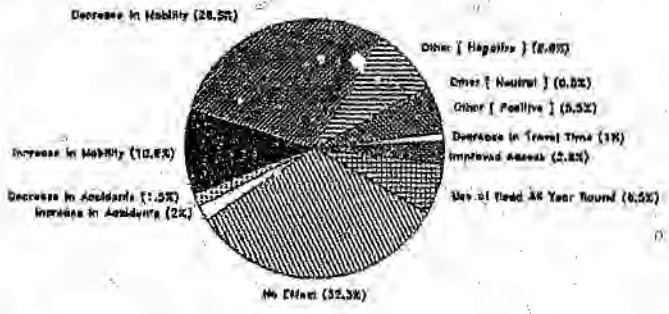
Figure 6.25 indicates the expected effects following the road improvements. 75% expected the gravel road to be improved to the standard of the newly tarred road. 12,5% expected accidents to increase and 4,2% expected nothing to occur.

iii. Libode gravel road

Figure 6.26 graphically represents the greatest effects of the road on residents located along the gravel road and reflects the relative importance of the effects of the road improvements on residents. 32,3% of gravel road residents identified no effect as greatest effect of the road improvement. The only other effects of note are increased mobility (10,9%) and the use of the road throughout the year (6,5%). A range of other effects was also identified. Table ALR50(OLD) ranks a selected number of impacts as identified by the literature in terms of the most impor-

tant effects and least important effects. The most important effect ranked by 37% of residents is decreased accidents. Decreased accidents are followed in importance by the use of the road throughout the year (29,6%) and reduced travel time (18,5%). The least important effect ranked by 21,4% is the use of the road throughout the year, followed by an increase in population into the area (17,9%), better employment opportunities (10,7%) and greater access to medical facilities (10,7%).

FIGURE 6.26 : THE GREATEST EFFECTS OF IMPROVING THE LIBODE ROAD
[GRAVEL ROAD RESIDENTS][ALR27/29]



Residents located alongside the gravel road clearly did not benefit from the road improvement. 39,1% of all residents said that the road improvement had an adverse effect. Furthermore 32,3% experienced no effect and only 28,7% a positive effect.

FIGURE 6.27 : THE EXPECTED EFFECTS OF IMPROVING THE LIBODE ROAD
[GRAVEL ROAD RESIDENTS][ALR28]

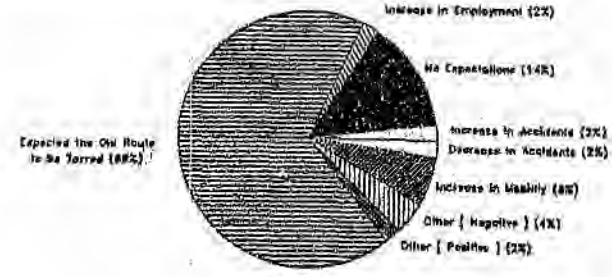


Figure 6.27 indicates the expected effects following the road improvements. 66% expected the gravel road to be improved to the standard of the newly tarred road. 14% expected accidents to increase and 4,2% expected nothing to occur. A few expected positive results, the largest advantage expected was an increase in mobility (6%).

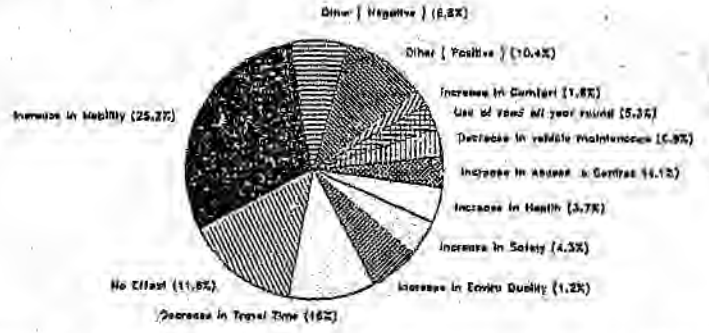
iv. Discussion

It is evident from the findings above that the tarring of the road benefited residents living alongside the tarred road while intermediate road residents and to a greater extent gravel road residents were either not affected in any way or were adversely affected. The advantages gained by residents located along the tarred road were perhaps to the disadvantage of residents located along the gravel road. This is suggested by the notion that the greatest effect of tarred road residents is an increase in mobility while no effect and mobility decline are the greatest effects of the road on gravel road residents. The main reason for the majority of adverse effects identified by gravel road residents is due to the decrease and continuous lack of constant vehicular traffic [Section 6.2]. The business impact survey shows similar adverse effects on business [Section 6.5]. Furthermore an important comparison must be made between the expectations of the residents of both the gravel and tarred roads. When the effects and expected effects on tarred road residents are compared the expectations are largely positive and were fulfilled to a large extent. Expectations of intermediate and gravel road residents on the other hand were not fulfilled. It can therefore be concluded that not only were residents located along the gravel road disadvantaged but their expectations were not fulfilled. The above effects could have significant social and political ramifications and the transportation planner should be conscious of decisions made and the resultant actions that may occur.

c. Sterkspruit road

Figure 6.28 graphically represents the greatest effects of the road on residents and reflects the relative importance of the effects of the road improvements on residents.

FIGURE 6.28 : THE GREATEST EFFECTS OF IMPROVING THE STERKSPRUIT ROAD [ASR27/29]



30% of residents identified an increase in mobility as the greatest effect of the road improvement. [This is the subject of the discussion of the following section.]. This is followed in importance by 14,1% of residents indicating that the road improvement had no effect on them, a decrease in travel tim (10,9%) and an increase in safety (6,2%). Effects of lesser importance included an increase in environmental quality (4,5%), increased access to health facilities (4,4%), increased access to centres (3,9%), decrease in vehicle maintenance (3,4%), the use of the road throughout the year (3,3%), and an increase in comfort (2,1%). A range of other effects was also identified. Table ASR50 ranks a selected number of impacts as identified by the literature in terms of the most important effects and least important effects. Again the four groups are presented in terms of one sample. The most important effect ranked by 34,6% of residents is reduced travel time. Reduced travel time is followed in importance by the use of the road throughout the year (13,3%), decreased accidents (12,2%), greater access to medical facilities (11,4%), improved business activity (8,4%) and better

employment opportunities (8%). The least important effects each ranked by 16,5% is an increase of population into the area and the use of the road all year round, followed by decreased travel time (16,1%), reduced travel costs (14,5%)and better employment opportunities (11%). Differences in perception to the total sample included more older people than younger people who ranked an increase in access to medical facilities as an important effect. Furthermore males more than females identified better employment opportunities as the least important effect. A great many more young males identified reduced travel times as an important effect and females were the largest group identifying reduced travel times as a least important effect.

Residents located alongside the tarred road clearly benefited from the road improvement. 79,1% of all residents said that the road improvement had a beneficial effect. Only 6,8% noted a negative effect and 14,1 no effect.

FIGURE 6.29 : THE EXPECTED EFFECTS OF IMPROVING THE STERKSPRUIT ROAD [ASR28]

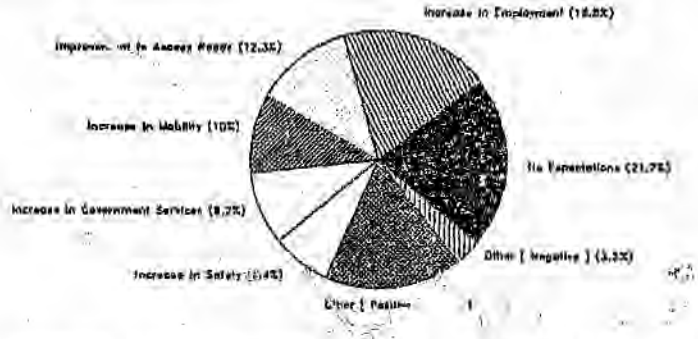


Figure 6.29 indicates the expected effects following the road improvements. 18,8% of residents expected no effect following the road improvement. This is followed by 18,8% expecting an increase in employment, 12,3% expecting access roads to be improved 10% expecting an increase in mobility, 9,2% an increase in government services, and 7,4% expected an increase in safety.

Only a few young males expected little effect from the road but a large number expected increases in government services. More older people expected access roads to be improved than younger respondents.

d. Discussion

It is evident from the findings that road improvements benefit surrounding residents to a large extent. The largest benefit is an increase in mobility. This concept is discussed in greater detail in the following section. Direct benefits of the road improvements [eg increase in access, decrease in travel times, the use of the road throughout the year etc] are perceived as the next group of most important effects. Other secondary effects of the road improvements are perceived to a limited extent.

6.4.4 The effect of the road on travel

a. Literature review

Improvements to rural road infrastructure result in an increase in vehicle volumes and travel. An important consequence of the provision or improvement of a road is the increase in travel for non-economic related activities. [Section 4.1 and Section 4.9]

b. Libode Road

i. Libode tarred road

Respondents were asked if traffic had increased since the road improvement and the reasons therefor. Figure 6.30 illustrates the results. 99% of respondents said traffic had increased. Reasons ascribed to this increase are the tarring of the road (77,4%), tourism and through traffic (11,6%), increase in safety (6,3%), the use of the road throughout the year (2,7%) and increase in taxi traffic (1,1%).

FIGURE 6.30 : THE EFFECT OF THE LIBODE ROAD ON TRAFFIC [TARRED ROAD RESIDENTS][ALR17/18]

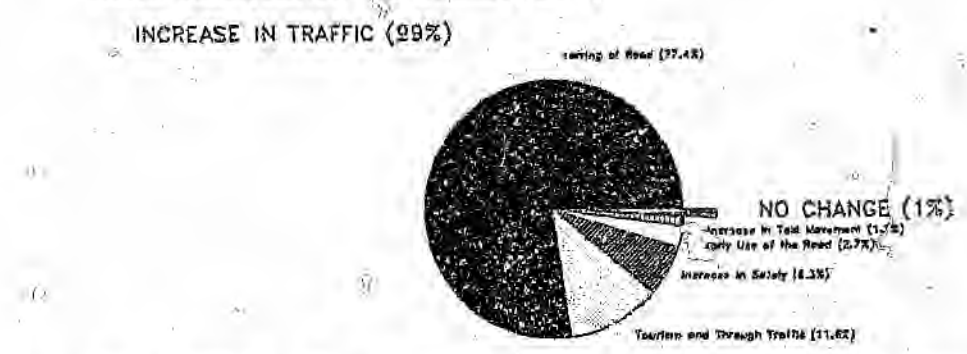
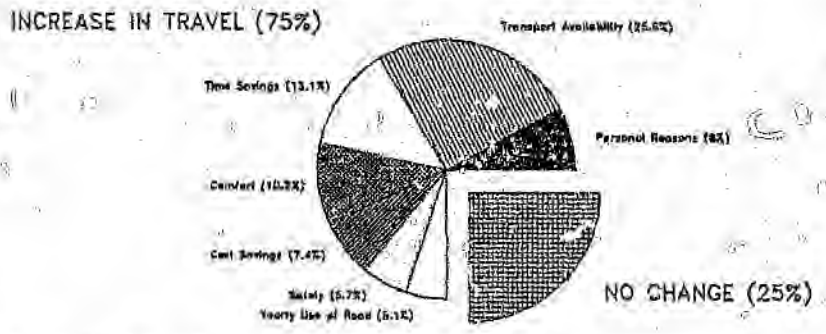


FIGURE 6.31 : THE EFFECT OF THE LIBODE ROAD ON INDIVIDUAL TRAVEL [TARRED ROAD RESIDENTS][ALR19/20]



Residents were asked if they had increased the frequency of their trip making since the road had been tarred and the reasons therefor. Figure 6.31 illustrates the results. 75% of residents said they travelled more frequently. The reasons for increase in such trave are all related directly to the road except for one [personal reasons (10,6%)]. Reasons for the increase included the availability of transport (25,6%), travel time savings (13,1%), comfort (10,2%), travel cost savings (7,4%), increase in safety (5,7%) and the use of the road throughout the year (5,7%). An increase in the availability of transport for travel was identified by 36,8% of respondents as the most important effect of the road improvement [Figure 6.22].

Residents were asked the frequency of travel for various purposes and to various towns. A trip was defined as the one-way trip being made by the resident for a particular purpose. Table 6.26 indicates the average frequency for each trip purpose.

TABLE 6.26 : FREQUENCY OF TRIP PURPOSE - LIBODE ROAD [ALR21]

	New Road	Intermediate Road	Old Road
Work	3,15	3,52	1,34
Social	1,56	1,00	0,84
Shopping	4,21	2,96	1,94
Religious	1,76	1,28	0,98
Education	0,72		
Health	2,70	1,49	1,25
Government	0,55	0,88	0,13
	N=70	N=25	N=68

The most frequently made trip is the shopping trip which is made 4,21 times per month. This is followed by the work trip which is made 3,15 times per month and health trips made 2,7 times per month. Trips of lesser importance in terms of frequency are religious trips [1,76 times per month], social trips [1,56 times per month], education trips [0,72 times per month], and government trips [0,55 times per month].

TABLE 6.27 : FREQUENCY OF TRAVEL TO VARIOUS CENTRES - LIBODE ROAD [ALR23]

	New Road	Intermediate Road	Old Road
Umtata	3,10	2,26	1,61
Libode	6,92	5,80	4,65
Port St Johns	0,62	0,72	0,47
Lusikisiki	0,22	0,09	0,20
Ngqeleni	2,01	0,71	0,85
Tsomo	0,04	0,03	
	N=75	N=25	N=29

Table 6.27 indicates the average frequency of trips to various centres in the region. Residents travel to the town of Libode most frequently [6,92 times per month]. This is followed by the town of Umtata as a centre of frequent travel. Residents made 3,1 trips per month to Umtata. Other towns of lesser importance in terms of frequency are Ngqueleni [2,01 times per month], Port St Johns [0,62 times per month], Lusikisiki [0,22 times per month] and Tsomo [0,04 times per month].

TABLE 6.28 : PURPOSE OF TRAVEL TO UMTATA - LIBODE ROAD [ALR24.2]

	New Road		Old Road	
	No.	%	No.	%
Work	4	5,8	10	15,4
Social	7	10,1	14	21,5
Shopping	34	49,3	24,5	37,7
Religious			2,5	3,8
Education	4	5,8	1	1,5
Health	14	20,3	10	15,4
Government	6	8,7	3	4,6
TOTAL	69	100	65	100

TABLE 6.29 : AVAILABILITY OF LOCAL FACILITIES TO RESIDENTS TRAVELLING TO UMTATA - LIBODE ROAD [ALR25]

	New Road		Old Road	
	No.	%	No.	%
Facility available locally	40	58	20	30,8
Facilities not available locally	29	42	45	69,2
TOTAL	69	100	65	100

88,4% of residents travel to Umtata. Respondents travelling to Umtata were asked the reasons and motivation for travel. The purpose of travel to Umtata is illustrated in Table 6.28. 49,3% are travelling for the purpose of shopping. This is followed in importance by 20,3% travelling for health purposes, 10,1% travelling for social purposes, 8,7% travelling for government purposes and 5,8% each travelling for education and work purposes. 58% of residents travelling to Umtata said that the facilities were

available locally [Table 6.29]. Reasons for travelling to Umtata instead of using local facilities are illustrated in Table 6.30. Of the 58% travelling to Umtata instead of using local facilities, 48% said facilities were better in Umtata, 30% said that facilities were cheaper and a further 30% that facilities were both cheaper and better.

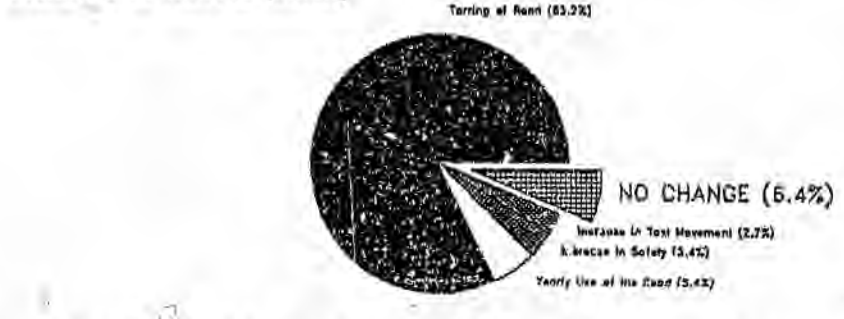
TABLE 6.30 : REASON FOR THE USE OF FACILITIES IN UMTATA INSTEAD OF THOSE AVAILABLE LOCALLY - LIBODE ROAD [ALR26]

	New Road		Old Road	
	No.	%	No.	%
Facilities better in Umtata	18	48	13	65
Facilities cheaper in Umtata	12	30	1	5
Facilities cheaper and better in Umtata	12	30	6	30
TOTAL	40	100	20	100

ii. Libode gravel road

Residents were asked if traffic had increased on the tarred road and the reasons therefor. Figure 6.32 illustrates the results.

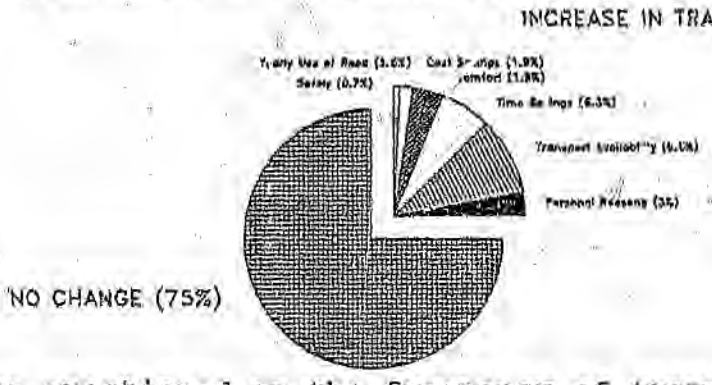
FIGURE 6.32 : THE EFFECT OF THE LIBODE ROAD ON TRAFFIC [GRAVEL ROAD RESIDENTS][ALR17/18]



94,6% of residents said traffic had increased. Reasons ascribed to this increase are the tarring of the road (83,2%), the use of the road throughout the year (5,4%), increase in safety (3,4%)

and an increase in taxi traffic (2,7%). Residents were asked if they had increased the frequency of their trip making since the road had been tarred and the reasons therefor. Figure 6.33 illustrates the results. 25% of residents said they travelled more frequently. The reasons for increase in such travel are all related directly to the road except for one [personal reasons (3%)]. Reasons for the increase included the availability of transport (9,6%), travel time savings (6,3%), comfort (1,9%), travel cost savings (1,9%), increase in safety (0,7%) and the use of the road throughout the year (1,6%). A decrease in mobility was identified as the single most important effect by 22,1% of intermediate road respondents and 28,5% of gravel road respondents [Figures 6.24 and 6.26].

FIGURE 6.33 : THE EFFECT OF THE LIBODE ROAD ON INDIVIDUAL TRAVEL
[GRAVEL ROAD RESIDENTS][ALR19/20]



Residents were questioned on the frequency of travel for various purposes and to various towns. Frequencies of travel for various purposes and to various towns between intermediate road respondents and gravel road respondents are different and are therefore presented separately. Table 6.26 indicates the average frequency for each trip purpose for intermediate road residents. The most frequently made trip is the work trip which is made 3,52 times per month. This is followed by the shopping trip which is made 2,96 times per month and health trips made 1,49 times per month. Trips of lesser importance in terms of frequency are religious

trips [1,28 times per month], social trips [once a month], and government trips [0,88 times per month]. Table 6.26 also indicates the average frequency for each trip purpose for gravel road residents. The most frequently made trip is the shopping trip which is made 1,94 times per month. This is followed by the work trip which is made 1,34 times per month and health trips made 1,25 times per month. Trips of lesser importance in terms of frequency are religious trips [0,98 times per month], social trips [0,84 times per month], and government trips [0,13 times per month].

Table 6.27 indicates the average frequency of trips to various centres in the region by intermediate road residents. Residents travel to the town of Libode most frequently [5,80 times per month]. Next in terms of frequency of travel is Umtata which is visited 2,26 trips per month. Towns of lesser importance in terms of frequency are Port St Johns [0,72 times per month], Ngqueleni [0,71 times per month], Lusikisiki [0,09 times per month] and Tsomo [0,03 times per month]. Table 6.27 also indicates the average frequency of trips to various centres in the region of gravel road residents. Residents travel to the town of Libode most frequently [4,65 times per month]. This is followed by the town of Umtata as a centre of frequent travel. Residents made 1,61 trips per month to Umtata. Other towns of lesser importance in terms of frequency are Ngqueleni [0,85 times per month], Port St Johns [0,47 times per month] and Lusikisiki [0,20 times per month].

84,4% of respondents travel to Umtata. Respondants travelling to Umtata were asked the reasons for travel and the motivation for such travel. The purpose of travel to Umtata is illustrated in Table 6.28 37,7% are travelling for the purpose of shopping. This is followed in importance by 21,5% travelling for social purposes, 15,4% travelling for health purposes, 15,4% travelling

for work purposes, 4,6% travelling for government purposes, 3,8% for religious purposes and 1,5% travelling for education purposes. 30,8% of residents travelling to Umtata said that the facilities were available locally [Table 6.29]. Reasons for travelling to Umtata instead of using local facilities are illustrated in Table 6.30. Of the 30,8% travelling to Umtata instead of using local facilities, 65% said facilities were better in Umtata, 5% said that facilities were cheaper and a further 30% that facilities were both cheaper and better.

iii. Discussion

The findings above indicate that the tarring of the road has attracted vehicular traffic. Furtheremore findings from Section 6.2 support this evidence. The attraction of traffic to the tarred road has important consequences. 75% of tarred road respondents stated that they travel more frequently since the road has been tarred. Of greater importance for increased frequency of travel is the availability of transport for travel. This suggests that increased traffic results in increased community travel. The availability of travel [mobility] was identified as the greatest effect of the road improvement by 36,8% of tarred roads residents. Surfaced road conditions attract vehicles, some of which are passenger vehicles. [Section 6.2] The ability to travel is therefore increased. Patronage of passenger services increases the frequency of such a service often by increasing the fleet size. This results in greater traffic volumes [and more passenger vehicles] and the above system perpetuates itself.

The attraction of traffic to the tarred road does however have negative effects on respondents living away from the tarred road. Only 25% of gravel road residents have increased the frequency of their travel. The large non-increase in frequency of travel of gravel road residents can be attributed to the decrease in mobility associated with the gravel road, which was identified as

the greatest effect of the road improvement by gravel road residents. [Section 6.4.4]

Tarred road residents travel much more frequently than intermediate or gravel road residents. Gravel road residents travel the least frequently of all residents. The infrequent travel of gravel road residents can be attributed to the unavailability of transport for travel and activities in which respondents are largely involved [informal non-economic activities][Section 6.4.2]. The difference between the total trips per month for various activities [Table 6.26] and the total trips to various centres [Table 6.27] could be caused by multi-purpose trips and other local trips which do not involve travel to town. Respondents travel largely for the purpose of shopping followed in importance by trips for health and work purposes.

The road improvement has created greater access to other centres, particularly Umtata to where more than 85% of residents travel. Improved road conditions encourage greater distance travel [Section 6.5.7] and more frequent travel [Section 6.3.2]. Thus increased access has expanded the catchment area of the Umtata region to the detriment of the Libode region resulting in a large amount of revenue leaking from the region even though facilities are available locally. This is discussed at greater length in Section 6.5.7.

c. Sterkspruit Road

Residents were asked if traffic had increased since the road improvement and the reasons thereof. Figure 6.34 illustrates the results. 93,5% of residents said traffic had increased. Reasons ascribed to this increase are the tarring of the road (52,8%), the availability of vehicles for travel (10,3%), tourism and "through" traffic (8,1%), increase in safety (7,6%), decrease in travel time (4%), the use of the road throughout the year (2,5%), and increase in taxi traffic (1,4%).

FIGURE 6.34 : THE EFFECT OF THE STERKSPRUIT ROAD ON TRAFFIC [ASR17/18]

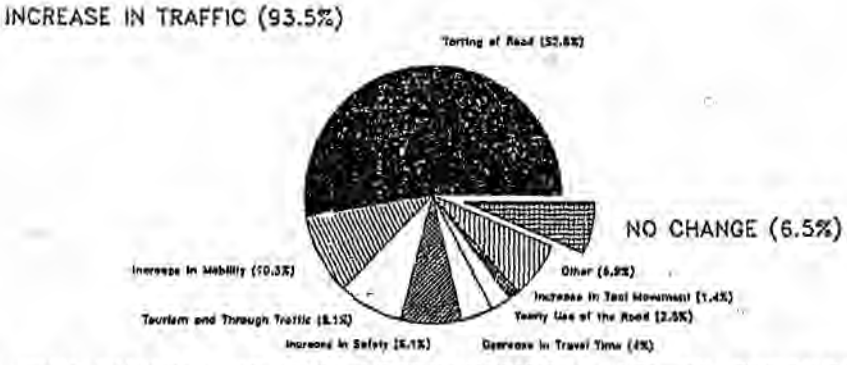
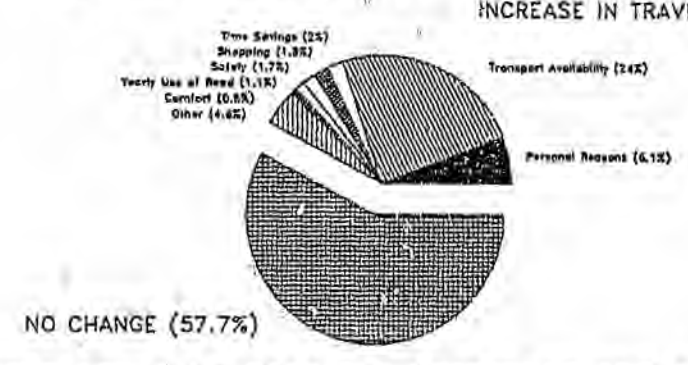


TABLE 6.31 : THE EFFECT OF THE STERKSPRUIT ROAD ON INDIVIDUAL TRAVEL [ASR19/20]

	Young Males		Young Females		Old Males		Old Females	
	No.	%	No.	%	No.	%	No.	%
Increase in travel	19	50	46	55,4	11	22	31	37,8
No change in travel	19	50	37	44,6	39	78	51	62,2
No reponse	3	—	6	—	1	—	12	—
TOTAL	41	100	89	100	51	100	94	100

FIGURE 6.35 : THE EFFECT OF THE STERKSPRUIT ROAD ON INDIVIDUAL TRAVEL [ASR19/20]



Residents were asked if they had increased the frequency of their trip making since the road had been tarred and the reasons thereof. The four groups responded differently. Table 6.31 il-

lustrates the results. Young people have increased the frequency of their travel to a greater extent than older people. 50% and 55,4% of young males and young females have increased the frequency of their travel. Only 22% and 37,8% of old males and old females respectively have increased the frequency of their travel. The reasons for the increase in travel yield similar results and are therefore presented as one sample in Figure 6.35. The reasons for increase in frequency of travel is the availability of transport (24%) and personal reasons (6,1%). Other reasons of lesser importance for the increase included travel time savings (2%), increase in shopping (1,9%), increase in safety (1,7%), the use of the road throughout the year (1,1%) and comfort (0,8%). An increase in the availability of transport for travel was identified as the most important effect of the road improvement by 30% of respondents [Section 6.4.3].

Residents were questioned on the frequency of travel for various purposes and to various towns. Tables 6.32 and 6.33 indicate the average frequency for each trip purpose and the average frequency to various centres in terms of the four groups respectively.

TABLE 6.32 : FREQUENCY OF TRIP PURPOSE - STERKSPRUIT ROAD [ASK21]

	Young Males	Young Females	Old Males	Old Females
Work	6,25	1,53	3,31	1.97
Social	2,32	1,32	0,80	1,01
Shopping	4,01	2,94	1,89	1,90
Religious	1,27	0,82	0,85	1,28
Education	0,81	1,26	0,08	
Health	0,92	1,18	1,63	1,40
Government	0,18	0,14	0,08	0,22
	N=37	N=51	N=35	N=81

TABLE 6.33 : FREQUENCY OF TRAVEL TO VARIOUS CENTRES - STERKSPRUIT ROAD [ASR23]

	Young Males	Young Females	Old Males	Old Females
Umtata	0,23	0,07	0,18	0,13
Sterkspruit	9,64	5,73	5,81	4,22
Zastron	1,32	0,53	0,84	0,38
Lady Grey	0,96	0,61	1,26	0,48
Aliwal North	0,55	0,38	1,30	0,31
	N=35	N=83	N=47	N=84

Males tend to travel more frequently than females. Young males travel the most frequently. The most frequently made trip of young males is the work trip which is made 6,25 times per month. This is followed by the shopping trip which is made 4,01 times per month and social trips made 2,32 times per month. Trips of lesser importance in terms of frequency are religious trips [1,27 times per month], health trips [0,92 times per month], education trips [0,81 times per month], and government trips [0,19 times per month].

Young males travel to the town of Sterkspruit most frequently [9,64 times per month]. This is followed in terms of frequency to Zastron which is made 1,32 trips per month. Towns of lesser importance in terms of frequency are Lady Grey [0,96 times per month], Aliwal North [0,55 times per month], and Umtata [0,23 times per month].

Old males follow young males in terms of frequency of travel. The most frequently made trip of old males is the work trip which is made 3,31 times per month followed by the shopping trip which is made 1,89 times per month and the health trip made 1,63 times per month. Trips of lesser importance in terms of frequency are religious trips [0,85 times per month], social trips [0,80

times per month], education trips [0,08 times per month] and government trips [0,08 times per month].

Old males travel to the town of Sterkspruit most frequently [5,81 times per month]. This is followed by travel to Aliwal North [1,30 trips per month] and Lady Grey [1,26 trips per month]. Towns of lesser importance in terms of frequency are Zastron [0,64 times per month] and Umtata [0,16 times per month].

The most frequently made trip of young females is the shopping trip which is made 2,94 times per month. This is followed by the work trip which is made 1,53 times per month. Next in importance in terms of frequency are social trips made 1,32 times per month. Trips of lesser importance in trems of frequency are education trips [1,26 times per month], health trips [1,18 times per month], religious trips [0,92 times per month], and government trips [0,14 times per month].

Young females travel to the town of Sterkspruit most frequently [5,73 times per month]. This is followed in terms of frequency of travel to Lady Grey [0,61 trips per month]. Other towns of lesser importance in terms of frequency are Zastron [0,53 times per month], Aliwal North [0,38 times per month], and Umtata [0,07 times per month].

Old females travel the least frequently of all respondents. The most frequently made trip of old females is the work trip which is made 1,97 times per month. This is followed by the shopping trip which is made 1,90 times per month and health trips made 1,40 times per month. Trips of lesser importance in terms of frequency are religious trips [1,26 times per month], social trips [1,01 times per month], government trips [0,22 times per month] and education trips which are not made at all.

Old females travel to the town of Sterkspruit most frequently [4,22 times per month]. Towns of lesser importance in terms of frequency are Lady Grey [0,49 times per month], Zastron [0,33 times per month], Aliwal North [0,31 times per month], and Umtata [0,13 times per month].

Respondents travelling to Umtata were asked the reasons for travel and the motivation for same. Only 9,7% of residents travel to Umtata. The purpose of travel to Umtata is illustrated in Table 6.34. The purpose of travelling to Umtata is for work (28%), social (28%) and health purposes (28%). Government and religious trips are made by a further 8% each. 44% of residents travelling to Umtata said that the facilities were available locally [Table 6.35]. Reasons for travelling to Umtata instead of using local facilities instead are illustrated in Table 6.36. Of the 44% travelling to Umtata of using local facilities, 55,6% said facilities were better in Umtata, 22,2% said that facilities are not always available in Sterkspruit and a further 22,2% said it was related to head office purposes.

TABLE 6.34 : PURPOSE OF TRAVEL TO UMTATA - STERKSPRUIT ROAD [ASR24.2]

Reason	No.	%
Work	7	28
Social	7	28
Shopping		
Religious	2	8
Education		
Health	7	28
Government	2	8
No response	1	
TOTAL	26	100

TABLE 6.35 : AVAILABILITY OF LOCAL FACILITIES TO RESIDENTS TRAVELLING TO UMTATA - STERKSPRUIT ROAD [ASR25

	No.	%
Facilities available in Sterkspruit	11	44
Facilities not available in Sterkspruit	14	56
No response	1	
TOTAL	26	100

TABLE 6.36 : REASON FOR THE USE OF FACILITIES IN UMTATA INSTEAD OF THOSE AVAILABLE LOCALLY - STERKSPRUIT ROAD[ASR26]

	No.	%
Facilities better in Umtata	5	55,6
Facilities not always available	2	22,2
Head Office	2	22,2
No response	2	
TOTAL	11	100

d Discussion

It is evident from the findings above that the tarring of both roads has increased traffic. Furthermore residents, particularly younger residents have increased the frequency of their travel since the road has been tarred. The main reason for such travel can be attributed to the availability of transport for travel.

Males travel more frequently than females . Within this categorisation the younger population travels more frequently than the older population. The majority of trips made by males is for the purpose of work. This is followed by trips for shopping purposes. Females travel most frequently for shopping purposes followed by trips made for work purposes. The older population travels more frequently for health purposes while the younger population travels more frequently for social purposes.

Improved road conditions have increased access to both regions. The effect of increased access in the two regions does however produce different results. In the Sterkspruit region the im-

provement of the Sterkspruit Road results in the expansion of the catchment area of the town of Sterkspruit where resident and business activity is concentrated and where the bulk of resident trips converge. Few trips are made outside the region. This has important consequences on economic activity within the region.

The result of increased access in the Libode region has the opposite effect. The improvement of the Libode Road has increased the catchment area of the town of Umtata and a large amount of trips generated within the region by-pass the lower level town of Libode and seek the services found within the town of Umtata.

It can therefore be concluded that the effect of the road improvement on access and the resultant travel behaviour depends on local circumstances in terms of the demographic, economic and social and geographic setup. Road improvements may allow access to a region so that it becomes a subregion within a larger region's catchment area or it may open up a region so that it encourages activity and travel to be concentrated within the region. The resultant effects have important consequences on the economic development of the region. The effect of improved access on economic activity is discussed in greater detail in Section 6.5.7.

6.4.5 The effect of the road on population movement

a. Literature review

Improvements to rural road infrastructure tend to encourage the movement of populations to the roadside [Section 4.13].

b. Libode Road

i. Libode tarred road

Residents were asked how long they had been living in the area. This was to determine if the tarred road was an attractive location for outsiders. Furthermore the internal movement of established residents was determined by subtracting the percentage of

newcomers into the area from the total percentage of residents who moved as a result of the road improvement. 5,2% of inhabitants resident along the road are newcomers in the area [Table 6.37]. 5,2% [10,4% - 5,2%] of established residents moved to the roadside as a result of the road improvement [Table 6.38]. Table 6.39 indicates that the changes of location were all related to the advantages of the road. Of the 10,4% that changed location 87,5% did so because of transport advantages and 12,5% did so for other reasons relating to advantages associated with the road.

TABLE 6.37 : LENGTH OF ABODE IN THE LIBODE REGION [ALR1]

	New Road		Old Road	
	No.	%	No.	%
Respondents living in the area for less than 2 years	5	5,2	1	1,3
Respondents living in the area for more than 2 years	91	94,8	76	98,7
No response	2		1	
TOTAL	98	100	78	100

TABLE 6.38 : THE EFFECT OF THE LIBODE ROAD ON THE RELOCATION OF RESIDENTS [ALR30.1]

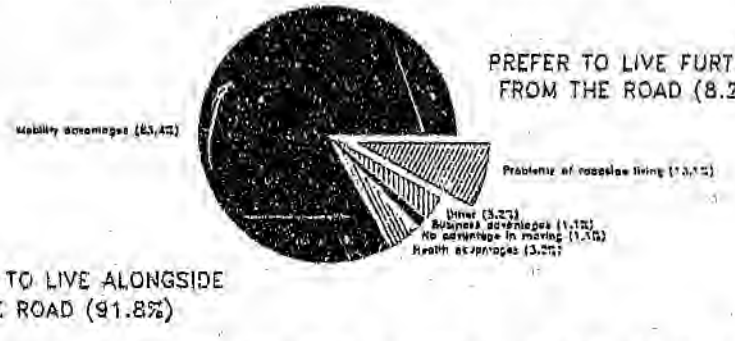
	New Road		Old Road	
	No.	%	No.	%
Moved as a result of the road	10	10,4	1	1,3
Did not move	86	89,8	74	98,7
No response	2		3	
TOTAL	98	100	78	100

TABLE 6.39 : REASONS FOR RELOCATION OF RESIDENTS - LIBODE ROAD [ALR30.2]

Reasons	New Road No.	%	Old Road No.	%
Transport advantages	7	87,5		
Other roadside advantages	1	12,5		
Other			1	100
No response	2			
TOTAL	10	100	1	100

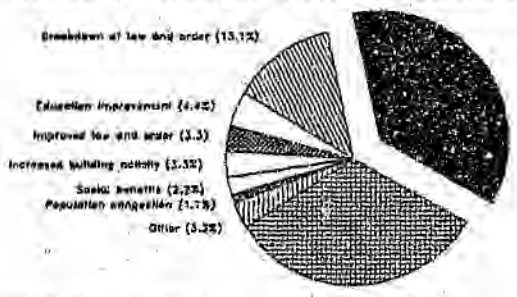
Respondents were asked where they preferred to live in order to determine if the tarred road was a potentially attractive location and the reasons thereof. The results are illustrated in Figure 6.36.

FIGURE 6.36 : PREFERRED PLACE OF ABODE - LIBODE ROAD [TARRED ROAD RESIDENTS][ALR35/36.1/36.2]



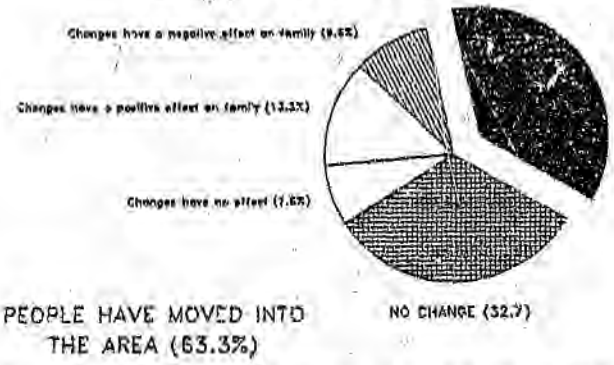
91,8% of tarred road residents preferred to live alongside the tarred road. The main reason identified by 83,4% of residents for preferring to live alongside the road was because of mobility advantages. Reasons of lesser importance identified by residents are health advantages (3,2%), business advantages (1,1%), and no advantage in moving elsewhere (1,1%). 8,2% of tarred road residents preferred to live further away from the road due to problems of roadside living. Respondents were asked if they had perceived an influx of people into the area, the changes which had occurred and the effect on their families. The results are illustrated in Figure 6.37.

FIGURE 6.37 : THE EFFECT OF THE LIBODE ROAD ON POPULATION MOVEMENT [TARRED ROAD RESIDENTS][ALR31/32.1/32.2]



63,3% of residents living along the tarred road said that people had moved into the area. 32,7% said that no changes had occurred as a result of this movement. 30,6% said changes had occurred since people moved into the area. The most important change identified by 13,1% of respondents was a break-down in law and order. Other changes of lesser importance were the improvement in education (4,4%), improved law and order (3,3%), increased building activity (3,3%), social benefits (2,2%) and population congestion (1,1%). Figure 6.38 illustrates the effect of the changes on the family.

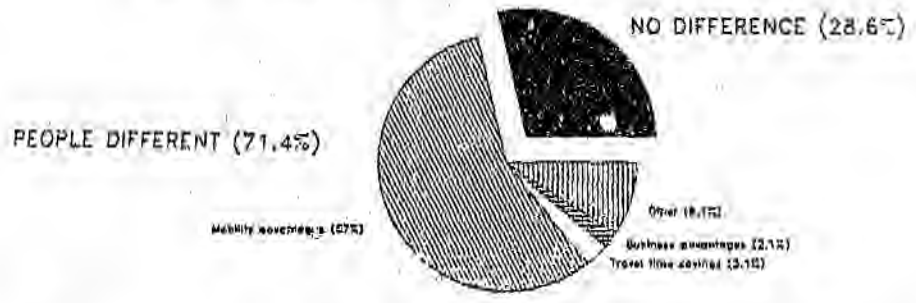
FIGURE 6.38 : THE EFFECT OF POPULATION MOVEMENT ON THE FAMILY - LIBODE ROAD [TARRED ROAD RESIDENTS][ALR31/33/34]



Evident from this figure is that although 30,6% of respondents perceived changes to have occurred 7,6% said the changes had no effect on them. The remainder of residents perceiving change

said they were affected - 13,3% affected in a positive way and 9,9% in a negative way. Respondents were asked if the people who lived alongside the road are different to those who live a distance away from the road and the reasons for the difference. Figure 6.39 illustrates the results.

FIGURE 6.39 : THE DIFFERENCE BETWEEN RESIDENTS LOCATED ALONGSIDE THE ROAD AND THOSE LIVING A DISTANCE AWAY - LIBODE ROAD [TARRED ROAD RESIDENTS][ALR37/38]



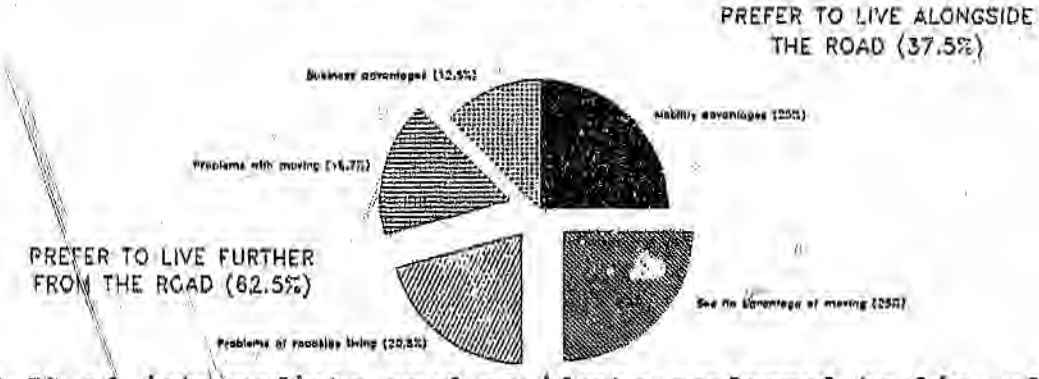
71,4% of tarred road respondents said that communities living alongside the road were different. The reasons for the difference were they have mobility advantages (57%), travel time savings (3,1%) and business advantages (2,1%).

ii. Libode gravel road

Residents were asked how long they had been living in the area. This was to determine if the tarred road was an attractive location for outsiders. Furthermore the internal movement of established residents was determined by subtracting the percentage of newcomers into the area from the total percentage of residents who moved as a result of the road improvement. 1,3% of inhabitants resident in the gravel road region are newcomers in the area. [Table 6.37] No established residents moved to the gravel road zone of influence as a result of the road improvement. [Table 6.38] Table 6.39 indicates that the change of location was not related to the advantages of the road.

Respondents living alongside the gravel road were asked where they preferred to live in order to determine if the tarred road was an attractive location and the reasons therefore. Differences in response between intermediate road residents and gravel road residents were noted and are therefore presented seperately. The prefered place of abode of intermediate road residents are illustrated in Figure 6.40.

FIGURE 6.40 : PREFERRED PLACE OF ABODE - LIBODE ROAD [INTERMEDIATE ROAD RESIDENTS][ALR35/36.1/36.2]



37,5% of intermediate road residents preferred to live alongside the tarred road. The main reason identified by 25% of residents for preferring to live alongside the road is mobility advantages followed in importance by 12,5% identifying business and employment advantages. 62,5% of intermediate road residents preferred to live further away from the road. 20,8% identified the problem of roadside living as the reason for preferring to live further away. 25% saw no advantage in moving towards the roadside and the advantages of roadside living were unable to compensate for the problems associated with moving for a further 16,7%. Respondents were asked if they had perceived an influx of people into the area, the changes which had occurred and the effect on their families. The results are illustrated in Figure 6.41. 31,8% of residents living along the intermediate road said that people had moved into the area. 6,4% said that no changes had occurred as a result of this movement. 25,4% said changes had occurred since

people had moved into the area. The most important change identified by 19,1% of respondents was that population congestion had occured followed by 6,4% identifying a break-down in law and order.

FIGURE 6.41 : THE EFFECT OF THE LIBODE ROAD ON POPULATION MOVEMENT [INTERMEDIATE ROAD RESIDENTS]
[ALR31/32.1/32.2]

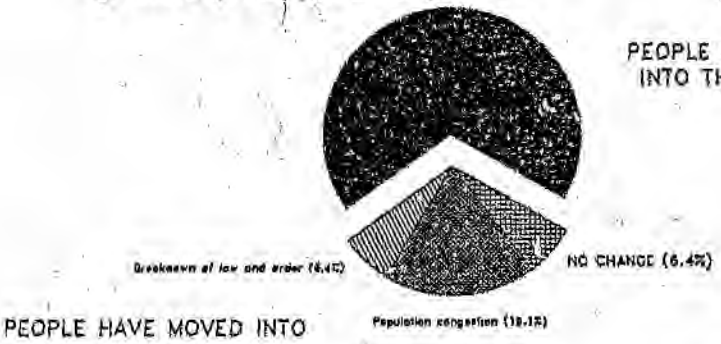


FIGURE 6.42 : THE EFFECT OF POPULATION MOVEMENT ON THE FAMILY - LIBODE [INTERMEDIATE ROAD RESIDENTS]
[ALR31/33/34]

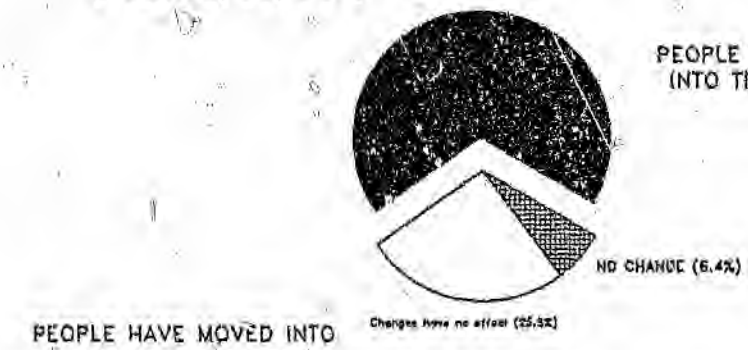
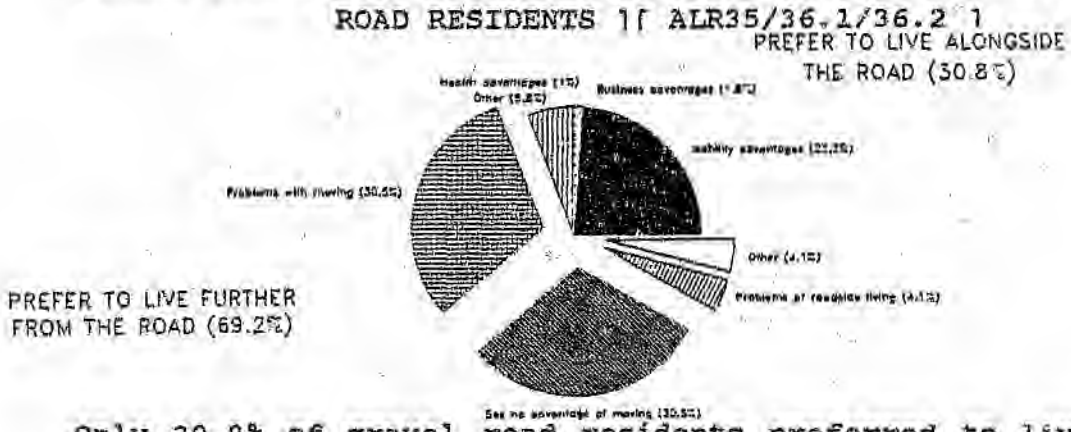


Figure 6.42 illustrates the effect of the changes on the family and indicates that no respondents who perceived changes had occurred were affected by these changes.

Gravel road respondents were also asked where they preferred to live in order to determine if the tarred road was an attractive location and the reasons therefore. The results are illustrated

in Figure 6.43.

FIGURE 6.43 : PREFERRED PLACE OF ABODE - LIBODE ROAD [GRAVEL ROAD RESIDENTS][ALR35/36.1/36.2]



Only 30,8% of gravel road residents preferred to live alongside the tarred road. The main reason identified by 22,2% of residents for preferring to live alongside the road is mobility advantages. Reasons of lesser importance identified by residents are business advantages (1,9%) and health advantages (1%). 69,2% of gravel road residents preferred to live further away from the road. The two major reasons for the choice were residents were unable to see the advantages of moving (30,5%) and the advantages of moving could not compensate for the problems of moving (30,5%). Only 4,1% identified problems of roadside living as the reason for living elsewhere. Respondents were asked if they had perceived an influx of people into the area, the changes which had occurred and the effect on their families. The results are illustrated in Figure 6.44. 22,4% of residents living along the tarred road said that people had moved into the area. 14,9% said that no changes had occurred as a result of this movement. Changes noted by respondents were social benefits (5%) and population congestion (2,5%). Figure 6.45 illustrates the effect of the changes on the family.

FIGURE 6.44 : THE EFFECT OF THE LIBODE ROAD ON POPULATION MOVEMENT [GRAVEL ROAD RESIDENTS][ALR31/32.1/32.2]

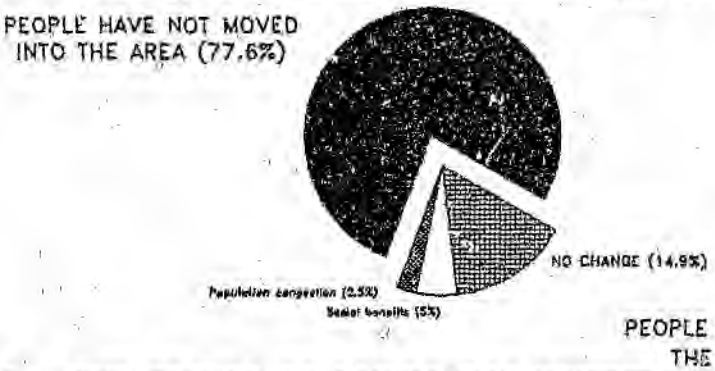
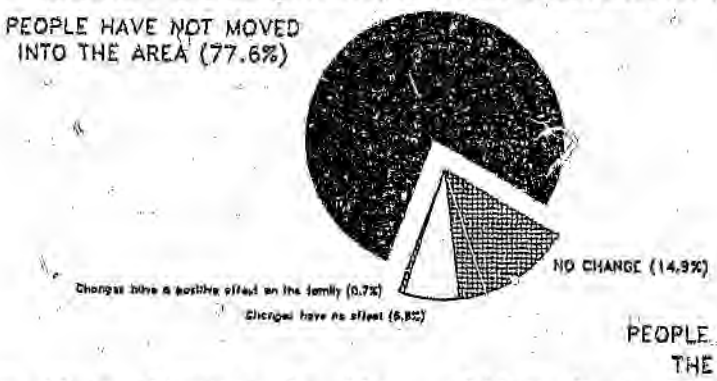
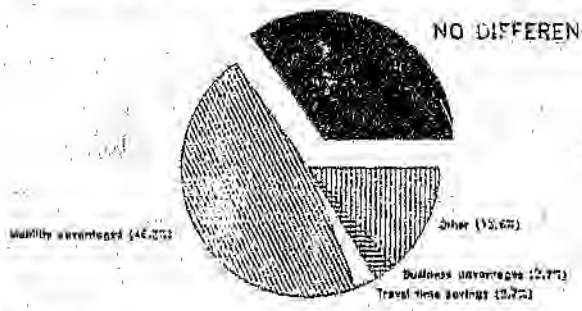


FIGURE 6.45 : THE EFFECT OF POPULATION MOVEMENT ON THE FAMILY - LIBODE ROAD [GRAVEL ROAD RESIDENTS][ALR31/33/34]



Evident from this figure is that although 7,5% of respondents perceived changes had occurred only 0,7% perceived a change affecting the family in a positive way. Respondents were asked if the people who lived alongside the road are different to those who live a distance away from the road and the reasons for the difference. Figure 6.46 illustrates the results. 65,3% of gravel road respondents said that communities living alongside the road were different. The reasons for the difference were they have mobility advantages (46,2%), travel time savings (2,7%) and business advantages (2,7%).

FIGURE 6,46 : THE DIFFERENCE BETWEEN RESIDENTS LOCATED ALONGSIDE THE ROAD AND THOSE LIVING A SIATANCE AWAY - LIBODE ROAD [GRAVEL ROAD RESIDENTS][AL 37/38]



iii. Discussion

It is evident from the findings above that the tarred road is an attractive location for both newcomers moving into the area and for established residents. The vast majority of tarred road residents prefer to live alongside the tarred road. Approximately one third and possibly more [if problems of moving could be overcome] of gravel road respondents, would prefer to live alongside the tarred road. The major reasons for such choice were related to mobility advantages. Reasons of lesser importance included health, business and employment advantages. Roadside living does however have disadvantages. This was noted as a reason for choice of abode elsewhere, particularly amongst intermediate road residents. This could be attributed to the locational characteristics of intermediate residents where a more objective decision is made. It is evident from the above findings that residents felt people had moved into the area, particularly into the area along the tarred road. The actual movement into the area is somewhat smaller. The perceived movement into the area has caused relatively few changes that affect residents in an adverse way. Only 9,6% of residents located along the tar road were affected in an adverse way - the largest contributor to this was a breakdown of law and order. The changes due to population movement and the effects thereof illustrate

that the tarred road is the most attractive place for relocating residents.

c. Sterkspruit Road

Residents were asked how long they had been living in the area. This was to determine if the tarred road was an attractive location for outsiders. Furthermore the internal movement of established residents was determined by subtracting the percentage of newcomers into the area from the total percentage of residents who moved as a result of the road improvement. 0,8% of inhabitants resident along the road are newcomers in the area [Table 6.40]. 0,8% [1,5% - 0,8%] of established residents moved to the road side as a result of the road improvement [Table 6.41]. Table 6.41 also indicates that the changes of location were all related to the advantages of the road.

TABLE 6.40 : LENGTH OF ABODE IN THE STERKSPRUIT REGION [ASR1]

	No.	%
Respondents living in the area for less than two years	2	0,8
Respondents living in the area for more than 2 years	256	99,2
No response	17	———
TOTAL	275	100

TABLE 6.41 : REASONS FOR RELOCATION OF RESIDENTS - STERKSPRUIT ROAD [ASR30]

	No.	%
Moved as a result of the road	4*	1,5
Did not move	271	98,5
TOTAL	275	100

*All respondents moved because of transport advantages.

Respondents were asked where they preferred to live in order to determine if the tarred road was an attractive location and the reasons thereof. Table ASR35 through to Table ASR36.2 illustrate the results of preference of living in terms of the four population groups. Analysis of the findings show that inconsistencies occur between age groups. The results are therefore presented in two age groups and are illustrated in Figures 6.47 and 6.48.

FIGURE 6.47 : PREFERRED PLACE OF ABODE - STERKSPRUIT ROAD
[YOUNGER RESIDENTS][ASR35/36.1/36.2]

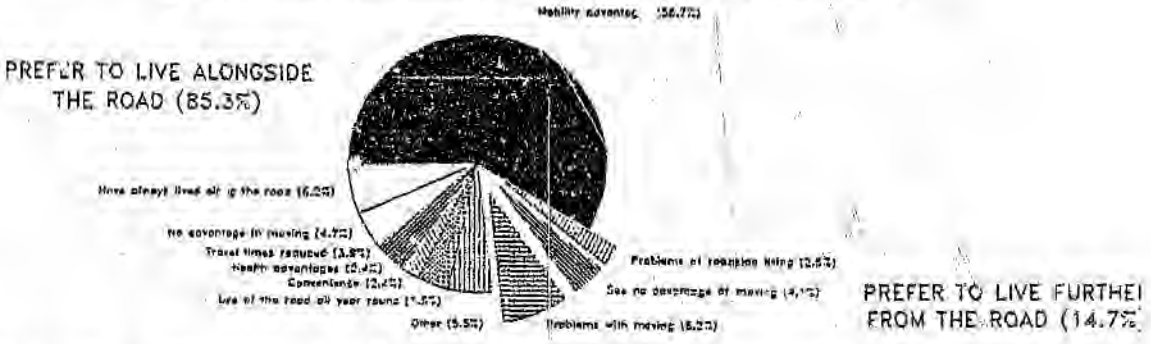


FIGURE 6.48 : PREFERRED PLACE OF ABODE - STERKSPRUIT ROAD
[OLDER RESIDENTS][ASR35/36.1/26.2]

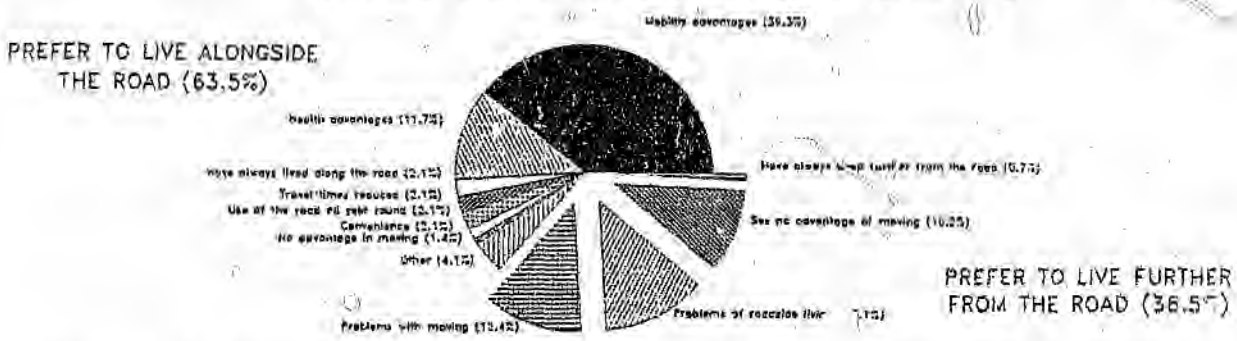


Figure 6.47 illustrates the preference of the young population. 85,3% of young people prefer to live alongside the tarred road. The main reason for such choice [identified by 57,7%], is mobility advantages. Reasons of lesser importance included reduced travel time (3,9%), use of the road through the year (3,9%), health advantages (2,4%) and convenience (1,5%). 10,9%

preferred to live alongside the road because they saw no advantages in moving elsewhere or chose to live where they were because they had been living there for some period of time. Of the 14,7% who preferred to live further away from the road 2,5% wanted to do so because of problems associated with living alongside the road. 4,1% saw no advantages in moving and 8,2% would experience problems with moving.

Evident from Figure 6.48 is that fewer older people prefer living alongside the road. Of the 63,5% who preferred to live along the tarred road 39,3% did so because of mobility advantages. This is followed in importance by 11,7% who preferred to live alongside the tarred road because of health advantages. Reasons of lesser importance include travel time savings (2,1%), the use of the road through out the year (2,1%), have always lived near the road (2,1%) see no advantage in moving (1,4%) and convenience (0,7%).

Of 36,5% of older residents who preferred to live further away from the road, 13,1% identified problems of roadside living as the reason for choice of abode elsewhere. 12,4% had problems with moving and 10,3% saw no advantage in moving.

Respondents were asked if they had perceived an influx of people into the area and the changes which had occurred and the effect on their families. The results are illustrated in Figure 6.49 and Figure 6.50. 49,6% of residents living along the tarred road said that people had moved into the area. 38,6% said that no changes had occurred as a result of this movement. 13,9% said changes had occurred since people had moved into the area. The most important change identified by 5,6% was an increase in population congestion followed by 3,8% identifying a break-down in law and order. Other changes of lesser importance were business benefits (1,5%), social benefits (1,1%), mobility advantages (1,1%) and social disadvantages (0,7%).

FIGURE 5.49 : THE EFFECT OF THE STERKSPRUIT ROAD ON POPULATION MOVEMENT [ASR31/32.1/32.2]

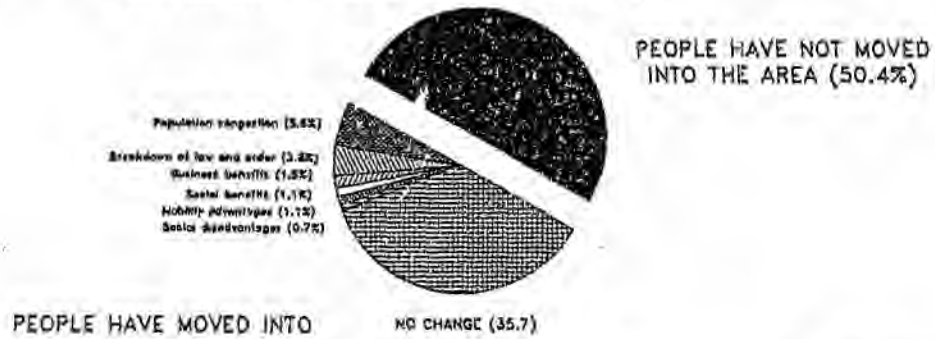


FIGURE 5.50 : THE EFFECT OF POPULATION MOVEMENT ON THE FAMILY - STERKSPRUIT ROAD [ASR31/33/34]

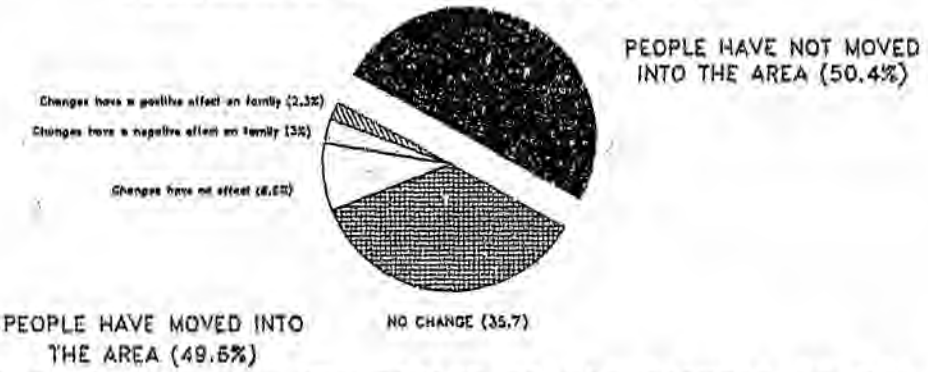
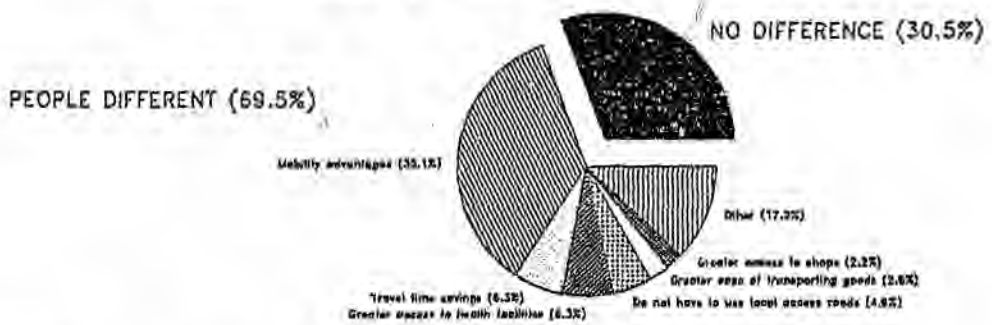


Figure 6.50 illustates the effect of the changes on the family. Evident from this figure is that although 13,9% of respondents perceived changes had occurred, 8,6% said the changes had no effect on them. The remainder of residents perceiving change said they were affected - 2,3% affected in a positive way and 3% in a negative way. Respondents were asked if the people who live alongside the road are different to those who live a distance away from the road and the reasons for the difference. Figure 6.51 illustrates the results. 69,5% of respondents said that communities living alongside the road were different. The difference relates to trasport advantages. 35,1% of respondents said the people were different because they had transport advantages. Reasons of lessor importance included travel time savings (6,3%), greater access to health facilities (6,3%), direct access

from the tarred road without having to use local roads (4,9%), greater ease of transporting goods (2,6%) and greater access to shops (2,2%).

FIGURE 6.51 : THE DIFFERENCE BETWEEN RESIDENTS LOCATED ALONGSIDE THE ROAD AND THOSE LIVING A DISTANCE AWAY - STERK - SPRUIT ROAD [ASR37/38]



d. Discussion

Although little population movement occured in the Sterkspruit region it is evident from the findings in the Libode region that the tarred road is an attractive location for established residents and new comers moving into the area. Generally the road side was identified as an attractive location largely due to the tansport advantages associated with roadside living by respondents. The attractiveness of roadside living as identified by respondents varies according to age. The younger population finds roadside living more attractive than older population.

Although relatively few people moved into the area a large porportion of respondents perceived an influx of people into the area. The increase of population had few adverse effects on existing communities.

6.4.6 The extent of the reliability of roads

a. Literature review

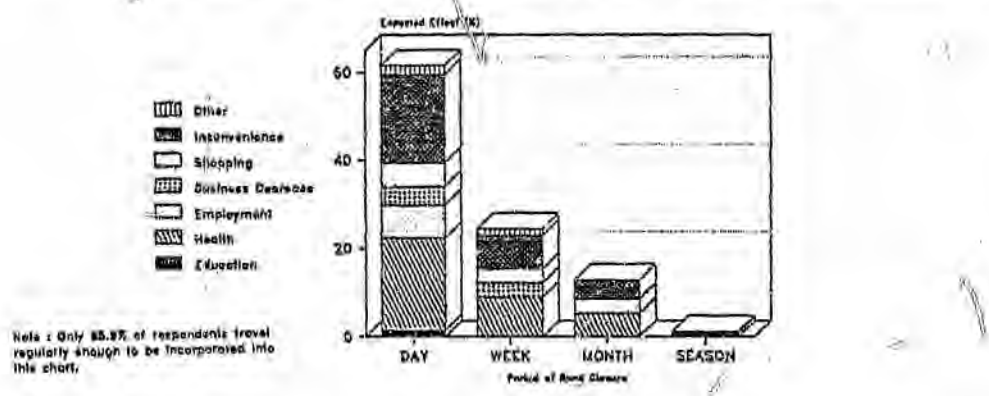
No known literature

b. Libode Road

i. Libode tarred road

Figure 6.52 graphically illustrates the reasons for inconvenience of road closure over a period of one day increasing to a period of one season of the year. The use of the road throughout the year was identified by 12,2% of respondents as the most important effect of the road improvement [Figure 6.22].

FIGURE 6.52 : INCONVENIENCE OF ROAD CLOSURE - LIBODE ROAD
[TARRED ROAD RESIDENTS][ALR22.2 (NEW ROAD)]



95,9% of residents are inconvenienced if the road is closed for any particular time period. 59,2% of residents said they would be inconvenienced if the road was closed for one day. The main reasons for the inconvenience were related to health (20%), employment (7,1%), shopping (5,1%) and decline of business (4,1%). A further 23,5% would be inconvenienced if the road was closed for a period of one week of the year and a total of 94,9% would be inconvenienced if the road was closed for a period of one month of the year. Overall reasons for inconvenience were for health (33,8%), shopping (11,3%), decline in business (7,2%), employment (7,1%) and education (1,5%). A further 31,6% could not provide a suitable response for the stated period of inconvenience.

ii. Libode intermediate road

FIGURE 6.53 : INCONVENIENCE OF ROAD CLOSURE - LIBODE ROAD
[INTERMEDIATE ROAD RESIDENTS][ALR22.2(INTER RD)]

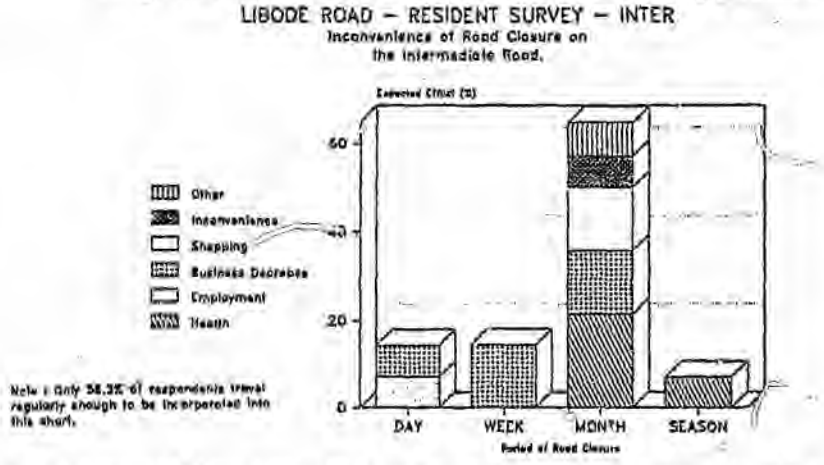
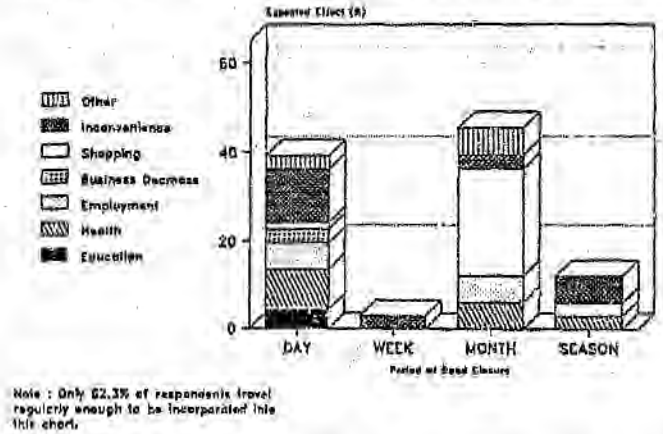


Figure 6.53 graphically illustrates the reasons for inconvenience of road closure over a period of one day increasing to a period of one season of the year. 58,3% of residents are inconvenienced if the road is closed for any particular time period. 8,3% of residents said they would be inconvenienced if the road was closed for one day. The main reasons for the inconvenience were related to employment (4,2%) and decline of business (4,2%). A further 8,3% would be inconvenienced if the road was closed for a period of one week of the year and a total of 54,1% would be inconvenienced if the road was closed for a period of one month of the year. Overall reasons for inconvenience were the decline of business (20,8%), health (16,7%), shopping (8,3%), and employment (4,2%). A further 4,2% could not provide a suitable response for the stated period of inconvenience.

iii. Libode gravel road

Figure 6.54 graphically illustrates the reasons for inconvenience of road closure over a period of one day increasing to a period of one season of the year. 62,3% of residents are inconvenienced if the road is closed for any particular time period.

FIGURE 6.54 : INCONVENIENCE OF ROAD CLOSURE - LIBODE ROAD
[GRAVEL ROAD RESIDENTS][ALR22.2(OLD ROAD)]



24,5% of residents said they would be inconvenienced if the road was closed for one day. The main reasons for the inconvenience were related to health (5,7%), shopping (5,1%), employment (3,8%), education (2,8%) and the decline of business (1,9%). A further 1,9% would be inconvenienced if the road was closed for a period of one week of the year and a total of 54,7% would be inconvenienced if the road was closed for a period of one month of the year. Overall reasons for inconvenience were for shopping (17,9%), health (11,7%), employment (7,6%) education (2,8%) and the decline of business (1,9%).

iii. Discussion

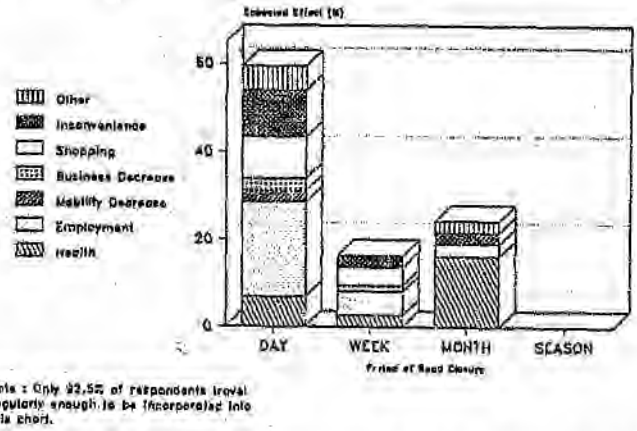
The above findings suggest that tarred road respondents are more regular travellers [see also Section 6.4.5] and more dependent on a reliable road than their counterparts living alongside the gravel road. Furthermore the inconvenience to respondents of intermediate and gravel roads for a period of a month suggests a monthly travel pattern and further indicates that residents in these area are to a great extent independent of the money economy [Section 6.4.2]. The willingness of intermediate and gravel road respondents to accept a less reliable road and the evidence of less frequent travel [Section 6.4.4] suggests that a well maintained gravel road [superior to the unsatisfactory condition

at present [section 6.11]] would satisfy the travel needs of residents located alongside it.

c. Sterkspruit road

The four groups are presented and discussed separately as they yield different results. Figure 6.55 graphically illustrates the reasons for inconvenience of road closure over a period of one day increasing to a period of one season of the year for young males.

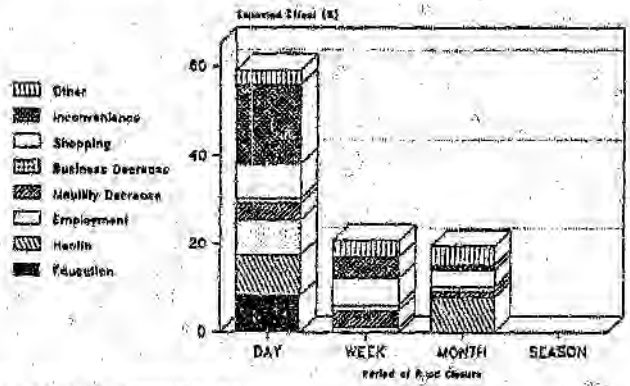
FIGURE 6.55 : INCONVENIENCE OF ROAD CLOSURE - STERKSPRUIT ROAD [YOUNG MALES][ASR22.2 (YOUNG MALES)]



Note : Only 92,5% of respondents travel regularly enough to be incorporated into this chart.

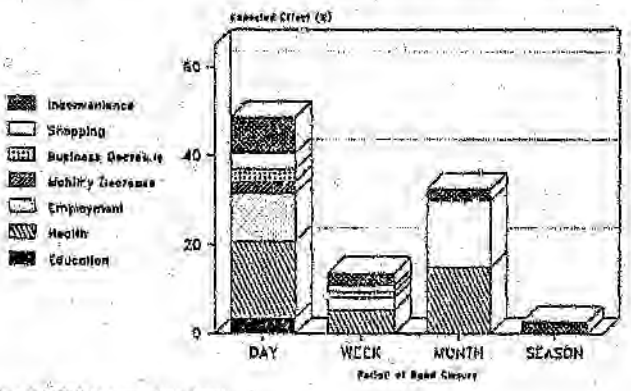
92,5% of residents are inconvenienced if the road is closed for any particular time period. 55% of residents said they would be inconvenienced if the road was closed for one day. The main reasons for the inconvenience were related to employment (20%), shopping (8,8%), health (6,3%), mobility decline (2,5%) and decline of business (4,1%). A further 15% would be inconvenienced if the road was closed for a period of one week of the year and a total of 92,5% would be inconvenienced if the road was closed for a period of one month of the year. Overall reasons for inconvenience were for health (23,8%), shopping (11,3%), decline in business (7,2%), employment (7,1%) and education (1,5%). A further 31,6% could not provide a suitable response for the stated period of inconvenience.

6.56 Inconvenience of Road Closure - Sterkspurit Road [Young Females][ASR22.2 (YOUNG FEMALES)]



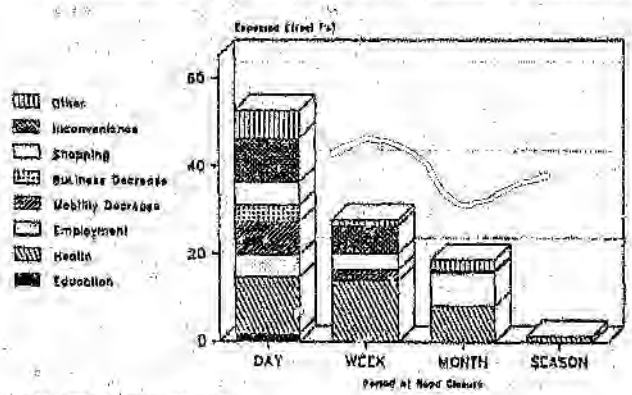
Note : Only 93.1% of respondents travel regularly enough to be incorporated into this chart.

6.57 Inconvenience of Road Closure - Sterkspurit Road [Old Males][ASR22.2 (OLD MALES)]



Note : Only 74% of respondents travel regularly enough to be incorporated into this chart.

6.58 Inconvenience of Road Closure - Sterkspurit Road [Old Females][ASR22.2 (OLD FEMALES)]



Note : Only 88% of respondents travel regularly enough to be incorporated into this chart.

Figure 6.56 graphically illustrates the reasons for inconvenience of road closure over a period of one day increasing to a period of one season of the year for young females. 93,1% of residents are inconvenienced if the road is closed for any particular time period. 55,2% of residents said they would be inconvenienced if the road was closed for one day. The main reasons for the inconvenience were related to health (8,4%), education (7,8%), employment (7.5%), shopping (7,3%), mobility decline (3,4%) and decline of business (1,1%). A further 19,5% would be inconvenienced if the road was closed for a period of one week of the year and a total of 93,1% would be inconvenienced if the road was closed for a period of one month of the year. Overall reasons for inconvenience were for shopping (16,4%), health (15,9%), employment (8,6%), mobility decrease (7,9%), education (7,8%)and decline in business (3,3%). A further 22,4% could not provide a suitable response for the stated period of inconvenience.

Figure 6.57 graphically illustrates the reasons for inconvenience of road closure over a period of one day increasing to a period of one season of the year for old males. 74% of residents are inconvenienced if the road is closed for any particular time period. 36% of residents said they would be inconvenienced if the road was closed for one day. The main reasons for the inconvenience were related to health (12,7%) and employment (8%). Reasons of lessor importance included education (2,7%), mobility decline (2%), decline of business (2%) and shopping (1,7%). A further 10% would be inconvenienced if the road was closed for a period of one week of the year and a total of 70% would be inconvenienced if the road was closed for a period of one month of the year. Overall reasons for inconvenience were for health (27,7%), shopping (13,7%), employment (10%), decline in business (3%), mobility decrease (2%) and education (2,7%). A further 12% could not provide a suitable response for the stated period of inconvenience.

Figure 6.58 graphically illustrates the reasons for inconvenience of road closure over a period of one day increasing to a period of one season of the year for old females. 86% of residents are inconvenienced if the road is closed for any particular time period. 45,2% of residents said they would be inconvenienced if the road was closed for one day. The main reasons for the inconvenience were related to health (10,9%), mobility decline (6,5%), employment (4,5%), shopping (4,5%), decline of business (3,2%) and education (1,6%). A further 23,7% would be inconvenienced if the road was closed for a period of one week of the year and a total of 85% would be inconvenienced if the road was closed for a period of one month of the year. Overall reasons for inconvenience were for health (30,8%), shopping (14,2%), mobility decrease (8,7%), employment (4,5%), decline in business (3,2%) and education (1,6%). A further 14,5% could not provide a suitable response for the stated period of inconvenience.

It is evident from the findings above that the younger population is more dependent on a reliable road than the older population. All groups are largely dependent on a reliable road every day and almost all dependent on the road not being closed for a month of the year. The dependance on a reliable road is largely for health and shopping purposes.

d. Discussion

Respondents resident along a tarred road show similar dependance on a reliable road. Various groups within the population do however show differences in dependance and reasons for such dependance. It is suggested that by increasing the reliability of a road, residents and travellers became dependent on the road resulting in a continual need for a reliable road.

6.4.7 The effect of the road on travel costs, travel time and accidents

a. Literature review

Improvements to rural road infrastructure reduce vehicle operating costs in terms of vehicle maintenance and fuel savings. Vehicle operating cost savings do however benefit a relatively small number of people [Section 4.1]. Rural road improvements reduce travel times [Section 4.2] and accidents [Section 4.3] but the severity of accidents may increase due to the higher levels of speed that are attainable.

b. Libode road

i. Libode tarred road

Table 6.42 and Table 6.43 respectively show the effect of the road improvement on travel costs and travel time.

TABLE 6.42 : THE EFFECT OF THE LIBODE ROAD ON TRANSPORT COSTS [ALR45]

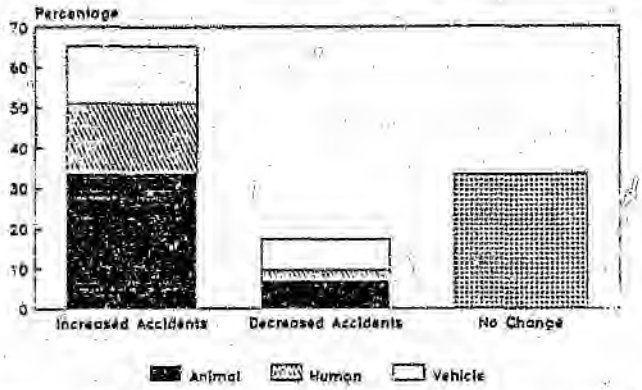
	New Road		Old Road	
	No.	%	No.	%
No change in transport costs	74	76,7	70	90,9
Decrease in transport costs	20	21,3	7	9,1
No response	4		1	
TOTAL	98	100	78	100

TABLE 6.43 : THE EFFECT OF THE LIBODE ROAD ON TRAVEL TIME [ALR46]

	New Road		Old Road	
	No.	%	No.	%
Decrease in travel time	87	89,7	50	64,9
No change in travel time	10	10,3	27	35,1
No response	1		1	
TOTAL	98	100	78	100

21,3% of residents experienced a decrease in travel costs. 89,7% of residents experienced a decrease in travel time. Figure 6.59 illustrates the effect of improved roads on accidents.

FIGURE 6.59 : THE EFFECT OF THE LIBODE ROAD ON ACCIDENTS
[TARRED ROAD RESIDENTS][ALR47/48.1/48.2]



17,3% of residents said there was no change in accidents while 65,3% said there was an increase in accidents and 17,3% said there was a decrease in accidents. An increase in animal accidents (33,7%) followed by an increase in human accidents (14,3%) are the largest contributors to accidents.

ii. Libode gravel road

Table 6.42 and Table 6.43 respectively show the effect of the road improvement on travel costs and travel time. 9,1% of residents experienced a decrease in travel costs. 64,9% of residents experienced a decrease in travel time.

FIGURE 6.60 : THE EFFECTS OF THE LIBODE ROAD ON ACCIDENTS
[GRAVEL ROAD RESIDENTS][ALR47/48.1/48.2]

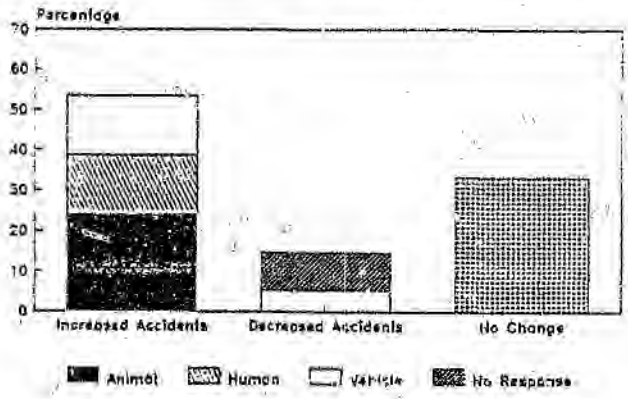


Figure 6.[illegible] illustrates the effect of improved roads on accidents. 32% of residents said there was no change in accidents while 53,3% said there was an increase in accidents and 14,7% said there was a decrease in accidents. An increase in animal accidents (24%) followed by an increase in human and vehicle accidents (14,7% each) are the largest contributors to accidents.

iii. Discussion

It is evident from Section 6.3.3.4 that the road results in cost savings for vehicle operators. Evidence from the findings above indicates that savings are perceived as not being passed on to the consumer [residents]. The results above clearly indicate that road improvements result in travel time savings particularly for tarred road residents who have direct access to the tarred road. Furthermore evidence suggest that accidents have increased along the tarred road particularly amongst livestock.

c. Sterkspruit road

Table 6.44 and Table 6.45 respectively show the effect of the road improvement on travel costs and travel time. 6,8% of residents experienced a decrease in travel costs. 93,5% of residents experienced a decrease in travel time.

TABLE 6.44 : THE EFFECT OF THE STERKSPRUIT ROAD ON TRANSPORT COSTS [ASR45]

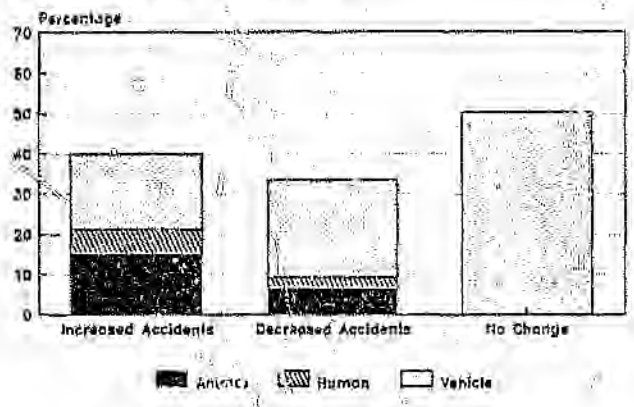
	No.	%
No change in transport costs	233	93,2
Decrease in transport costs	17	6,8
No response	25	
TOTAL	275	100

TABLE 6.45 : THE EFFECT OF THE STERKSPRUIT ROAD ON TRAVEL TIME [ASR46]

	No.	%
Decrease in travel time	246	93,5
No change in travel time	17	6,5
No response	12	
TOTAL	275	100

Figure 6.61 illustrates the effect of improved roads on accidents. 26,6% of residents said there was no change in accidents while 39,9% said there was an increase in accidents and 33,5% said there was a decrease in accidents. Vehicle accidents and, to a lesser extent, animal accidents comprise most of the accidents.

FIGURE 6.61 : THE EFFECT OF THE STERKSPRUIT ROAD ON ACCIDENTS
[ASR47/48.1/48.2]



d. Discussion

It is evident from the findings above that improved road conditions do not result in travel cost savings for road users apart from vehicle operators [Section 6.3.3.4]. Improved roads do however result in travel time savings. Residents are undecided whether improved road conditions result in increased accidents or decreased accidents or have no effect on accidents. Findings of the travel purpose survey reveal similar results. Further investigation into the effect of road improvements on accidents is therefore necessary.

6.4.8 The effects of the road on employment

a. Literature review

Improvements to rural road infrastructure create short-term employment opportunities directly through construction itself and related activities and, to a limited extent, medium and long term

employment. [Section 4.11]

b. Libode Road

i. Libode tarred road

Respondents were asked if they or their families were involved in some type of employment in the construction of the road. The results are illustrated in Table 6.46. 25,8% of respondents said they or a member of their family were involved in road construction. Table 6.47 shows that there is potentially a large labour force willing to get involved in continuous upgrade and maintenance programmes. 72,2% of tarred road inhabitants stated that they or a member of their family were willing to be involved in the above mentioned programmes.

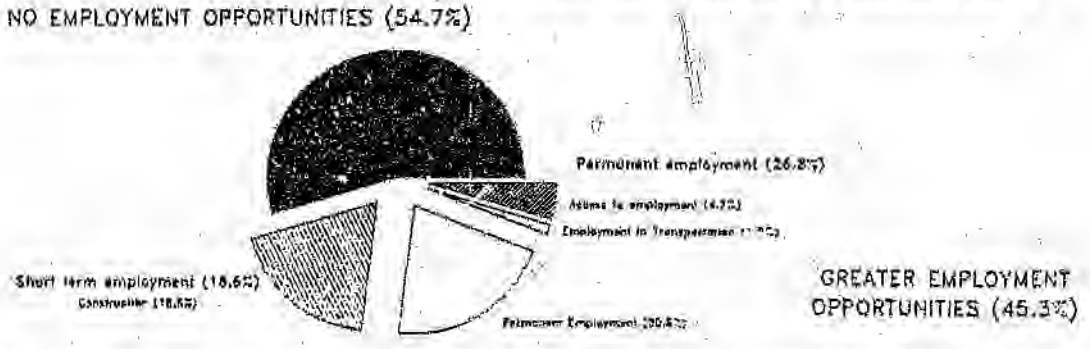
TABLE 6.46 : RESIDENTS INVOLVED IN THE CONSTRUCTION OF THE LIBODE ROAD [ALR15]

	New Road		Old Road	
	No.	%	No.	%
Employed on the road	25	25,8	11	14,1
Not employed on the road	72	74,2	67	85,9
No response	1			
TOTAL	98	100	78	100

TABLE 6.47 : RESIDENTS WILLING TO BE INVOLVED IN MAINTENANCE OF THE LIBODE ROAD [ALR16]

	New Road		Old Road	
	No.	%	No.	%
Want to be employed on the road	70	72,2	41	52,6
Do not want to be employed on the road	27	27,8	37	47,4
No response	1			
TOTAL	98	100	78	100

FIGURE 6.62 : THE EFFECTS OF THE LIBODE ROAD ON EMPLOYMENT OPPORTUNITIES [TARRED ROAD RESIDENTS][ALR41/42]

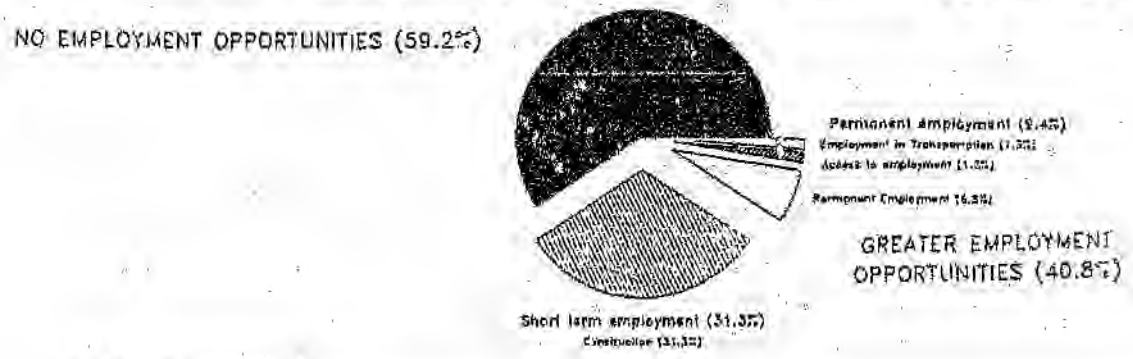


45,3% of respondents said the road construction had improved employment opportunities [Figure 6.62]. The types of employment opportunities perceived to have increased can be divided into long term and short term employment. 18,6% said short term [costruction jobs] employment had increased and 22,1% said permanent employment had increased and a further 4,7% stated that access to jobs had increased.

ii. Libode gravel road

Respondents were asked if they or their families were involved in some type of employment in the construction of the road. The results are illustrated in Table 6.46. Only 14,1% of respondents said they or a member of their family were involved in road construction. Table 6.47 shows that there is potentially a large labour force willing to get involved in continuous upgrade and maintenance programmes. 52,6% of gravel road inhabitants stated that they or a member of their family were willing to be involved in the above mentioned programmes. 40,8% of respondents said the road construction had improved employment opportunities [Figure 6.63]. The types of employment opportunities perceived to have increased can be divided into long term and short term employment. 31,3% said short term [construction jobs] employment had increased and 8,1% said permanent employment had increased and a further 1,3% stated that access to jobs had increased.

FIGURE 6.63 : THE EFFECTS OF THE LIBODE ROAD ON EMPLOYMENT OPPORTUNITIES [GRAVEL ROAD RESIDENTS][ALR41/42]



iii. Discussion

The findings above are consistent with the literature which suggests that road construction is an important contributor to short-term employment and that longer term employment is created to a limited extent only. Residents along the tarred road benefit from construction employment to a greater extent than gravel road residents. The fewer involved in construction and the fewer willing to get involved could be a reflection of the dependence on subsistence agriculture and non involvement in the formal economy [Section 6.4.2]. Furthermore a greater number of tarred road residents perceived employment opportunities had increased. Of greater significance is that a greater number of tarred road residents perceived long term permanent employment had increased. Therefore tarred road residents benefited not only from short-term employment but also longer term permanent employment.

c. Sterkspruit Road

Respondents were asked if they or their families were involved in some type of employment in the construction of the road. The results are illustrated in Table 6.48. 12% of respondents said they or a member of their family were involved in road construction. Table 6.49 shows that there is potentially a large labour force willing to get involved in continuous upgrade and maintenance programmes. 51,6% of respondents stated that they or a

member of their family were willing to be involved in the above mentioned programmes.

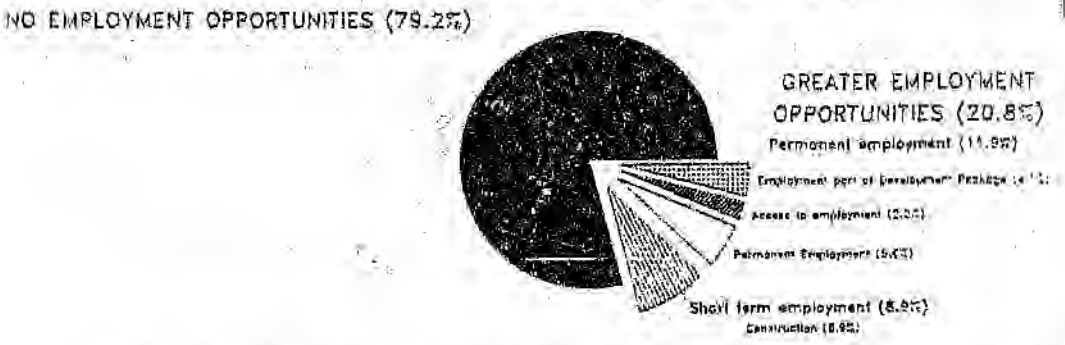
TABLE 6.48 : RESIDENTS INVOLVED IN THE CONSTRUCTION OF THE STERKSPRUIT ROAD [ASR15]

	No.	%
Employed on the road	33	12
Not employed on the road	242	88
TOTAL	275	100

TABLE 6.49 : RESIDENTS WILLING TO BE INVOLVED IN MAINTENANCE OF THE STERKSPRUIT ROAD [ASR16]

	No.	%
Want to be employed on the road	142	51,6
Do not want to be employed on the road	133	48.4
TOTAL	275	100

FIGURE 6.64 : THE EFFECTS OF THE STERKSPRUIT ROAD ON EMPLOYMENT OPPORTUNITIES [ASR41/42]



20,8% of respondents said the road construction had improved employment opportunities [Figure 6.64]. The types of employment opportunities perceived to have increased can be divided into long term and short term employment. 8,9% said short term [construction jobs] employment had increased and 9,7% said permanent employment had increased. Included in this category are 4,1% who saw the road as part of the development package of the

Sterkspruit region which has created jobs. A further 2,2% stated that access to jobs had increased.

d. Discussion

The number of respondents involved in road construction was small. Greater benefit could be achieved if labour intensive construction methods could be employed. This method would also further the extent of permanent employment through the acquisition of skills and the subsequent employability of construction workers.

Although business has benefited from the road improvement in the Sterkspruit area [Section 6.5.4], it is evident from the findings that the road has had little effect on employment within the region. Furthermore, the region acts as a self-sufficient economic region for residents [Section 6.5.7]. Few employment opportunities are available and money is therefore being sent into the region from outside. This is also suggested in Section 5.1.2. Other developmental schemes are therefore needed to change the structure of the town of Sterkspruit from mainly retail [Table ASBiii] to sectors which employ greater numbers. Greater employment opportunities were however perceived in the Libode region. This could be attributed to the concept that the road improvement has resulted in the growth of the catchment area of the Umtata region to include the Libode region and that greater access to permanent employment opportunities in the greater Umtata region has resulted in the perception that there are more employment opportunities.

6.4.9 The effect of the road on government services

a. Literature review

Improvements to rural road infrastructure result in further government investment [Section 4.12].

b. Libode Road

i. Libode tarred road

Table 6.50 indicates that 41,7% of residents perceive government services and investment to have increased since the road has been tarred. The greatest improvement in government services following the road improvement was the quarterly settlement of pensions (34,2%) followed by improvements to agricultural extension officer relations (23,2%), health and clinics (15,3%), public transport (13,2%), water reticulation (9,2) and education (2,1%) [Table ALR40].

TABLE 6.50 : THE EFFECT OF THE LIBODE ROAD ON GOVERNMENT SERVICES
[ALR39]

	New Road		Old Road	
	No.	%	No.	%
Government services have improv	40	41,7	28	38,6
No change in government services	56	56,3	46	61,3
No response	2	____	3	____
TOTAL	98	100	78	100

ii. Libode gravel road

Table 6.50 indicates that 38,6% of residents perceive government services and investment to have increased since the road has been tarred. The greatest improvement in government services following the road improvement was the agricultural extension officer relations (46,4%), followed by increases in education (17,9%), water reticulation (8,9%), health and clinics (5,4%),the payment of pensions (3,6%) and public transport (3,6%) [Table ALR40].

iii. Discussion

The findings above are consistent with the literature which suggests that further government assistance typically follows road improvements. It also suggests that gravel road residents have gained increased access from the tar road. The type of assistance is very "area specific" and related to the problems, oppor-

tunities and constraints of the particular area. This is particularly evident on the gravel road where the majority of residents are involved in agriculture [Section 6.4.2.1] and where the main function of government assistance perceived is improvements to agricultural methods.

c. Sterkspruit Road

Table 6.51 indicates that 33,6% of residents perceive government services and investment to have increased since the road has been tarred. The greatest improvement in government services following the road improvement are water reticulation (43,2%), health and clinics (17,6%), education (9,8%), public transport (8,2%), agricultural extension officer relations (6,5%), and the administration of the government (6,3%).

TABLE 6.51 : THE EFFECT OF THE STERKSPRUIT ROAD ON GOVERNMENT SERVICES [ASR39]

	No.	%
Government services have improved	92	33,5
No change in government services	182	66,4
No response	1	
TOTAL	275	100

d. Discussion

The findings above are consistent with the literature which suggests that further government assistance typically follows road improvements. The type of assistance is very "area specific" and related to the problems, opportunities and constraints of the particular area.

6.4.10 Participation of residents prior to and during construction of the road

a. Literature review

Not appropriate

b. Libode Road

i. Libode tarred road

Respondents were asked if the community was involved in some form of public participation during the planning and construction stages of the road improvement.

TABLE 6.52 : PARTICIPATION OF RESIDENTS PRIOR TO AND DURING THE CONSTRUCTION OF THE LIBODE ROAD [ALR43.1]

	New Road No.	%	Old Road No.	%
Residents involved in some form of participation	38	40,9	29	37,2
Residents not involved in public participation	55	59,1	49	62,8
No response	5			
TOTAL	98	100	78	100

TABLE 6.53 : TYPES OF PUBLIC PARTICIPATION - LIBODE ROAD [ALR43.2]

	New Road No.	%	Old Road No.	%
Headman	12	34,3	16,5	56,9
Meeting	9	25,7	1	3,5
Public broadcast	2	5,7	1,5	5,2
Informal	12	34,3	2	6,9
No response	3		8	27,6
TOTAL	38	100	29	100

Table 6.52 illustrates that 40,9% of tarred road residents were involved in some form of public participation. Table 6.53 illustrates the forms of public participation. Of the 40,9% who said they were involved in some form of public participation 34,3% said they were informed by the headman. A further 34,3% said that they were involved only on an informal basis. 25,7% attended a meeting about the road and the remaining 5,7% heard of the road construction over radio.

ii. Libode gravel road

Respondents were asked if the community was involved in some form of public participation during the planning and construction stages of the road improvement. Table 6.52 illustrates that 37,2% of gravel road residents were involved in some form of public participation. Table 6.53 illustrates the forms of public participation. Of the 37,2% who said they were involved in some form of public participation 56,9% said they were informed by the headman. A further 6,9% said that they were involved only on an informal basis. 3,5% attended a meeting about the road and 5,2% heard of the road construction over radio. The remainder could not provide a suitable response to the question on the form of participation in which they were involved.

iii. Discussion

It is evident from the findings above that respondents were informed to a limited extent rather than being involved in any public participation exercise. Decisions have therefore been made in isolation from the views and opinions of local residents. Through effective public participation problems identified in this dissertation as a result of the road improvement may have been overcome and some of the opportunities and advantages strengthened. Further research needs to be done on methods of involving developing communities into the decision making process.

c. Sterkspruit Road

Respondents were asked if the community was involved in some form of public participation during the planning and construction stages of the road improvement. Table 6.54 illustrates that 75,2% of residents were involved in some form of public participation. Table 6.55 illustrates the forms of public participation. Of the 75,2% who said they were involved in some form of public participation 88,7% said they were informed by the headman. 27,8% were informed by the headman and a further 60,8% were informed by the headman to pay a sum of money towards the

cost of the road. A further 27,8% were informed by the headman. 2,1% said that they were involved only on an informal basis. 5,7% attended a meeting about the road and the remaining 3,6% were informed about the construction of the road by government officials.

TABLE 6.54 : PARTICIPATION OF RESIDENTS PRIOR TO AND DURING THE CONSTRUCTION OF THE STERKSPRUIT ROAD [ASR43.1]

	No.	%
Residents involved in some form of participation	203	75,2
Residents not involved in public participation	67	24,8
No response	5	
TOTAL	275	100

TABLE 6.55 : TYPES OF PUBLIC PARTICIPATION - STERKSPRUIT ROAD [ASR43.2]

	No.	%
Headman*	172	88,7
Meeting	11	5,7
Government officials	7	3,6
Informal	4	2,1
No response	9	
TOTAL	203	100

d. Discussion

It is evident from the findings that residents were "informed" rather than being involved in any public participation exercise. Residents along the Sterkspruit road were informed to a greater extent than Libode road residents. This can probably be attributed to the need of headmen to raise funds for the construc-

tion of the road. As we have already seen in this dissertation, large groups of people, particulaly in the Libode region have been adversely affected by the road improvement. Effective participation involving local residents and businesses in the decision making process could overcome some problems and strengthen opportunities and advantages created and give greater credibility to the planning process.

6.4.11 The effect of the road on maintenance of other routes within the region

a. Literature review

No known literature

b. Libode Road

i. Libode tarred road

Respondents were asked if the old gravel route within the region was being adequately maintained. The results are illustrated in Table 6.56.

TABLE 6.56 : PERCEPTION ON THE MAINTENANCE OF THE OLD GRAVEL ROAD [ALR51]

	New Road		Old Road	
	No.	%	No.	%
Road adequately maintained	24	25	27	34,6
Route not adequately maintained	72	75	51	65,4
No response	2			
TOTAL	98	100	78	100

25% said that the road was being adequately maintained. Reasons for the route being adequately maintained were the road was still usable (8,3%) and the road was of less importance (41,7%) [ALR52]. The underlying assumption was that the road did not need to be maintained to its previous standard.

ii. Libode gravel road

Respondents were asked if the old gravel route within the region was being adequately maintained. The results are illustrated in

Table 6.56. 34,6% said that the road was being adequately maintained, the reason was the road was still usable (72%) [ALR52].

iii. Discussion

The majority of respondents located along the gravel road perceive the gravel road to be in an unsatisfactory condition. 66% of gravel road residents expected the gravel road to be tarred [Figure 6.4.12]. Findings on the importance of a reliable road [Section 6.4.6] do however suggest that the willingness of gravel road respondents to accept a less reliable road and the evidence of less frequent travel [Section 6.4.4] suggests that a well maintained gravel road [superior to the unsatisfactory condition at present] would satisfy the travel needs of gravel road communities.

6.4.12 Summary

- improved roads encourage local inhabitants away from traditional subsistence economy and towards greater involvement in the formal economy. This results in the respondents located alongside the tarred road to gear to a greater extent, in terms of agriculture and money-making activities, towards commercial type activities
- the minimal effects of the road improvement on agriculture [particularly in the Sterkspruit region] can be attributed to the unimportance of agriculture as a day-to-day activity. Furthermore few benefits were experienced by those involved in money making activities.
- relatively few agricultural benefits resulted from the road improvement but of those benefits the majority were experienced by respondents located along the tarred road. Similarly, few benefits to informal money making activities were experienced by respondents, but of the benefits the majority were experienced by residents located along the tarred road.
- respondents located along the gravel road were adversely affected by the tarring of the Libode Road. This has been attributed to the lack of continuous vehicular traffic. Further-

more a decrease in mobility was identified as the single most important effect of the tarring of the road. On the other hand residents located alongside the tarred road clearly benefited from the road improvement. This suggests that advantages gained by residents located along the tarrred road were to the disadvantage of residents located along the gravel road.

- the greatest benefit identified by respondents resulting from the road improvement was an increase in the availability of transport for travel. Direct benefits of the road improvement [eg increase in access, decrease in travel times, the use of the road throughout the year, etc] are perceived as the next group of important effects. Other secondary effects of the road improvements are perceived to a limited extent only.
- expectations of tarred road residents were largely fulfilled while the expectations of gravel road residents were not met. This could have significant social and political ramifications and the transportation planner should be conscious of decisions made and the resultant action that may occur.
- respondents travel mainly for the purpose of shopping followed by trips for health and work purposes.
- respondents located along the tarred road travel more frequently in terms of purpose and place than gravel road respondents. Furthermore findings of the study indicate that improved roads encourage increased frequency of travel.
- the younger population group tends to have increased the frequency of its travel to a greater extent that the older population group as a result of the road improvement.
- males travel more frequently than females. Within this categorisation the younger population group travels more frequently than the older population group.
- the majority of trips made by males are for the purpose of work. This is followed by trips for shopping purposes. Females travel for shopping purposes followed by trips made for work purposes. The older population group travels more frequently for

health purposes while the younger population group travels more frequently for social purposes.
- in terms of frequency of travel to various centres in the Libode region, respondents travel twice as frequently to Libode than to Umtata, the only towns in the region attracting a substantial amount of respondents.
- in the Libode region the road improvement has increased access to other centres [particularly Umtata] outside the region resulting in frequent travel to such centres, allowing community revenue to leak from the region even though facilities are available locally.
- few trips originating from the Sterkspruit region are destined to centres outside the region. The bulk of trips made radiate towards the town of Sterkspruit, resulting in little resident revenue leaking from the region.
- the tarred road is an attractive place of abode for both established residents and newcomers into the region. The transport advantages associated with roadside living are a major contributor to this attraction.
- the advantages of roadside living outweigh the few disadvantages that may be experienced.
- respondents perceived an increase of population into areas surrounding the tarred road. The increase of population had few adverse effects on existing communities.
- younger people [who are more frequent travellers] prefer to live alongside the road. The reason for the choice of preference is due to the availability of transport for travel.
- the extent of dependence on a reliable road tends to reflect the frequency of travel of respondents. Thus the younger population group is more dependent on a reliable road than the older population group and residents living alongside the tarred road are more dependent on a reliable road than gravel road respondents. A well maintained gravel road could satisfy the travel needs of the gravel road communities. Evidence suggests that the

increased reliability of tarred roads changes daily activities resulting in the continual need for a reliable road.
- many respondents are dependant on a reliable road every day and almost all are dependent on a reliable road that is not closed for longer than one month of the year.
- the road results in travel time savings.
- the effect to the road on accidents is unclear.
- respondents perceive few cost savings resulting from the road.
- the road created only limited short-term employment opportunities through the construction of the road and minimal medium and long term employment.
- further governmental assistance typically follows road improvements. The type of assistance is very "area specific" and related to the problems, opportunities and constraints of a particular area.
- in terms of public participation respondents were informed to a limited extent rather than being involved in any form of public participation.
- the old gravel road is not being maintained to a suitable standard as perceived by respondents.

6.5 BUSINESS IMPACT SURVEY

6.5.1 Stratification

Tables ALBii, ALBiii, ASBii and ASBii respectively show the stratification of the Libode and Sterkspruit Roads' business impact questionnaire in terms of the type of business and the relationship of the respondent to the business. Table ALBi and ASBi identify the number of surveys administered in each zone location along the Libode and Sterkspruit roads. As the majority of businesses are located in the main towns of Libode and Sterkspruit the sample is heavily weighted in favour of these locations. Map 1 and Map 2 identify the zone locations and the respective number of business questionnaires administered within

each zone location along the Libode and Sterkspruit roads.

6.5.2 The effect of the road on business location

a. Literature review

Improvements to rural road infrastructure result in an intensification of the utilisation of land close to the road in terms of agricultural, residential and commercial activity. [Section 4.10]

b. Libode road

i. Libode tarred road

Table 6.57 indicates that 23,5% of businesses located along the tarred road had been attracted to the area since the construction of the road had been completed. Of the 23,5% of businesses that located, 75% did so because of reasons other than those relating to transport advantages. A further 5,9% of businesses changed location within the region and located alongside the road because of transport advantages [Table 6.58].

TABLE 6.57 : LENGTH OF BUSINESS OPERATION IN THE LIBODE REGION [ALB1]

	New Road		Old Road	
	No.	%	No.	%
Business operating in the area for less than 2 years	4	23,5	2	50
Business operating in the area for more than 2 years	13	76,5	2	50
No response	1			
TOTAL	18	100	4	100

TABLE 6.58 : THE EFFECT OF THE LIBODE ROAD ON THE RELOCATION OF BUSINESS [ALB3/4/5]

	New Road		Old Road	
	No.	%	No.	%
Businesses which have moved since the building of the road	1*	5,9		
Businesses which have not moved since the building of the road	16	94,1	4	100
No response	1			
TOTAL	18	100	4	100

ii. Libode gravel road

Table 6.57 indicates that 50% of busine[illegible]ed along the old road had been attracted to the area sin[illegible]he [illegible]truction of the new road had been completed. The reasons for location in this area are related to profits and needs identified in the area. Table 6.58 indicates that no businesses established within the area moved to locations along the gravel road.

iii. Discussion

Although it is evident from the findings above that the gravel road seems to be an attractive location for business, evidence from the rest of the findings of the questionnaire suggests otherwise. It can however be concluded that since the construction of the road the Libode region has become an attractive location point for business. It therefore stands to reason that improved road conditions are a contributing factor in attracting business to locate in the region.

c. Sterkspruit road

Table 6.59 indicates that 21,6% of all businesses in the area have been attracted to the area since the surfacing of the road has been completed. All of the businesses that moved into the area did so for reasons other than those related to the advantages of the road. The reasons for location in this area are related to profits (50%) and needs identified in the area (50%).

Only 2% of businesses relocated from within the region [Table 6.60]. The reason for this relocation was because of transport advantages.

TABLE 6.59 : LENGTH OF BUSINESS OPERATION IN THE STERKSPRUIT REGION [ASB1]

	No.	%
Business operating in the area for less than 2 years	11	21,6
Business operating in the area for more than 2 years	40	78,4
TOTAL	51	100

TABLE 6.60 : THE EFFECT OF THE STERKSPRUIT ROAD ON THE RELOCATION OF BUSINESS [ASB3/4/5]

	No.	%
Businesses which have moved since the tarring of the road	1*	2
Businesses which have not moved since the tarring of the road	48	98
No response	2	—
TOTAL	51	100

d. Discussion

It is evident from the findings above that improved road conditions have made the area attractive for the location of business. It must however be noted the reasons for locating were mainly related to the prime interest of business - fulfilling a certain need in a community and making a profit. Improved road conditions contribute to a profitable climate [Section 6.5.4] and are a contributory factor in the choice of business location. The effects of road improvements on business are discussed at length in the following section.

6.5.3 The expected effects and the greatest effects of the road on business

a. Literature review

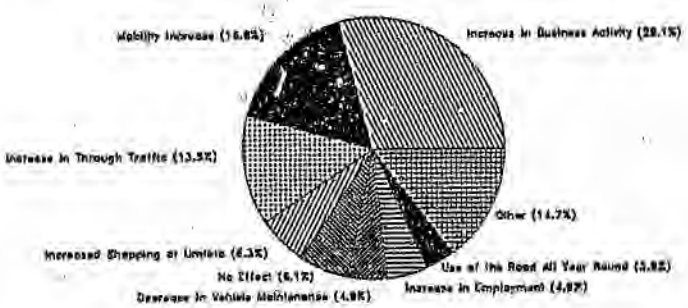
Improvements or additions to rural road infrastructure not only have a wide range of effects but also immediate and long term effects as well as both positive and negative effects. Although the literature does accept that not all groups benefit, it generally accepts that the benefits of road improvements outweigh the costs. [Chapter 4]

b. Libode Road

i. Libode tarred road

Figure 6.65 graphically represents the greatest effects of the road on businesses located along the tarred road and reflects the relative importance of the effects of the road improvement on these businesses.

FIGURE 6.65 : THE GREATEST EFFECTS OF IMPROVING THE LIBODE ROAD [TARRED ROAD BUSINESSES][ALB7/9 (NEW)]



29,1% of businesses identified an increase in business activity as the greatest effect of the road improvement. [This is discussed in greater detail in Section 6.5.4]. This is followed in importance by an increase in mobility identified by 16,8% and an increase in "through" traffic identified by 13,5% of business respondents. A range of other effects was also identified. Table ALB28 ranks a selected number of impacts as identified by the literature in terms of the most important effects and least

important effects and confirms the findings portrayed in Figure 6.65. The most important effect ranked by 40% of business respondents is an increase in business activity. An increase in business activity is followed in importance by the use of the road throughout the year (20%). The importance of the reliability of roads to business is discussed in Section 6.5.10. The least important effect ranked by 33,3% of business respondents is a decrease in accidents and an increase in employment opportunities (16,7%).

Businesses located along the tarred road clearly benefited from the road improvements. 81,3% of all business respondents said that the road improvement had a beneficial effect. Only 12,8% noted a negative effect [the main reason being increased shopping at centres outside the region] and 6,1% no effect.

FIGURE 6.66 : THE EXPECTED EFFECTS OF IMPROVING THE LIBODE ROAD
[TARRED ROAD BUSINESSES][ALB8 (NEW)]

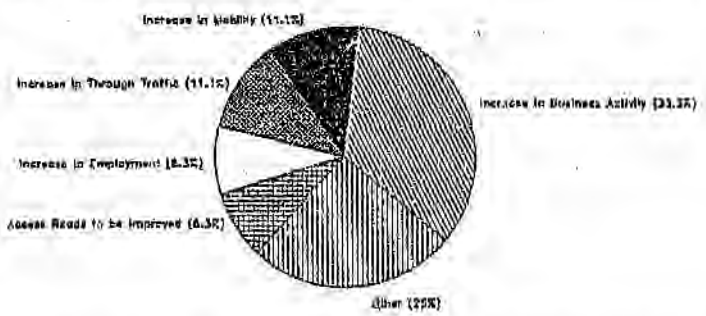
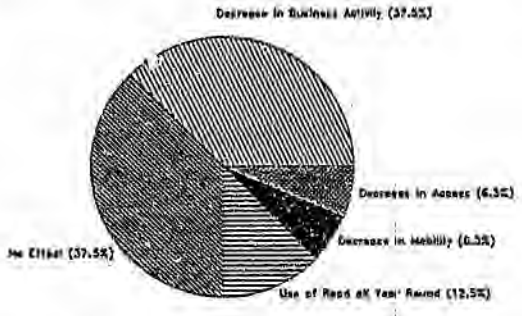


Figure 6.66 indicates the expected effects following the road improvement. 33,3% of businesses expected an increase in business activity followed by 11,1% each expecting an increase in mobility and an increase in "through" traffic. A further 11,1% expected access roads to be improved. Although this concept was not investigated in any detail, suggestions were made that mobility could be substantially increased by increasing the quality of access roads.

ii. Libode gravel road

Figure 6.67 graphically represents the greatest effects of the road on businesses located along the gravel road and reflects the relative importance of the effects of the road improvement on these businesses.

FIGURE 6.67 : THE GREATEST EFFECTS OF IMPROVING THE LIBODE ROAD
[GRAVEL ROAD BUSINESSES][ALB7/9 (OLD)]

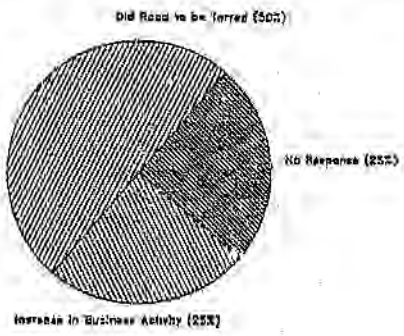


The two most important effects of the road improvement, each identified by 37,5% of business respondents, were a decrease in business activity and no effect. This is followed in importance by the use of the road all year round (12,5%), a decrease in mobility (6,3%) and a decrease in access (6,3%). Little can be drawn from Table ALB28 about the relative importance of the effects on business.

Businesses located along the gravel road clearly did not benefit from the road improvements. 50,1% of all businesses said that the road improvement had an adverse effect. Furthermore 37,5% experienced no effect and only 12,5% noted a beneficial effect.

Figure 6.68 indicates the expected effects following the road improvements. 50% of respondents expected the road alongside which they were located to be upgraded to the standard of the newly tarred road. A further 25% expected an increase in business activity.

FIGURE 6.68 : THE EXPECTED EFFECTS OF IMPROVING THE LIBODE ROAD
[GRAVEL ROAD BUSINESSES][ALB8 (OLD)]



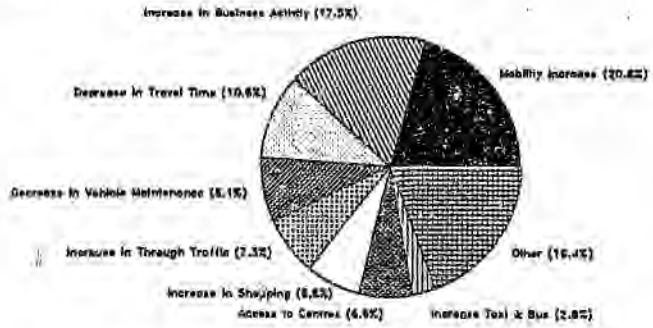
iii. Discussion

It can be stated that businesses located on the tarred road have benefited positively from the road improvements with an increase in business activity as the most important effect. The advantages gained by businesses located along the new road were perhaps to the disadvantage of the businesses located along the gravel road where a decrease in business activity was identified as the greatest effect together with the notion that the road improvement had little or no effect. The lack of continuous traffic [Section 6.2] is the main reason for the decrease in business activity and other adverse effects. Furthermore an important comparison must be made between the expectation of the businesses of both the gravel and tarred roads. When the effects and expected effects of the tarred road are compared the three most important expectations and effects are the same and the importance thereof similar. When the effects and the expectations of the gravel road are compared there are no similarities between the perceived expectations and the perceived effects. It can therefore be concluded that not only were the businesses located along the gravel road disadvantaged but their expectations were not fulfilled. The above effects could have significant social and political ramifications and the transportation planner should be conscious of decisions made and the resultant actions which may occur.

c. Sterksp[illegible]uit Road

Figure 6.69 graphically represents the greatest effects of the road on business and reflects the relative importance of the effects of the road improvement on businesses.

FIGURE 6.69 : THE GREATEST EFFECTS OF IMPROVING THE STERKSPRUIT ROAD [ASB7/9]



20,8% of businesses identified an increase in mobility as the greatest effect of the road improvement. This is followed in importance by an increase in business activity identified by 17,5% [this is discussed in greater detail in Section 6 [illegible].4] and a decrease in travel time by 10,6% of business respondents. A range of other effects was also identified including a decrease in vehicle maintenance (8,1%) an increase in "through" traffic (7,2%), an increase in shopping (6,8%) and greater access to centres (6,6%). Table ALB28 ranks a selected number of impacts as identified by the literature in terms of the most important effects and least important effects and confirms the findings portrayed in Figure 6.69. The most important effect ranked by 53,3% of business respondents is the increase in business activity. An increase in business activity is followed in importance by the use of the road throughout the year which was ranked by 15,6% of business respondents. This is discussed in greater detail in Section 6.5.10. The least important effect ranked by business respondents is a reduction in travel time (25%), a decrease in accidents (11,4%), and increased agricultural ac-

tivity (22,7%).

Businesses located along the tarred road clearly benefited from the road improvements. 96,1% of all business respondents said that the road improvement had a beneficial effect. Only 3,9% noted a negative effect.

FIGURE 6.70 : THE EXPECTED EFFECTS OF IMPROVING THE STERKSPRUIT ROAD [ASB8]

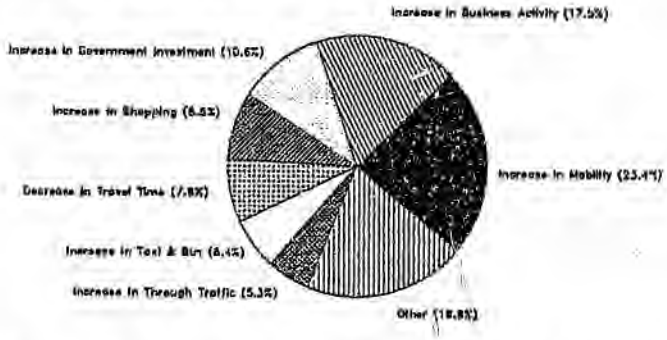


Figure 6.70 indicates the expected effects following the road improvement. 23,4% of businesses expected an increase in business activity followed by 18,1% expecting an increase in mobility and 10,6% expecting further government investment. Other expected effects included an increase in shopping, a decrease in travel time, an increase in taxi and bus movement and an increase in "through" traffic.

d. Discussion

It is evident from the findings above that road improvements result in two major benefits to business - an increase in business activity and an increase in mobility / access, the latter complementing the former to the extent of increasing business activity and profitability. This is discussed in greater detail in Section 6.5.4.

6.5.4 The effect of the road on business

a. Literature review

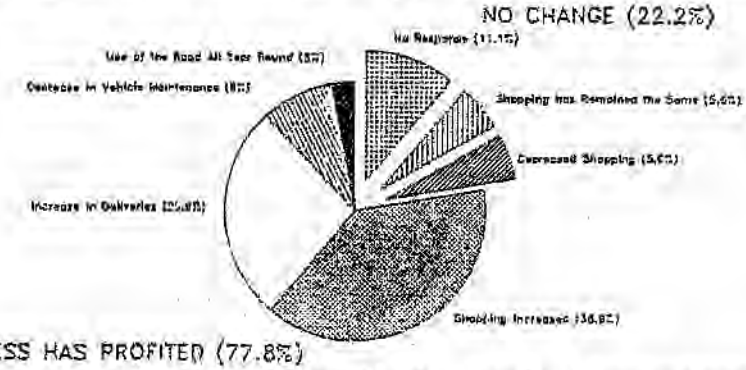
Improvements to rural road infrastructure have noticeable positive economic impacts on business. [Section 4.5.5]

a. Libode Road

i. Libode tarred road

Improved business activity was the most important effect identified by business respondents due to the improved road [see Figure 6.65]. Figure 6.71 graphically represents the effect of the road on business profit and the perceived reasons for such a change.

FIGURE 6.71 : THE EFFECT OF THE LIBODE ROAD ON BUSINESS PROFIT [TARRED ROAD BUSINESSES][ALB18.1/18.2/18.3]



77,8% of business respondents felt that road improvements had benefited their business. The size of the benefit to business is indicated by the increase in the size to the turnover. Table ALR iii indicates the type of business in which respondents were involved. All businesses located along the tarred road ( ) gravel road are, in terms of man-power and floor area, similar, and the average turnover was determined by adding individual responses and dividing by the total number of responses. The turnover of businesses located along the tarred road increased over the past two years by 15,32%_[Table ALB18.1]. Reasons for this increase included an increase in shopping (38,9,%), an increase in deliveries (26,9%), a decrease in vehicle maintenance (9%), and

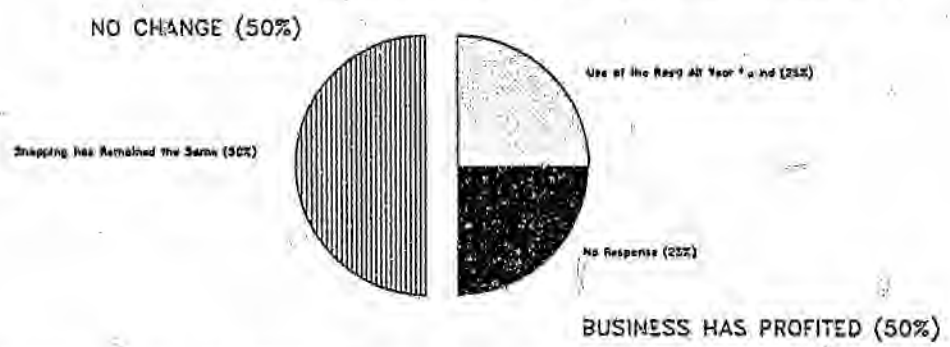
the use of the road all year round (3%).

22,2% of businesses felt the road had not benefited their business. 5.6% said that shopping had remained the same and a further 5,6% said that shopping had decreased.

i. Libode gravel road

A decrease in business activity, together with a response of "no effect" was identified as the greatest effect of the improved road on business [Figure 6.67]. Figure 6.72 graphically represents the effect of the road on business profit and the perceived reasons for such a change.

FIGURE 6.72 : THE EFFECT OF THE LIBODE ROAD ON BUSINESS PROFIT [GRAVEL ROAD BUSINESS][ALB18.1/18.2/18.3]



Only 25% of business respondents felt that road improvements had benefited their businesses, the reason for the improvement was the use of the road throughout the year. The size of the adverse effect on business is indicated by the decrease in the size to the turnover. 75% of businesses felt the road had not benefited their business. The average business turnover decreased over the past two years by 8,75%_[Table ALB18.1]. 50% said that shopping had remained the same and the remainder could not provide a suitable answer.

iii Discussion

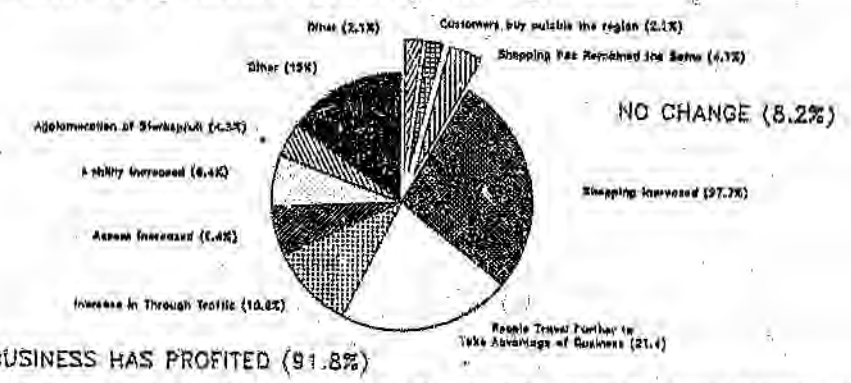
It is evident from the findings above that businesses located

alongside the tarred road benefited positively from the road improvement. On the other hand businesses located along the gravel road were adversely affected. Businesses benefited in two ways - an increase in business profit and a decrease in business operation costs. The findings above suggest that it is easier to get to shops alongside the tarred roads and the subsequent patronage is at the expense of local shops.

c. Sterkspruit road

Improved business activity was the second most important effect identified by business respondents of the improved road. Figure 6.73 graphically represents the effect of the road on business profit and the perceived reasons for such a change.

FIGURE 6.73 : THE EFFECT OF THE STERKSPRUIT ROAD ON BUSINESS PROFIT [ASB18.1/18.2/18.3]



91,8% of business respondents felt that road improvements had benefited their business. The size of the benefit to business is indicated by the increase in the size of the turnover. Business turnover increased over the past two years by 25,41% [Table ASB18.1]. Reasons for this increase included an increase in shopping (27,7%), an increase in travel distance to business centres (21,4%) and an increase in "through" traffic (10,6%). Other reasons of note included increased access to the business centre (6,4%) an increase of mobility (6,4%) and the attractions and other spin-off effects of agglomeration at Sterkspruit (4,3%).

8,2% of businesses felt that the road had not benefited their business. The reasons for no change in business profit were that shopping had remained the same (4,1%) and customers were buying from outside the region (2,1%).

d. Discussion

It is evident from the Libode survey that businesses located alongside the tarred road profitted while businesses located alongside the gravel road were adversely affected. Furthermore businesses located in the Sterkspruit region have benefited profitably from the road improvements. Road improvements result in increased accessibility [accessibility from surrounding regions and accessibility to "through" traffic] and increased mobility [ability of people to get to the towns of Sterkspruit and Libode, travel longer distances and more frequently] both of which result in increased business activity. The extent of the benefit to business depends on local circumstances. Section 6.5.6 discusses in greater detail how Sterkspruit acts as a self-sufficient economic region resulting in little leakage of revenue from the region whereas in the Libode region, the road improvement, results in a large amount of leakage. Local circumstances in the Sterkspruit region promote business growth, hence the large increases in profitability while local circumstances in the Libode region tend to retard business growth, hence the smaller increase in profitability. It can therefore be concluded that the surfacing of the Sterkspruit and Libode roads has benefited business within the area and is one of the reasons for rapid business growth within the two regions.

6.5.5 The effect of the road on deliveries

a. Literature review

Surfaced road conditions attract an increasing number of passenger and goods vehicles. [Section 4.1]

b. Libode Road

i. Libode tarred road

An important facet of business operation is the continual replacement of purchased goods. Goods are replaced either by fetching goods or through delivery to the store. Figure 6.74 and Figure 6.75 graphically illustrate the effect of the road improvements on the frequency of delivery service and the quality of delivery service.

FIGURE 6.74 : THE EFFECT OF THE LIBODE ROAD ON THE FREQUENCY OF DELIVERY SERVICE [TARRED ROAD BUSINESSES]
[ALB15.1/15.2/15.3]

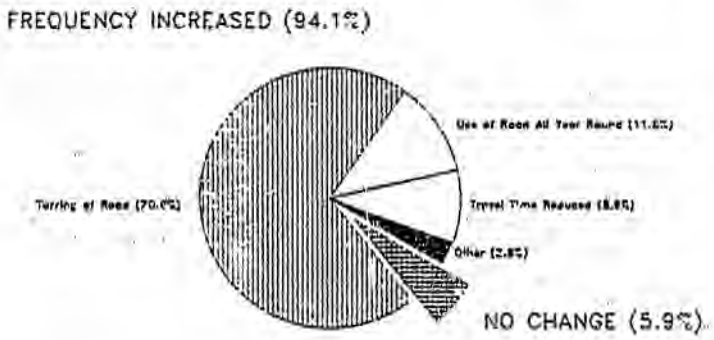
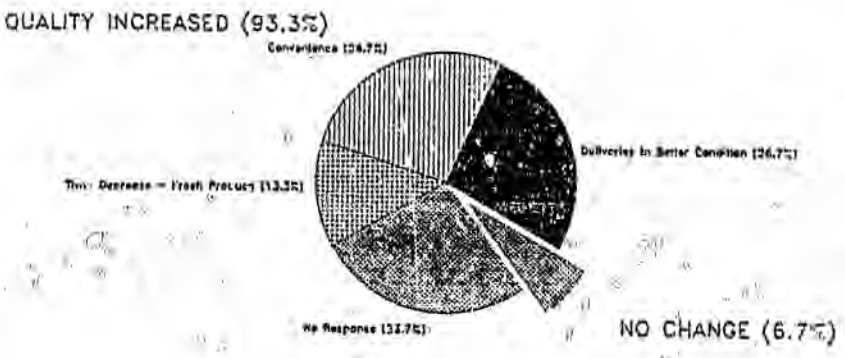


FIGURE 6.75 : THE EFFECT OF THE LIBODE ROAD ON THE QUALITY OF DELIVERY SERVICE [TARRED ROAD BUSINESSES]
[ALB16.1/16.2/16.3]

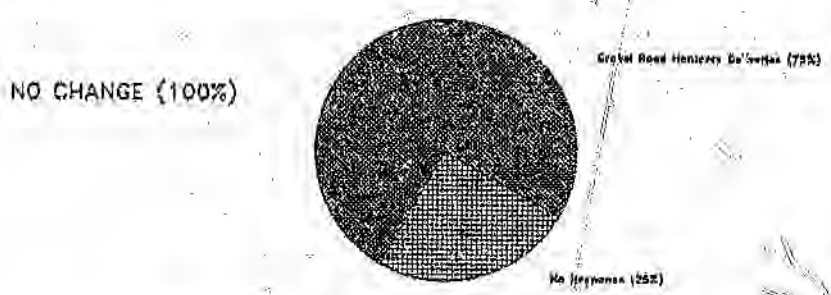


94,1% of businesses considered the frequency of delivery service to have improved [Figure 6.74] Reasons for frequency improvement were the tarring of the road (70,6%), the use of the road throughout the year (11,8%) and travel time reductions (8,9%). In contrast 5,9% of businesses have not experienced a change in the frequency of delivery service. 93,3% of businesses felt the quality of delivery service had improved [Figure 6.75]. The reasons given for an increase in the quality of delivery service are deliveries in better condition (26,7%), convenience for deliveries (26,7%) and travel time reductions resulting in fresher produce (13,3%).

ii. Libode gravel road

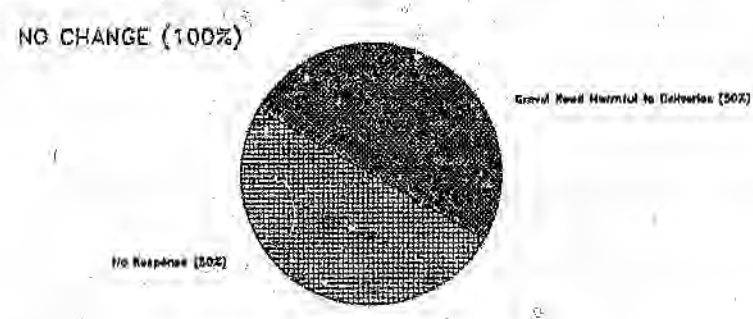
Figure 6.76 and Figure 6.77 graphically illustrate the effect of the road improvements on the frequency of delivery service and the quality of delivery service.

FIGURE 6.76 : THE EFFECT OF THE LIBODE ROAD ON THE FREQUENCY OF DELIVERY SERVICE [GRAVEL ROAD BUSINESSES]
[ALB15.1/15.2/15.3]



No business considered the frequency of delivery service to have improved [Figure 6.76]. The reason for no change in the frequency of deliveries was because the old, untarred road hampers delivery. Furthermore no business felt the quality of delivery service had improved [Figure 6.77]. Again the reason for no change in the quality of delivery service was because the old, untarred road hampers deliveries.

FIGURE 6.77 : THE EFFECT OF THE LIBODE ROAD ON THE QUALITY OF DELIVERY SERVICE [GRAVEL ROAD BUSINESSES] [ALB16.1/16.2/16.3]



iii. Discussion

It is evident from the findings that improved road conditions increase both the frequency and quality of delivery services. Furthermore it is also evident from the findings that businesses are reluctant to deliver on gravel roads, thereby forcing businesses located on gravel roads to fetch goods.

c. Sterkspruit road

Figure 6.78 and Figure 6.79 graphically illustrate the effect of the road improvements on the frequency of delivery service and the quality of delivery service.

FIGURE 6.78 : THE EFFECT OF THE STERKSPRUIT ROAD ON THE FREQUENCY OF DELIVERY SERVICE [ASB15.1/15.2/15.3]

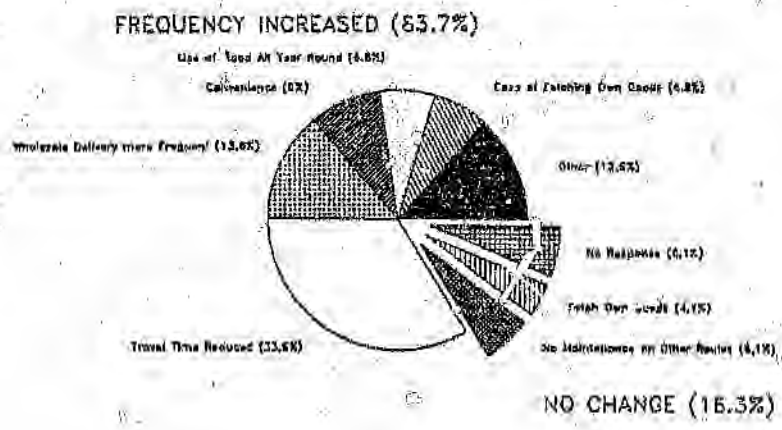
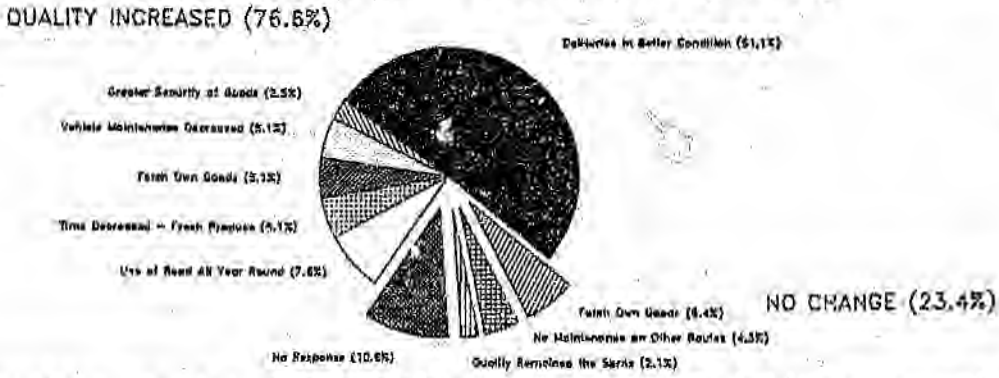


FIGURE 6.79 : THE EFFECT OF THE STERKSPRUIT ROAD ON THE QUALITY OF DELIVERY SERVICE [ASB16.1/16.2/16.3]



83,7% of businesses considered the frequency of delivery service to have improved [Figure 6.78]. Reasons for frequency improvement were travel time reductions (33,9%), an increase in number of deliveries (13,6%), convenience for delivery (9%), the use of the road throughout the year (6,8%) and ease of fetching own goods (6,8%). In contrast 16,3% of businesses have not experienced a change in the frequency of delivery service. 4,1% of businesses fetched their own goods and 6,1% were located along gravel routes that are not maintained and on which firms are reluctant to deliver. This substantiates the finding that road improvements lead to an increase in delivery. 76,6% of businesses felt the quality of delivery service had improved [Figure 6.79]. The reasons given for an improvement in the quality of delivery service are deliveries are in better condition (51,1%) and the use of the road throughout the year (7,6%). Reasons of lesser importance included travel time reductions resulting in fresher produce (5,1%) and ease of fetching own goods (5,1%).

d. Discussion

It is evident from the findings that improved road conditions increase the ability to deliver as well as the frequency and quality thereof.

6.5.6 The effect of the road on the development of the region

a Literature review

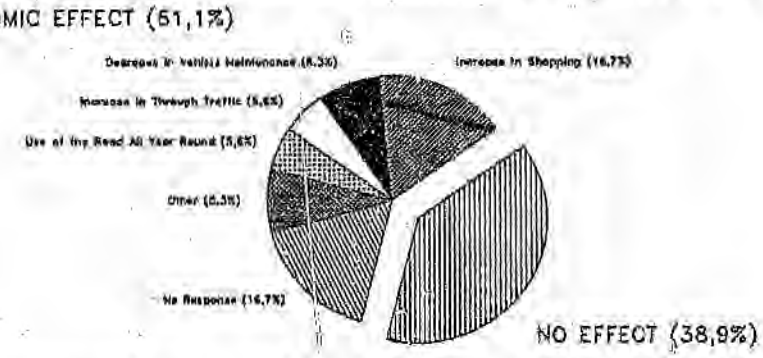
Improvements to rural road infrastructure have noticeable economic and non-economic impacts on the surrounding communities. It is accepted that there is a close relationship between transport and development and that transport is one component of an integral package needed for economic development. [Section 2.4.7]

b. Libode Road

i. Libode tarred road

Figure 6.80 graphically represents the perceived effect of the road improvement on the region.

FIGURE 6.80 : THE ECONOMIC EFFECT OF THE LIBODE ROAD ON THE REGION [TARRED ROAD BUSINESSES][ALB10/11]

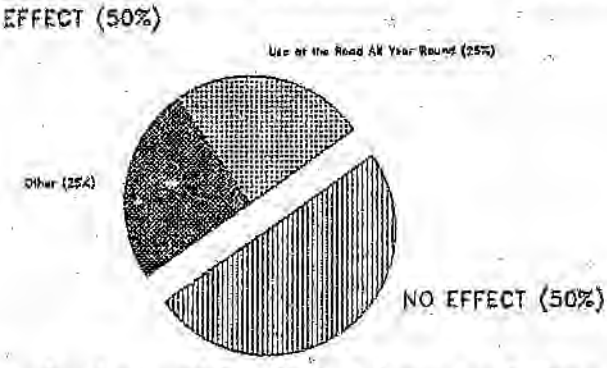


61,1% of business respondents said that the road has a positive economic effect on the region. Road improvements benefit the region in two major ways - an increase in business activity (16,7%), and an increase in advantages directly related to the road (19,5%). The former contains increased shopping (16,7%) and the latter contains advantages such as a decrease in vehicle maintenance (8,3%), the use of the road throughout the year (5,6%) and an increase in through traffic (5,6%).

ii. Libode gravel road

Figure 6.81 graphically represents the perceived effect of the road improvement on the region.

FIGURE 6.81 : THE ECONOMIC EFFECT OF THE LIBODE ROAD ON THE REGION [GRAVEL ROAD BUSINESSES][ALB10/11]



50% of business respondents said that the road has a positive economic effect on the region. The most important economic effect identified by 25% of business respondents was the use of the road throughout the year. The reliability of roads to business is discussed in Section 6.5.10.

iii. Discussion

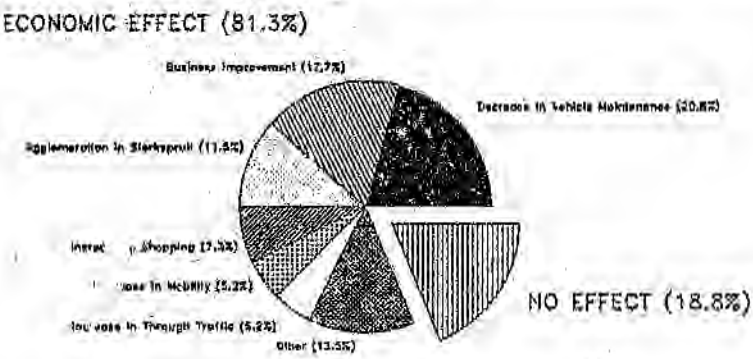
It can be concluded from the findings above that approximately half of business respondents on the gravel road and on the tarred road perceived the road to have a positive economic effect on the region. Improvements to the road affected the region economically in two major ways - an increase in business activity and an increase in advantages to road users. The reader must bear in mind that this question was directed towards the effects of the road on the region and not simply the specific area of business location. The actual effects of the road on business has been discussed in Sections 6.5.4.

c. Sterkspruit Road

Figure 6.82 graphically represents the perceived effect of the road improvement on the region. 81,3% of business respondents said that the road has a positive economic effect on the region. Road improvements benefit the region in two major ways - an increase in business activity (36,5%) and an increase in advantages directly related to the road (31,2%). The former contains improved business (17,7%) agglomeration of Sterkspruit (11,5%), and

increased shopping (7,3%). The latter contains advantages such as decreased vehicle maintenance (20,8%), increase in mobility (5,2%) and increase in "through" traffic (5,2%).

FIGURE 6.82 : THE ECONOMIC EFFECT OF THE STERKSPRUIT ROAD ON THE REGION [ASB10/11]



d. Discussion

It is evident from the findings above that road improvements are perceived to benefit the two regions in an economic way. The Sterkspruit region tends to benefit to a greater extent as opposed to the Libode region. The reasons for the greater economic effect are discussed in the following section. Furthermore it is evident from the findings that the regions benefit from the road improvement in two major ways - a benefit due to the increase in business activity and a benefit due to the advantages to road users [vehicle maintenance savings, time savings, cost savings, through traffic, access and mobility], the latter influencing the extent of the former in two ways. Firstly business operating costs are reduced and secondly mobility and access influence the movement of shoppers.

6.5.7 The effect of the road on the ability to compete with business outside the region.

a. Literature review

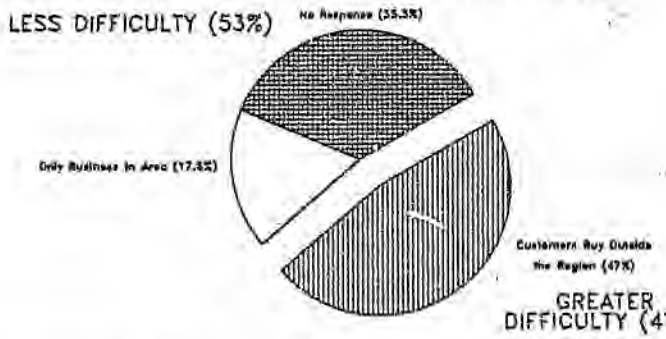
No known literature

b. Libode Road

i Libode tarred road

Figure 6.83 graphically represents the ability of business to compete outside the region.

FIGURE 6.83 : THE EFFECT OF THE LIBODE ROAD ON THE ABILITY OF BUSINESS TO REMAIN COMPETITIVE [TARRED ROAD BUSINESSES][ALB24.1/24.2/24.3]



Of the 53% of business respondents who found it less difficult to compete with business from outside the region, 17,7% said it was because they were the only type of business in the area. The other 35,4% could not identify reasons for this perception. On the other hand the 47% who found it more difficult to compete with business outside the region said so because they felt that customers were buying outside the region. Respondents were asked the effect of the road improvement on the distance of travel of shoppers. Table 6.61 illustrates the results.

TABLE 6.61 : THE EFFECT OF THE LIBODE ROAD ON DISTANCE OF TRAVEL [ALB6]

	New Road		Old Road	
	No.	%	No.	%
People travel further to take advantage of business	13	72,2	1	25
People do not travel further to take advantage of business	5	27,8	3	75
TOTAL	18	100	4	100

72,2% of businesses said people travel further to take advantage of their store. Thus improved road conditions have expanded the catchment area of business located along the tarred road. In the same way centres located outside the region have extended their catchment areas. Respondents were specifically asked where the majority of people do their shopping. The results are illustrated in Table 6.62.

TABLE 6.62 : PLACES WHERE THE BULK OF COMMUNITY SHOPPING IS DONE - LIBODE ROAD [ALB20]

	New Road		Old Road	
	No.	%	No.	%
Locally	5	31,3	1	25
Libode	3,5	21,9	1,5	37,5
Umtata	7,5	46,9	1,5	37,5
No response	2			
TOTAL	18	100	4	100

46,9% identified Umtata as the centre where the majority of shopping is done. This confirms the above findings that 47% of businesses find it more difficult to compete due to customers buying at other centres outside the region. More importantly however is where businesses operating within the region spend consumer money. For this reason respondents were also asked from which towns was the majority of stock bought. The results are illustrated in Table 6.63. 94,4% of businesses bought stock from Umtata.

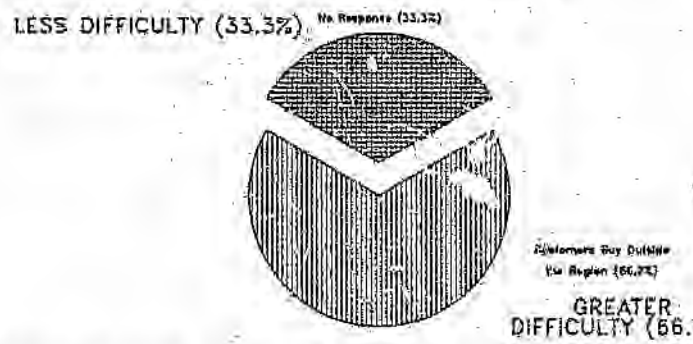
TABLE 6.63 : PLACES WHERE THE BULK OF BUSINESS SHOPPING IS DONE - LIBODE ROAD [ALB14]

	New Road		Old Road	
	No.	%	No.	%
Umtata	17	94,4	4	100
Kokstad	1	5,6	0	
TOTAL	18	100	4	100

ii Libode gravel road

Figure 6.84 graphically represents the abilit of businesses to compete outside the region.

FIGURE 6.84 : THE EFFECT OF THE LIBODE ROAD ON THE ABILITY OF BUSINESS TO REMAIN COMPETITIVE [GRAVEL ROAD BUSINESSES][ALB24.1/24.2/24.3]



Businesses generally found it more difficult to compete. 33% of business respondents found it less difficult to compete with business from outside the region, the reasons being they are the only type of business in the area. On the other hand the 66% found it more difficult to compete with business outside the region because they felt that customers were buying outside the region. Respondents were asked the effect of the road improvement on the distance of travel of shoppers. Table 6.61 illustrates the results. Only 25% of businesses said people travel further to take advantage of their store. Respondents were specifically asked where the majority of people do their shopping. The results are illustrated in Table 6.62. 75% of people buy from outside the local area and 37,5% identified Umtata as the centre where the majority of shopping is done. This reinforces the above findings that 66,7% of businesses find it more difficult to compete due to customers buying at other centres outside the region. More importantly however is where businesses operating within the region spend consumer money. For this reason respondents were also asked from which towns was the

majority of stock bought. The results are illustrated in Table 6.63. 100% of businesses bought stock from Umtata.

iii. Discussion

It is evident from the findings above that the road improvement has created greater access to other centres, particularly Umtata. More than half of businesses find it difficult to compete with businesses in the surrounding regions, the businesses located along the gravel road being the most severely affected. The reason attributed to greater difficulty in competing is that customers buy at other centres. This suggests that improved road conditions encourage greater distance travel and more frequent travel [Sections 6.3.2 and 6.4.4]. The Libode town has expanded its catchment area to the detriment of business located along the gravel road. In the same way Umtata has expanded its catchment area to the detriment of the Libode region. This suggests that the Libode region is a sub-region within the larger Umtata region. The Libode region is subservient to the larger region and there is a large amount of revenue leaking from the region in terms of both bulk good revenue and consumer good revenue. The multiplier effect within the region is therefore very small and the long term development of the region looks bleak. Thus the road improvement in the Libode region has increased the catchment area of the Umtata region at the economic expense of the Libode sub-region.

c. Sterkspruit Road

Figure 6.85 graphically represents the ability of business to compete outside the region. 64,7% of business respondents found it less difficult to compete with business from outside the region. The reasons given all relate to the advantages of the town of Sterkspruit. 22,4% of businesses said so because they are the only type of business in the area. Other reasons included increased shopping (12,4%), the ability of residents to travel further to reach shops (10%) greater variety of shops and the agglomeration benefits of the town of Sterkspruit (12,4%).

Only 35,3% found it more difficult to compete with business outside the region the main reason being that customers were buying outside the region.

FIGURE 6.85 : THE EFFECT OF THE STERKSPRUIT ROAD ON THE ABILITY OF BUSINESS TO REMAIN COMPETITIVE [ASB24.1/ 24.2/24.3]

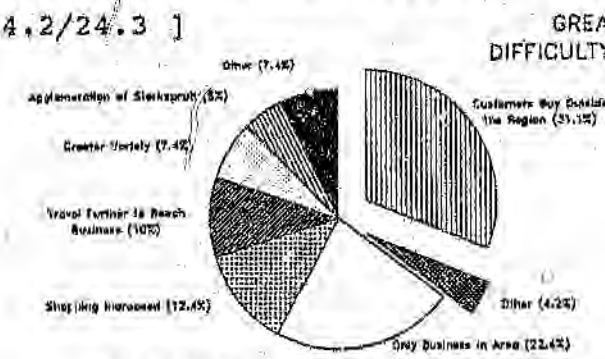


TABLE 6.64 : THE EFFECT OF THE STERKSPRUIT ROAD ON DISTANCE OF TRAVEL [ASB6]

	No.	%
People travel further to take advantage of business	40	78,4
People do not travel further to take advantage of business	11	21,6
TOTAL	51	100

Respondents were asked the effect of the road improvement on the distance of travel of shoppers. Table 6.64 illustrates the results. 78,4% of businesses said people travel further to take advantage of their store located in Sterkspruit. Respondents were specifically asked where the majority of people do their shopping. The results are illustrated in Table 6.65. 82,6% said that the majority of shopping was done at Sterkspruit. Only 17,4% said shopping was done outside the region - 8,7% at Aliwal North, 3,3% at Lady Grey and 5,4% at other centres. More importantly however is where businesses operating within the region spend consumer money. For this reason respondents were also

asked from which towns was the majority of stock bought. The results are illustrated in Table 6.66. 30,3% of respondents said they bought their stock from businesses within the Sterkspruit agglomeration. The majority (69,7%) of businesses bought the majority of their stocks from towns outside the Sterkspruit region - the largest contributors were the Orange Free State (31,3%) and the Cape Province (24,1%).

TABLE 6.65 : PLACES WHERE THE BULK OF COMMUNITY SHOPPING IS DONE - STERKSPRUIT ROAD [ASB20]

	No.	%
Sterkspruit	38	82,6
Aliwal North	4	8,7
Lady Grey	1,5	3,3
Other	2,5	5,4
No response	5	
TOTAL	51	100

TABLE 6.66 : PLACES WHERE THE BULK OF BUSINESS SHOPPING IS DONE - STERKSPRUIT ROAD [ASB14]

	No.	%
Orange Free State	15,3	31,3
Transkei - Sterkspruit	14,8	30,3
Cape	11,8	24,1
Transvaal	3,5	7,1
Other (R.S.A.)	3,5	7,1
No response	2	
TOTAL	51	100

d. Discussion

Evidence above suggests that the Sterkspruit region acts as a self sufficient economic region for local residents where travel concentrates on the town of Sterkspruit [Section 6.4.4] with relatively little local residents' revenue escaping to the surrounding regions. Moreover, approximately one third of businesses bought their stock from businesses within the Sterkspruit agglomeration. The Sterkspruit region therefore,

acts as a self-sufficient economic region for local business to a limited extent with a considerable amount of business revenue leaking from the region. The multiplier effect within the region has the potential to sustain long term economic development. In summary, the improvement of the Sterkspruit road resulted in the expansion of the catchment area of business located in the town of Sterkspruit increasing profitability. The agglomeration and expansion of the town of Sterkspruit enhances the attraction of Sterkspruit as a regional centre.

In the Libode region the opposite seems to have occurred. The Libode region tends to be a sub-region within the larger Umtata region and plays a subservient role to the larger region. Frequent travel, particularly to Umtata, is made to towns outside the region [Section 5.4.4]. This results in a large amount of resident and business revenue leaking from the region. The improvement of the road in this region has expanded the catchment area of the Umtata region at the economic expense of the Libode region. The relatively smaller economic effect of the road improvement on the region compared to the Sterkspruit region was identified by local business respondents. Owing to the large amount of leakage the resultant multiplier effect is small resulting in slow economic development.

It can therefore be concluded that the extent of effects of road improvements on the economic development of a region depends on local circumstances in terms of the social, demographic, economic and geographic setup. Road improvements can open up a region and further economic expansion or allow access to a region so that it becomes economically sub-servient to a larger region. Improved road conditions do however have an important role in the furthering of economic development but local circumstances and other factors have an important role to play in sustaining economic development.

6.5.8 The effect of the road on cost

a. Literature review

Improvements to rural road infrastructure reduces vehicle operating costs. [Section 4.1]

b. Libode Road

i. Libode tarred road

Table 6.67 deals with two aspects of cost - cost savings and the willingness to pay for the cost savings.

TABLE 6.67 : THE EFFECT OF THE LIBODE ROAD ON TRANSPORT COSTS AND THE PREPARDENESS OF BUSINESS TO PAY TOWARDS CONSTRUCTION COSTS OF THE ROAD [ALB21/22]

	Road results in cost savings				Road has no cost savings			
	New Road		Old Road		New Road		Old Road	
	No.	%	No.	%	No.	%	No.	%
Prepared to pay	10	55,5			2	11,1	3	75
Not prepared to pay	4	22,2	—	—	2	11,1	1	25
TOTAL	14	77,8	0	0	4	22,2	4	100

78,8% of business respondents felt that the improved road resulted in cost savings. More importantly are the 66,6% who are prepared to pay towards the cost of the road improvements.

ii Libode gravel road

Table 6.67 illustrates cost savings and the willingness to pay for the cost savings. No businesses felt that the improved road resulted in cost savings to them. 75% were prepared to pay towards the cost of the road improvements.

iii Discussion

Businesses located alongside the gravel road obviously could not gain any cost savings from the tarred road. The advantages and benefits of the tarred road are so great that businesses without it are prepared to pay for the advantages associated with it.

c. Sterkspruit Road

Table 6.68 deals with two aspects of cost.

TABLE 6.68 : THE EFFECT OF THE STERKSPRUIT ROAD ON TRANSPORT COSTS AND THE PREPARDENESS OF BUSINESS TO PAY TOWARDS CONSTRUCTION COSTS OF THE ROAD [ASB21/22]

	Road Results in Cost Savings		Road has no Cost Savings	
	No.	%	No.	%
Prepared to pay	32	64	1	2
Not prepared to pay	12	24	5	10
TOTAL	44	88	6	12

88% of business respondents felt that the improved road resulted in cost savings. More importantly however, are the 66% who are prepared to pay towards the cost of the road improvements.

d. Discussion

It is evident from the findings above that road improvements result in cost savings for businesses. Moreover businesses are prepared to pay towards the cost of road construction. Business could therefore make an important contribution to the financing of roads.

6.5.9 The effect of the road on government services

a. Literature review

Improvements to rural road infrastructure result in further government investment. [Section 4.12]

b. Libode Road

i. Libode tarred road

Table 6.69 indicates that 56,3% of business respondents perceive government services and investment have increased since the road has been tarred. The greatest improvement in government services following the road improvement was in clinics and health facilities (33,3%) and electricity (33,3%) followed by defense and police (16,7%), water reticulation (11,1%) and agricultural extension officers (5,6%). [Table ALB 13]

TABLE 6.69 : THE EFFECT OF THE LIBODE ROAD ON GOVERNMENT SERVICES [ALB12]

	New Road		Old Road	
	No.	%	No.	%
Government services have improved	9	56,3		
No change in government services	7	43,8	4	100
No response	2			
TOTAL	18	100	4	100

ii. Libode gravel road

Table 6.69 indicates that business respondents located along the gravel road did not perceive any further government assistance.

iii. Discussion

The findings above are consistent with the literature which suggests that further government assistance typically follows road improvements. Furthermore no further governmental assistance was given to the communities in the gravel road zone of influence. Thus not only did these communities suffer from the adverse effects associated with the rerouting but they received little compensation in the form of governmental assistance.

c. Sterkspruit road

Business respondents expected government services to improve following the road improvement [Figure 6.70] but it was not seen as a significant effect of the road improvement [Figure 6.69].

TABLE 6.70 THE EFFECT OF THE STERKSPRUIT ROAD ON GOVERNMENT SERVICES [ASB12]

	No.	%
Government services have improved	29	56,9
No change in government services	22	43,1
TOTAL	51	100

Table 6.70 indicates that 56,3% of business respondents believe government services and investment have increased since the road has been tarred. The greatest improvement in government services

[identified by 34,6% of respondents] was the administration of the government. Other improvements identified included clinics and health (21,2%), water (15,4%), agricultural extension services (10,4%) and electricity (8,8%). [Table ASB13].

d. Discussion

The findings above suggest that further government assistance typically follows road improvements. The type of assistance is very "area specific" and related to the problems, opportunities and constraints of the particular area.

6.5.10 The extent of the reliability of roads

a. Literature review

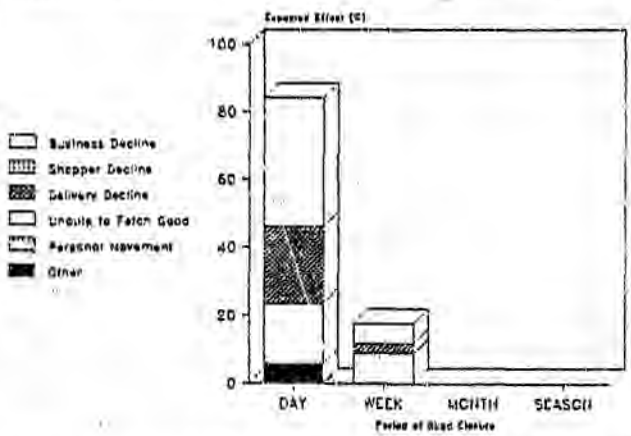
No known literature

b. Libodé Road

i. Libode tarred road

Figure 6.86 graphically illustrates the reasons for inconvenience of road closure over a period of one day to a period of one season of the year.

FIGURE 6.86 : INCONVENIENCE OF ROAD CLOSURE - LIBODE ROAD
[TARRED ROAD BUSINESSES][ALB17 (NEW)]



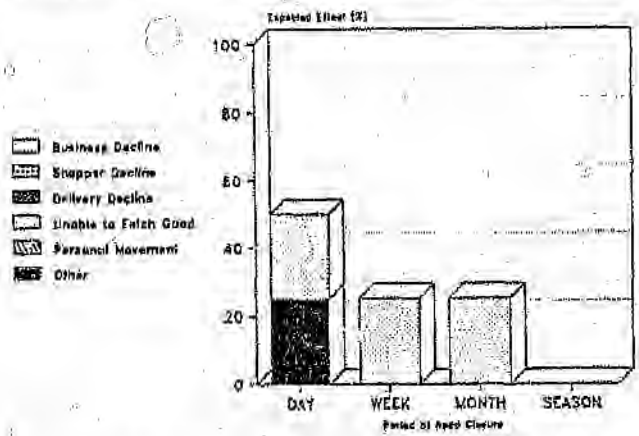
82,4% of businesses would be inconvenienced if the road was closed for one day. The reasons for inconvenience relate to the decline in business (38,2%), the inability to receive deliveries

(20,6%) and the inability to fetch goods (17,6%). All businesses would be inconvenienced for the same reasons if the road in question was closed for a period of one month of the year. Overall reasons for inconvenience were for business decline (44,1%), delivery decline (23,5%), and the inability to fetch goods (26,4%).

ii. Libode gravel road

Figure 6.87 graphically illustrates the reasons for inconvenience of road closure over a period of one day to a period of one season of the year.

FIGURE 6.87 : INCONVENIENCE OF ROAD CLOSURE - LIBODE ROAD
[GRAVEL ROAD BUSINESSES][ALB17 (OLD)]



50% of businesses would be inconvenienced if the road was closed for one day. The reason for inconvenience relates to the inability to fetch goods (25%). 75% of businesses would be inconvenienced for the same reasons if the road in question was closed for a period of one month of the year. The overall reasons for inconvenience was the inability to fetch goods (75%).

iii. Discussion

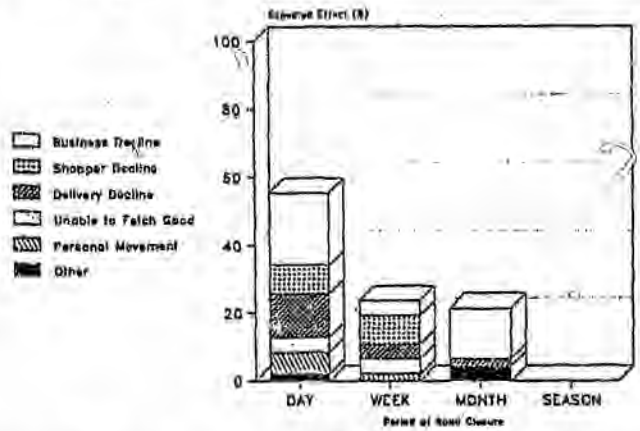
Reliable roads are necessary for both business operation and for shoppers to get to stores. Businesses on the tarred road require a reliable road for both delivery and fetching of goods. As businesses are reluctant to deliver on gravel roads, businesses

located on the gravel road require a reliable road for the purpose of fetching goods. Moreover businesses located on the gravel road are dependent on local trade and are therefor not so dependent on continual vehicle access.

c. Sterkspruit Road

Figure 6.88 graphically illustrates the reasons for inconvenience of road closure over a period of one day to a period of one season of the year.

FIGURE 6.88 : INCONVENIENCE OF ROAD CLOSURE - STERKSPRUIT ROAD [ASB17]



51,3% of businesses would be inconvenienced if the road was closed for one day. The reasons for inconvenience relate to the decline in business (20,4%), the inability to receive deliveries (12,6%), the restriction on personal movement (6,1%), the decline in shoppers (8,2%) and the inability to fetch goods (4,1%). 75,5% of businesses would be inconvenienced for similar reasons if the road in question was closed for a period of one week of the year and all businesses would be inconvenienced if the road was closed for a period of one month of the year. Overall reasons for inconvenience were for business decline (38,8%), delivery decline (18,3%), shopping decline (16,4%), the inability to fetch goods (8,2%) and the restriction of personal movement (6,1%).

d. Discussion

It is evident from the findings above that reliable roads are both necessary for business operation and the ability of customers to gain access to stores. This suggests that a reliable road performs an important role in the development of the business sector and is one of the reasons for rapid business growth within the two regions.

6.5.11 Summary

- improved road conditions are a contributory factor in the choice of business location. The advantages of roadside location has limited effects on the attraction of established business within the area.
- businesses located along the gravel road were adversely affected by the tarring of the Libode road. Businesses located along the tarred road benefited to a large extent from the road improvement. These effects have been attributed to the attraction of traffic to the tar road and the resultant lack of continuous vehicular traffic on the gravel road. The culmination of adverse effects has resulted in a decrease in business activity for businesses located along the gravel road. On the other hand road improvements result in two major benefits to business - an increase in business activity influenced by an increase in mobility and access [accessibility from surrounding regions and accessibility to "through" traffic and the ability, through the availability of transport, of local residents to reach activity centres, travel longer distances and more frequently], the latter complementing the former to the extent of increasing business activity and profitability and secondly in decreasing business operating costs [in terms of transportation of goods].
- the extent of benefit to business depends on local circumstances in terms of social, demographic, economic and geographic set-up and road improvements can open up a region and further economic expansion or allow access to a region so that it

becomes economically subservient to a larger region.
- improved road conditions have an important role in furthering economic development but local circumstances and other factors have an important role to play in sustaining economic development
- in the Sterkspruit region the road improvement has expanded the catchment area of the town of Sterkspruit resulting in increasing profitability and potential to sustain long term economic development in the region.
- in the Libode region the road improvement has expanded the catchment area of the Umtata region and the region becomes a sub-region within the larger Umtata region. This has resulted at the economic expense of the Libode region, and hence smaller increases in business activity experienced by business respondents in the area.
- road improvements increase both the frequency and quality of delivery services.
- further government assistance typically follows road improvements.
- reliable roads are very important to business operation in terms of delivery and fetching of goods and for the ability of customers to gain access to stores.

CONCLUSIONS AND RECOMMENDATIONS

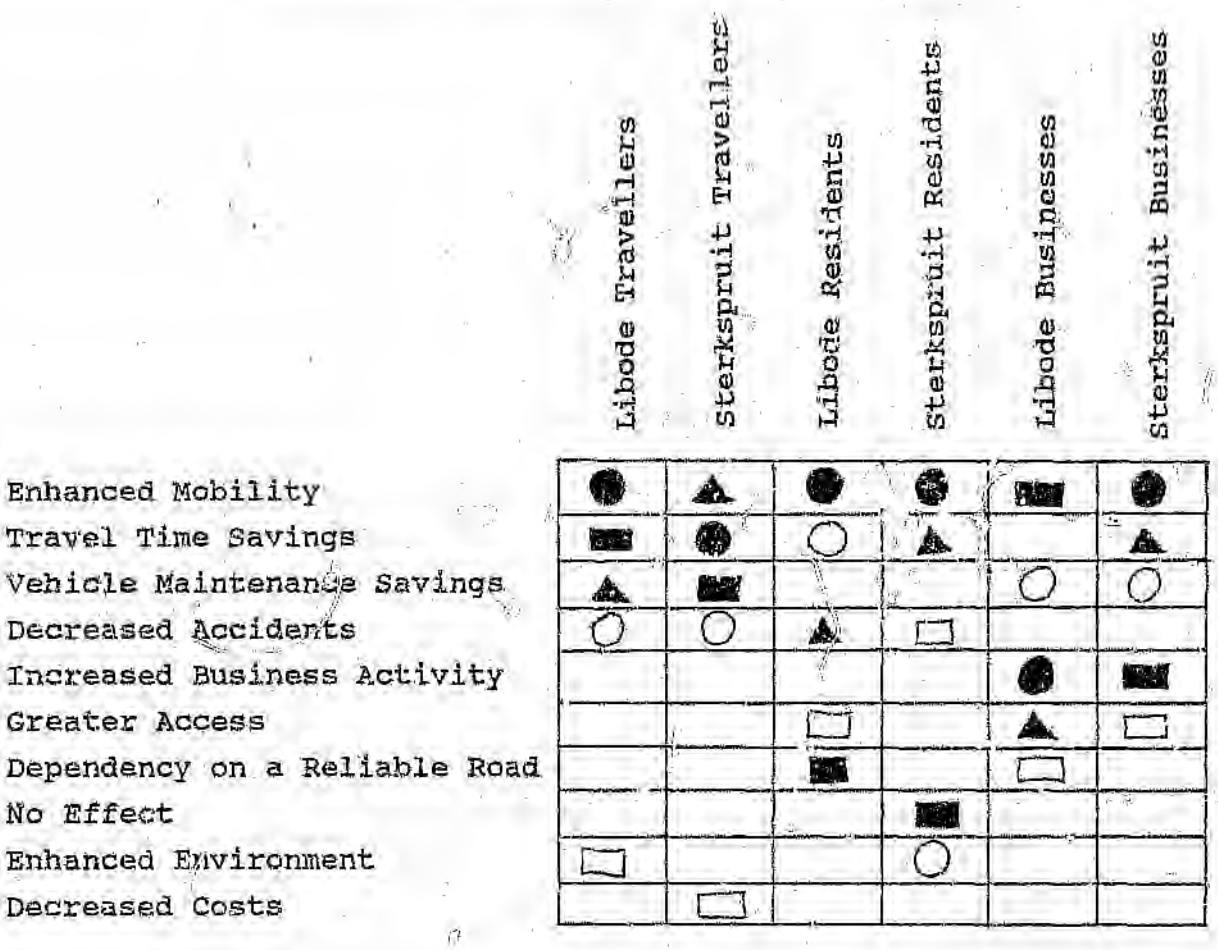
The study concentrated on determining the most important effects of additions and improvements to rural road infrastructure. An attempt to review a wide range of circumstances was therefore made. The study analysed two areas with differences in respect to regional location, physiographic characteristics and road traits [the effect of route realignment in the one area and improved conditions in the other]. Furthermore three groups within the rural community were identified [travellers, businesses and local inhabitants] and differences within this categorisation analysed.

In the preceeding Chapters it has been shown that a wide range of effects is perceived by local inhabitants and businesses, and these effects have been attributed to road infrastructure improvements in the region. An analysis of literature on the effects of additions and improvements to rural road infrastructure suggests a finite number of resultant effects. The results of the findings show that local communities perceive a **wide range of effects,** more than the literature initially indicated. Furthermore the **emphasis** on particular effects has largely been shown to be **different.**

Travellers, residents and businesses located alongside the road clearly benefited from the improved road conditions. Many of the benefits have been attributed to the primary effects of the road and the constant supply of vehicular traffic attracted to the road. Important effects as identified by the traveller, resident and business are discussed below. In the Libode region, **route realignment has caused many adverse effects for residents and businesses** located along the old route. The adverse effects have

been attributed to the lack of vehicular traffic and benefits associated with such traffic. The effects of road infrastructure therefore have significant social, economic and political ramifications and the transportation planner should be conscious of decisions made and the resultant actions which may occur.

TABLE 6.71 : SUMMARY OF THE MOST IMPORTANT EFFECTS OF IMPROVING THE LIBODE AND STERKSPRUIT ROADS AS PERCEIVED BY TRAVELLERS, RESIDENTS AND BUSINESSES



KEY :

- Most important effect
- Second most important effect
- Third most important effect
- Fourth most important effect
- Fifth most important effect

Table 6.71 is a summary of the five most important effects as perceived by the three targeted groups. The overwhelming effect identified by **all the respondents is enhanced mobility** ie. the ability to travel. Enhanced mobility is followed in importance by **travel time savings, vehicle maintenance savings, decreased accidents and increased business activity.** There are however significant differences in the perceptions of the three groups. The effects perceived by each particular group is discussed below.

The greatest effects identified by the **travellers** are those effects taken into account by techniques currently used in ex-ante evaluation of road projects by transportation planners in South Africa. The effects identified were **travel time savings, vehicle maintenance savings, accident savings and an increase in travel activities.**

The greatest effect identified by **residents** is **mobility** [the availability of transport for travel]. **Direct benefits of the road improvement** [eg increase in access, decrease in travel times, the use of the road throughout the year] are perceived as the next group of important effects. **Other secondary effects** of the road improvement are perceived to a limited extent only.

The greatest effects identified by **businesses** can be divided into two main groups. Firstly the road has an effect of decreasing business operating costs in terms of the transportation of goods and involves the **same effects as those identified by the traveller** and taken into account by current evaluation techniques. The second group of benefits identifed by businesses are effects which increase business activity. **Access** [accessibility from surrouding regions and the accessibility to through traffic] and **mobility** [the ability, through the availability of transport, for local residents to reach activity centres, travel longer dis-

tances and more frequently], the latter complementing the former to the extent of increasing business activity and profitablity.

RECOMMENDATIONS

The study should not be seen as a once-off study but rather as a pilot study which will provide valuable information into the direction of further long-term and ongoing research in the evaluation of improvements and additions to rural road infrastructure and also provide base line data for future evaluations of the Libode and Sterkspruit Roads. It is therefore recommended that **ongoing research** to determine the effects of additions and improvements to rural road infrastructure **over time** be carried out and that future research be **concentrated on effects concluded to be important in this dissertation.**

It is recommended that future ex-ante evaluation not only includes easily quantifiable **direct effects of road improvements** [vehicle maintenance savings, time savings, operating savings and accident savings] but also the **effects associated with the availability of transport for travel as well as the effect of the additional road or improvement on the accessibility of the region.** The findings indicate that there are a wide range of **additional effects.** These effects should however be **excluded** from ex-ante evaluation due to their small effect and the complexity of incorporating such effects into a practical and workable evaluation technique.

It is recommended that further research into **evaluation techniques capable of incorporating the above effects** be undertaken so that similar projects in the future can be more effectively evaluated prior to project implementation resulting in a better decision. Consequently there is a need for futher investigation

into the measurement of the access and mobility and quantifying the effects thereof so that they can be meaningfully and successfully incorporated into the evaluation technique.

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TRAVEL PURPOSE SURVEY

INTERVIEWER'S NAME N Zikhangu
ZONE LOCATION Y TE23/07/1990

A RESEARCH STUDY DONE BY THE UNIVERSITY OF THE WITWATERSRAND IN CONJUNCTION WITH THE DEVELOPMENT BANK OF SOUTHERN AFRICA

1. VEHICLE TYPE :-

	Car
	Bakkie
✓	Taxi/Minibus
	Bus
	Truck
	Other [Specify] .....

2. NATURE OF PERSON BEING INTERVIEWED

✓	Driver
	Paying passenger
	Passenger

3. ORIGIN\DESTINATION :-

Where are you coming from ?
.....Bon.....

Where are you going ?
.....

4. MAIN TRIP PURPOSE :-

Why are you travelling ?

	Work
	Social & leisure
	Shopping
	Church
	Health
	Education
	Government
✓	Other [specify]

5. How often is "today's trip" made on this road ?

.... times a day
or .... times a week
or .... times a month
or .... times a year

6. Do you make more trips on this road now than you did two years ago ?

✓	YES
	NO

7. IF YES ASK : Why do you make more trips ?
.....

8. What do you think the greatest effects of the tarring of this road have been ?
.....

9. Since this road has been tarred have you experienced any cost savings ?

✓	YES
	NO

10. Would you be prepared to pay towards the road improvement ?

✓	YES
	NO

11. IF YES ASK : How much would you be prepared to pay ?
.....R10.....

12. Since this road has been tarred, have you experienced any time savings ?

✓	YES
	NO

13. Since the road has been tarred do you think there has been an increase or decrease in accidents ?

[ ]	INCREASE
[ ]	DECREASE
[✓]	NO CHANGE

14. IF INCREASE OR DECREASE ASK : In what types of accidents ? .....
.....
.....
.....

15. It is expected that roads reduce travel time, costs and accidents. What do you think the most important aspect is ?

[ ]	COSTS
[✓]	TRAVEL TIME
[ ]	ACCIDENTS

16. What is important about this road improvement to you ?
.....
.....
.....
.....

17. If this road was closed for ONE DAY a year would it inconvenience you ?

[✓] YES [ ] NO

IF YES ASK : How would this inconvenience you ? .....
.....
.....
.....

If this road was closed for ONE WEEK a year would it inconvenience you ?

[✓] YES [ ] NO

IF YES ASK : How would this inconvenience you ? .....
.....
.....
.....

If this road was closed ONE MONTH a year would it inconvenience you ?

[✓] YES [ ] NO

IF YES ASK : How would this inconvenience you ? .....
.....
.....
.....

If this road was closed for the rainy season of the year would it inconvenience you ?

[✓] YES [ ] NO

IF YES ASK : How would this inconvenience you ? .....
.....
.....
.....

18. IF DRIVER/OWNER ONLY ASK

Since the road has been upgraded do you think it saves you vehicle maintenance costs ?

[✓] YES [ ] NO

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RESIDENT IMPACT STUDY
LIBODE - MGWENYANA - TOMBO ROAD

INTERVIEWER'S NAME.....
ZONE LOCATION.....F.....DATE21/2/1990

A RESEARCH STUDY DONE BY THE UNIVERSITY OF THE WITWATERSRAND IN CONJUNCTION WITH THE DEVELOPMENT BANK OF SOUTHERN AFRICA

Hello. My name is C.S.N.GQELE We are conducting a study of the effects of road improvements and I would like to ask you a few questions. Are you willing to participate ?

OBSERVED OBSERVED OBSERVED OBSERVED OBSERVED OBSERVED OBSERVED

Age | 62 | Sex | M | | | M |

Family status or status in community ? Owner

OBSERVED OBSERVED OBSERVED OBSERVED OBSERVED OBSERVED OBSERVED

1. How long have you been living here ? ..1985.....

2. What day to day activities take up most of your time ?

[IF NOT FARMING OR ANY MONEY MAKING ACTIVITY GO TO QUESTION 15]

.....farming.....

[redacted]

3. IF FARMING ASK : Do you sell your produce ? | YES | | | NO | |

4. IF YES : Where do you sell your produce ? .....
ASK : Why do you sell your product at this place ? ...
.....N/A
.....

5. IF NO ASK : Why don't you sell your product ? Not ..... Sufficient to sell because the area of land I am using is too small for that extent.

6. What effect has the building of this road had on your agricultural production ?

| DECREASED | | INCREASED | | NO CHANGE | |

7. IF INCREASE OR DECREASE ASK : Why has the building of this road had an effect on your agricultural production ?
It is because of the transport facilities available in this area

8. Has the building of this road led to greater participation with agricultural extension officers ?

YES ✓		NO	

[redacted]

9. IF SOME TYPE OF ACTIVITY/COTTAGE INDUSTRY/MONEY MAKING ACTIVITY ASK : What is produced ? Vegetables

10. Is the product sold ?

YES		NO ✓	

11. IF YES : Where is the product sold ? .....
ASK : Why do you sell your product at this place ? N/A

12. IF NO ASK : Why don't you sell your product ? It is because of the land that I am using is not adequate

13. Has the building of the road had any effect on the production of this product ?

DECREASED		INCREASED ✓		NO CHANGE	

14. IF INCREASE OR DECREASE ASK : Why has the building of this road had an effect on your product production ?
Because of the transport facilities available

[redacted]

15. Were you or your family invclved in some type of employment in the construction of this road ?

YES		NO ✓	

16. If the opportunity arose would you or any member of your family like to be involved in the maintenance and upkeep of this road ?

YES ✓	
NO	

Specify giving reasons By doing labour because we do not want the road to be eroded again

17. Do you think there is more traffic this year than two years ago ?

YES ✓		NO	

18. Why do you think there is this change ? Because the road that had been improved

19. Do you make more trips now than two years ago ?

YES		NO	

N/A

20. IF YES ASK : Why do you make more trips ? N/A

21. How often per month do you make the following trips ?

TRIP PURPOSE	NUMBER OF TRIPS PER MONTH
Work	
Social & leisure	
Shopping	likely once a month
Church	
Education	
Health	~~2~~ any time
Government	
Other [SPECIFY]	

22. If this road was closed for ONE DAY a year would it inconvenience you ?

YES ✓	IF YES ASK : How would this inconvenience you ? Most of all it will affect my health i.e. transport / illness pregnancy to reach the Hospital
NO	

If this road was closed for ONE WEEK a year would it inconvenience you ?

YES ✓	IF YES ASK : How would this inconvenience you ? Shopping and health factors
NO	

If this road was closed for ONE MONTH a year would it inconvenience you ?

YES ✓	IF YES ASK : How would this inconvenience you ? Shopping and health (illness)
NO	

If this road was closed for the rainy season of the year would it inconvenience you ?

YES ✓	IF YES ASK : How would this inconvenience you ?
NO	As already mentioned above illness

23. How often per month do you travel to the following centres ?

TOWN NAME	NUMBER OF TRIPS PER MONTH
1. UMTATA	Anytime
2. LIBODE	Anytime
3. PORT ST JOHNS	—
4. LUSIKISIKI	—
5. NGQELENI	Anytime
6. TSOMO	—

24. What is the most important purpose for travelling to Umtata ?
for health purposes e.g. Hospital

25. Is this facility available in Libode ?

YES ✓	NO

N'LAZA Hospital

26. IF YES ASK : Why do you travel to Umtata instead of using local facilities ? This depends on the nature of my health or illness

27. Has the newly built road between Libode and Mgwenyana had any effect on you and the community ? [SPECIFY IN DETAIL]

yes

IMPORTANT QUESTION IMPORTANT QUESTION IMPORTANT QUESTION

28. When this road was being built what did you expect would happen ? Transport facilities, employment opportunities and business owners have wealth running of their business

IMPORTANT QUESTION IMPORTANT QUESTION IMPORTANT QUESTION

IMPORTANT QUESTION IMPORTANT QUESTION IMPORTANT QUESTION

29. What do you think the greatest effects of building this road have been ?

Transport facilities

IMPORTANT QUESTION IMPORTANT QUESTION IMPORTANT QUESTION

30. Did you move as a result of the building of this road ?

YES ✓	Specify reason Because I wanted to be nearer to the tarred road as not be far from the road so as to get Transport too soon.
NO	

31. Since this road has been built do you think that there has been an increase of people into this area ?

YES ✓	NO

32. IF YES ASK : What changes have occurred since these people have moved to your area ?

hatred and conflicts

33. IF YES ASK : Does this affect you or your family in any way ?

YES ✓	NO

34. IF YES ASK : In what way does it affect your family ?

health emerged

35. If you had a choice where would you prefer to live ?

Alongside the newly built road ✓	
Further away from the newly built road	

36. What is the reason for your choice ? I want to be at the County of the road for the immediate transport

37. Are the people who live alongside the new road different to those who live a distance away from the road ?

YES		NO	✓

38. IF YES ASK: In what way are the people who live alongside the new road different ? As opposed to the ~~abo~~ distant people the alongside road people they get transport any

39. As a result of the building of this road have government services improved in the area ?

YES	✓	NO	

40. IF YES ASK : What services have improved as a result of the building of the road ? Health Service and also agricultural services ~~and~~ as well as Educational services have been improved.

41. Do you think that the building of the road has improved employment opportunities ?

YES	✓	NO	

42. Why do you feel this way ? This is highly appreciated as there had been a high rate of unemployment opportunities in this area.

43. Was the community consulted during the planning and construction of this road ?

YES	✓	IF YES ASK : How ? By the meeting conveyed between the Community and the Government Bodies in the Headmans place.
NO		

44. If the government had consulted you before building this road, what would you have suggested they invest in your area ?

		SPECIFY REASON FOR CHOICE Because of
Road	✓	Security transport for
Clinic	✓	distant health Services
School		any Maternity E.G. Buses were
Public transport	✓	not ~~available~~ available.
Other [specify]		

45. In comparison to other price increases do you think transport costs have been reduced since the building of this road ?

YES	✓	How has this affected you ? Lot of
NO		Expenses

46. Do you think travel time has been reduced since the road has been built ?

YES ✓		NO	

47. What effect has the building of this road had on accidents ?

INCREASED ACCIDENTS	
DECREASED ACCIDENTS	
NO CHANGE	

48. What types of accidents have increased or decreased ? .....
Cause of accidents.....

49. IF ANIMAL ACCIDENTS ASK : Has this affected your agricultural income ?

YES		NO	

N/A

50. Do you feel that the old route is being adequately maintained ?

YES ✓		NO	

51. Why do you feel this way ? We are not ...
problem but that it was not ...
maintained.....

52. Some people think that when a road is built there are a number of effects. From the following list what do you think the most important effect of building a road is ? [M]

From this list again what do you think the least important effect of building a road is ? [L]

	Increased agricultural activity ✓
	Improved business activity ✓
	Reduced travel time
	Decreased accidents
	Reduced travel costs
	Use of the road all year round ✓
	Better employment opportunities
	Increase of population into the area ✓
	Greater access to medical facilities ✓
	Greater access to education facilities ✓
	Better government services ✓
	Other [Specify] .....

THANK-YOU FOR YOUR PARTICIPATION

BUSINESS IMPACT STUDY
LIBODE - MQWENYANA - TOMBO ROAD

INTERVIEWER'S NAME T.S.A.P.E.P.A.....
ZONE LOCATION.....A.....DATE 28/2/1990

A RESEARCH STUDY DONE BY THE UNIVERSITY OF THE WITWATERSRAND IN CONJUNCTION WITH THE DEVELOPMENT BANK OF SOUTHERN AFRICA

SPEAK TO BUSINESS OWNER IF POSSIBLE

Hello. My name is T.S.A.P.E.P.A We are conducting a study of the effects of road improvements and I would like to ask you a few questions. Are you willing to participate ?

Name of business : Mandla's Butchery
.....
.....

Position in business :
Owner | ✓ |
Manager | |
Other | |
Specify .....

Type of business ? B.U.T.C.H.E.R.Y.....
.....

---

1. How long have you been in this type of business ? 7 yrs.....

---

2. IF OWNER HAS BEEN IN BUSINESS LESS THAN 2 YEARS ASK : What was your motivation for involvement in business ? .....
.....
.....
.....

---

3. Have you moved your business location since the building of this road ?

YES	
~~NO~~	✓

Reason ? I have live... here... long... here already, before the construction of the road
.....
.....

---

4. Where did you live 2 years ago ? Libode.....

---

5. Where do you live now ? L.I.B.O.D.E.....

---

6. Since this road has been built do you think that people travel further to take advantage of your store/business ?

YES	✓	NO	

7. Has the new tarred road between Libode and Mgwenyana had any effect on you and the community ? [SPECIFY IN DETAIL]
Customers prefer to buy at Libode and not come to our shop.

8. When this road was being constructed what did you expect would happen ? I expected many customers to come

9. What do you think the greatest effects of building this road have been ? It has made me to have more customers

10. Do you think the building of this road has had any economic effect in the region ?

YES		NO	

11. IF YES ASK : In what way does it have an economic effect ?
N/A

12. Have government services improved in the area since this road has been built ?

YES		NO	

13. IF YES ASK : What kind of government services have improved ?
ELECTRICITY

14. From which town do you buy the majority of your stocks for your business ? KOKSTAD

15. Has the frequency of your delivery service to your store improved ?

YES	
NO	

Reason : Because of the good condition of the road

16. Has the quality of your delivery service to your store improved ?

YES	✓
NO	

Reason : Because my deliveries arrive in time so they do not delay and get damaged

---

17. If this road was closed for ONE DAY a year would it inconvenience you ?

YES	✓
NO	

IF YES ASK : How would this inconvenience you ? they will be my customers and many people will be

If this road was closed for ONE WEEK a year would it inconvenience you ?

YES	✓
NO	

IF YES ASK : How would this inconvenience you ? as above

If this road was closed for ONE MONTH a year would it inconvenience you ?

YES	✓
NO	

IF YES ASK : How would this inconvenience you ? as above

If this road was closed for the rainy season of the year would it inconvenience you ?

YES	✓
NO	

IF YES ASK : How would this inconvenience you ? Slow down. Drop parking would occur

---

18. Do you feel that your business has benefited from the building of this road ?

YES	
NO	✓

Reason : There is no change what so ever to my rooms as before the building of this road

---

19. Could you guess at a percentage increase or decrease in turnover over the two past years ? 3-4%

---

20. Since the road has been built where do you feel more people do their shopping ? Uncertain

---

21. Has the building of this road resulted in cost savings for you ?

YES	✓	NO	

22. Would you be prepared to pay anything towards the cost of the road improvement ?

YES		NO
		✓

23. IF YES ASK : How much would you be prepared to pay ? We are willing to pay two dry pay tax for our property and that for the road

24. Since this road has been built do you have more difficulty competing with business outside this area ?

YES		NO
✓		

25. Why do you believe this to be the case ? There are many businesses dry goods and customers are from Kisumu or other business groups to buy all wanta

26. Can you name three types of businesses that have grown/developed as a result of the building of the road and where they are located ?

BUSINESS :	LOCATION :
N/A	

27. Can you name three types of businesses that have decreased/declined as a result of the building of the road and where they are located ?

BUSINESS :	LOCATION :
N/A	

28. Some people think that when a road is built there are a number of effects. From the following list what do you think the most important effect of building a road is ? [M]

From this list again what do you think the least important effect of building a road is ? [L]

	Increased agricultural activity
	Improved business activity
	Reduced travel time
	Decreased accidents
	Reduced travel costs
	Use of the road all year round
	Better employment opportunities
	Increase of population into the area
	Greater access to medical facilities
M	Greater access to education facilities
	Better government services
	Other [Specify] .....

THANK-YOU FOR YOUR PARTICIPATION

TABLE : ALOD1.1.1 - LIBODE ROAD - ORIGIN DESTINATION TRAFFIC COUNT

Original data of origin destination matrix*

	B	C	D	Z	G	Y	J	X	N	L	Sub Total	Total
B		227	16	26	1	8	1	2		1	284	
C	269		12	78	6	44	17	20	4	97	547	
D	18	9		3							30	
Z	16	90	4		11	75	10	16	8	42	272	
G	1	3		15							19	
Y	7	63	2	88	1		14	18	4	25	220	
J	4	11		9		15		7	1	3	50	
X	1	19		17		22	1		5	18	83	
N	1	6		5		3	1	8		12	34	
L	1	105		29		15	2	23	13		188	
Sub Total	318	533	36	280	19	182	46	90	35	198		1737
TOTAL											1737	3474

*120 vehicles not accounted for.
*Traffic count between 06h00 - 17h00 - i.e. 11 hours only

TABLE : ALOD1.1.2 - LIBODE ROAD - ORIGIN DESTINATION TRAFFIC COUNT

Original origin - destination matrix adjusted by the Furness method*

	B	C	D	Z	G	Y	J	X	N	L	Sub Total	Total
B		235	19	27	1	8	1	2		1	294	
C	278		12	81	6	46	18	21	4	100	566	
D	19	9		3							31	
Z	17	93	4		11	78	10	17	8	43	281	
G	1	3		16							20	
Y	7	65	2	101	1		14	17	4	26	237	
J	4	11		9		18		7	1	3	51	
X	1	20		18		23	1		5	19	87	
N	1	6		5		3	1	6		12	34	
L	1	108		30		15	2	24	13		193	
Sub Total	329	550	37	290	19	189	47	94	35	204		1794
TOTAL											1794	3588

*6 vehicles not accounted for.

TABLE : ALOD1.2.1 - LIBODE ROAD - ORIGIN DESTINATION TRAFFIC COUNT

Original data of outside origin destination matrix

	G	J	N	X	Sub Total	Total
G					0	
J	2		3		5	
N		3		1	4	
X			1		1	
Sub Total	2	3	4	1		10
TOTAL					10	20

TABLE : ALOD1.2.2 - LIBODE ROAD - ORIGIN DESTINATION TRAFFIC COUNT

Original origin destination matrix adjusted by the Furness method

	G	J	N	X	Sub Total	Total
G					0	
J	2		3		5	
N		3		1	4	
X			1		1	
Sub Total	2	3	4	1		10
TOTAL					10	20

TABLE : ALOD1.2.1 - LIBODE ROAD - ORIGIN DESTINATION TRAFFIC COUNT

Original data of outside origin destination matrix

	D	Z	Sub Total	Total
D		4	4	
Z	3		3	
Sub Total	3	4		7
TOTAL			7	14

TABLE : ALOD1.2.2 - LIBODE ROAD - ORIGIN DESTINATION TRAFFIC COUNT

Original origin destination matrix adjusted by the Furness method

	D	Z	Sub Total	Total
D		4	4	
Z	3		3	
Sub Total	3	4		
TOTAL			7	14

TABLE : ALOD1.2.1 - LIBODE ROAD - ORIGIN DESTINATION TRAFFIc COUNT

Original data o" outside origin destination matrix

	B	Z	Sub Total	Total
B		67	67	
Z	43		43	
Sub Total	43	67		110
TOTAL			110	220

TABLE : ALOD1.2.2 - LIBODE ROAD - ORIGIN DESTINATION TRAFFIC COUNT

Original origin destination matrix adjusted by the Furness method

	B	Z	Sub Total	Total
B		69	69	
Z	44		44	
Sub Total	44	69		113
TOTAL			113	226

TABLE : ALOD2 - LIBODE ROAD - ORIGIN DESTINATION SURVEY

Vehicle type

	Station 1		Station 2		Station 3		Station 4		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%
Car	333	27,1	183	25,9	140	25,1	131	29,8	787	26,8
Bakkie	571	46,4	332	47	256	45,8	194	44,1	1353	46,1
Taxi/Minibus	176	14,3	91	12,9	65	11,6	48	10,9	380	13
Bus	21	1,7	18	2,6	16	2,9	8	1,8	63	2,2
Truck	123	10	65	9,2	70	12,5	58	13,2	316	10,8
Tractor	2	0,2	3	0,4	1	0,2			6	0,2
Other	4	0,3	14	2	11	2	1	0,2	30	1
No response	5		10				1		16	
TOTAL	1235	100	716	100	559	100	441	100	2951	100

TABLE : ALOD3 - LIBODE ROAD - ORIGIN DESTINATION SURVEY

Number of vehicles at specified time intervals

Time	Station 1		Station 2		Station 3		Station 4		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%
6:00 - 6:59	77	6,2	38	5,3	39	7	15	3,4	169	5,7
7:00 - 7:59	103	8,3	83	11,6	44	7,9	34	7,7	264	8,9
8:00 - 8:59	122	9,9	70	9,8	49	8,8	40	9,1	281	9,5
9:00 - 9:59	127	10,3	88	12,3	61	10,9	50	11,3	326	11,1
10:00 - 10:59	129	10,5	84	11,7	52	9,3	48	10,9	313	10,6
11:00 - 11:59	116	9,4	59	8,2	60	10,7	43	9,8	278	9,4
12:00 - 12:59	96	7,8	50	7	39	7	41	9,3	226	7,7
13:00 - 13:59	97	7,9	45	6,3	36	6,4	31	7	209	7,1
14:00 - 14:59	138	11,2	74	10,3	61	10,9	41	9,3	314	10,6
15:00 - 15:59	111	9	71	9,9	61	10,9	52	11,8	295	10
16:00 - 16:59	119	9,6	54	7,5	57	10,2	46	10,4	276	9,4
TOTAL	1235	100	716	100	559	100	441	100	2951	100

TABLE : ASOD1.2 - STERKSPRUIT ROAD - ORIGIN DESTINATION TRAFFIC COUNT

Original origin - destination matrix adjusted by the Furness method*

	B	C	Z	F	Y	G	X	J	Sub Total	Total
B		23	44	2	22	9	20	2	122	
C	25		13	1	4	2	4	1	50	
Z	43	11		5	37	5	11	1	113	
F	3		3		26	6	23	9	70	
Y	18	3	33	9		26	81	12	182	
G	10	1	2	6	8		41	11	79	
X	23	8	7	15	66	76		101	296	
J	9	2	1	2	8	17	87		126	
Sub Total	131	48	103	40	171	141	267	137		1038
TOTAL									1038	2076

*3 vehicles not accounted for

TABLE : ASOD1.1 - STERKSPRUIT ROAD - ORIGIN DESTINATION TRAFFIC COUNT

Original data of origin - destination matrix*

	B	C	Z	F	Y	G	X	J	Sub Total	Total
B		22	43	2	21	9	19	2	118	
C	24		13	1	4	2	4	1	49	
Z	42	11		5	36	5	11	1	111	
F	3		3		25	6	32	9	68	
Y	17	3	32	8		23	79	12	177	
G	10	1	2	6	8		40	11	78	
X	22	8	7	15	64	74		99	289	
J	9	2	1	2	8	17	85		124	
Sub Total	127	47	101	40	166	138	260	135		1014
TOTAL									1014	2028

*51 vehicles not accounted for
*Traffic count between 06h30 and 13h30 - i.e. 7 hours only

TABLE : ASOD2 - STERKSPRUIT ROAD - ORIGIN DESTINATION SURVEY

Vehicle type

	Station 1		Station 2		Station 3		Station 4		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%
Car	64	19,3	61	18,2	160	30,1	68	24,8	353	24
Bakkie	128	38,7	113	33,7	221	41,6	127	46,4	589	40
Taxi/Minibus	52	15,7	77	23	60	11,3	27	9,8	216	14,7
Bus	17	5,1	13	3,9	14	2,6	11	4	55	3,7
Truck	58	17,5	63	18,8	63	11,9	35	12,8	219	14,9
Tractor	10	3	4	1,2	7	1,3			21	1,4
Other	2	0,8	4	1,2	6	1,1	6	2,2	18	1,2
No response			1		1		1		3	
TOTAL	331	100	336	100	532	100	275	100	1474	100

TABLE : ASOD3 - STERKSPRUIT ROAD - ORIGIN DESTINATION SURVEY

Number of vehicles at specified time intervals

Time	Station 1		Station 2		Station 3		Station 4		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%
6:30 - 7:29	41	12,4	65	19,3	131	24,6	21	7,6	258	17,5
7:30 - 8:29	36	10,9	62	18,5	128	24,3	35	12,7	262	17,8
8:30 - 9:29	53	16	51	15,2	71	13,4	43	15,6	218	14,8
9:30 - 10:29	46	13,9	61	18,2	67	12,6	60	21,8	234	15,9
10:30 - 11:29	51	15,4	60	17,9	58	10,9	29	10,6	198	13,4
11:30 - 12:29	47	14,2	11	3,3	39	7,3	43	15,6	140	9,5
12:30 - 13:29	57	17,2	26	7,7	37	7	44	16	164	11,1
TOTAL	331	100	336	100	532	100	275	100	1474	100

TABLE : ALT1 - LIBODE ROAD - TRAVEL PURPOSE SURVEY

Vehicle type

	No.	%
Car	15	18,8
Rakkie	11	13,8
Taxi/Mini bus	33	41,3
Bus	15	18,8
Truck	4	5
Other	2	2,5
No response	1	
TOTAL	81	100

TABLE : ALT2 - LIBODE ROAD - TRAVEL PURPOSE SURVEY

Nature of person being interviewed

	No.	%
Driver	41	50,6
Passenger	15	18,5
Paying passenger	25	30,9
TOTAL	81	100

TABLE : ALT4 - LIBODE ROAD - TRAVEL PURPOSE SURVEY

Why are you travelling?

	Driver		Passenger		Paying Passenger	
	No.	%	No.	%	No.	%
Work	29	70,7	4	26,6	2	8
Social	3	7,3			2	8
Shopping	6	14,6	9	60	11	44
Religious			0		1	4
Education	1	2,4	0		2	8
Health			1	6,7	5	20
Government	2	4,9	1	6,7	2	8
TOTAL	41	100	15	100	25	100

TABLE : ALT5 - LIBODE ROAD - TRAVEL PURPOSE SURVEY

How often is "today's trip" [ALT4] made on this road per month?

	Driver*	Passenger	Paying Passenger
Work	12,8	12,25	20
Social	4		2
Shopping	14,7	5,6	3,2
Religious			
Education	20		20
Health		4	2,4
Government	5	8	7

*Taxi drivers are excluded from the work trip as they bias the frequency of the work trip due to the large number of trips made. The average monthly trips of taxi drivers is 89,5 trips per month.

TABLE : ALT6 - LIBODE ROAD - TRAVEL PURPOSE SURVEY

Do you make more trips on this road now than you did two years ago?

	No.	%
Increase in travel	53	67,1
No change in travel	26	32,9
No response	2	
TOTAL	81	100

TABLE : ALT7 - LIBODE ROAD - TRAVEL PUR SURVEY

IF INCREASE IN TRAVEL [ALT6] : Why do you make more trips?

	No.	%
Tarring of road	24	48
Availability of transport	7,5	15
Personal reasons	7	14
Time savings	6	12
Decrease in accidents	2,5	5
Other	3	6
No response	3	
TOTAL	53	100

TABLE : ALT9 - LIBODE ROAD - TRAVEL PURPOSE SURVEY

Since the road has been tarred have you experienced any cost savings?

	Driver		Passenger		Paying Passenger	
	No.	%	No.	%	No.	%
Road results in cost savings	36	92,3	11	73,3	11	44
Road has no cost savings	3	7,7	4	26,7	14	56
No response	2					
TOTAL	41	100	15	100	25	100

TABLE : ALT10/9 - LIBODE ROAD - TRAVEL PURPOSE SURVEY

Since this road has been tarred have you experienced any cost savings and would you be prepared to pay towards the road improvements?

	Road Results In Cost Savings		Road Results In No Cost Savings	
	No.	%	No.	%
Prepared to pay	51	65,7	3	3,8
Not prepared to pay	6	7,7	18	22,8
No response	1			
TOTAL	58	73,4	21	26,6

2 no response to question of road resulting in cost savings.
N=81

TABLE : ALT12 - LIBODE ROAD - TRAVEL PURPOSE SURVEY

Since this road has been tarred have you experienced any time sa ings?

	No.	%
Road results in time savings	77	98,7
Road results in no time savings	1	1,3
No response	3	
TOTAL	81	100

TABLE : ALT13 - LIBODE ROAD - TRAVEL PURPOSE SURVEY

Since the road has been tarred do you think there has been an increase or decrease in accidents?

	No.	%
Increase in accidents	35	43,2
Decrease in accidents	19	23,5
No change	27	33,3
TOTAL	81	100

TABLE : ALT14.1 - LIBODE ROAD - TRAVEL PURPOSE SURVEY

IF INCREASE IN ACCIDENTS [ALT13] : In what type of accidents?

	No.	%
Animal	22,7	68,8
Human	3,7	11,2
Vehicle	6,7	20,3
No response	2	
TOTAL	35	100

TABLE : ALT14.2 - LIBODE ROAD - TRAVEL PURPOSE SURVEY

IF DECREASE IN ACCIDENTS [ALT13] : In what type of accidents?

	No.	%
Animal	8,8	46,9
Human	1,3	7,2
Vehicle	7,8	43,3
No response	1	
TOTAL	19	107

TABLE : ALT15 - LIBODE ROAD - TRAVEL PURPOSE SURVEY

It is expected that roads reduce travel time, costs and accidents. What do you think the most important aspect is?

	No.	%
Reduced travel time	64	81
Reduced costs	9	11,4
Reduced accidents	6	7,6
Other	2	
TOTAL	81	100

TABLE : ALT8/18 - LIBODE ROAD - TRAVEL PURPOSE SURVEY

What do you think the greatest effects of the tarring of the road have been and what is important about this road improvement to you?

	No.	%
Increase in mobility	25,7	31,7
Decrease in travel time	14,8	18,3
Decrease in vehicle maintenance	10,8	13,3
Decrease in Accidents	[illegible],7	7
Increase in environmental quality	4,2	5,2
Greater access to other centres	3,6	4,4
Other (positive effect)	8,3	10,3
Other (neutral)	1,3	1,6
Increase in travellers	2,5	3,1
Increase in accidents	3,1	3,8
Other (negative effect)	1,3	1,6
TOTAL	81	100

TABLE : ALT17 - LIBODE ROAD - TRAVEL PURPOSE SURVEY

If this road was closed for ONE DAY/ONE WEEK/ONE MONTH/ RAINY SEASON would it inconvenience you? How would it inconvenience you?

	Inconvenienced for							
	Day		Week		Month		Season	
	No.	%	No.	%	No.	%	No.	%
Business	10	12,5	2	2,5				
Shopping	3	3,8	2	2,5				
Employment	18	22,5	5	6,3				
Health	7	8,8	3	3,8				
Education	2	2,5	0	0				
Inconvenience	15	18,8	11	13,8	1	1,3		
Other	—	—	1	—	—	—	—	—
TOTAL	55	68,8	24	30	1	1,3	0	0

80 (100%) respondents are inconvenienced. No response = 1.
N=81.

TABLE : ALT18 - LIBODE ROAD - TRAVEL PURPOSE SURVEY

Since the road has been upgraded do you think it saves you vehicle maintenance costs? [ASK DRIVERS ONLY]

	No.	%
Road results in vehicle maintenance savings	34	87,1
Road results in no vehicle maintenance savings	1	2,9
No response	5	—
TOTAL	40	100

TABLE : AST1 - STERKSPRUIT ROAD - TRAVEL PURPOSE SURVEY

Vehicle type

	No.	%
Car	23	21,7
Bakkie	20	18,9
Taxi/Minibus	50	47,2
Bus	7	6,6
Truck	5	4,7
Other	1	0,9
TOTAL	106	100

TABLE : AST2 - STERKSPRUIT ROAD - TRAVEL PURPOSE SURVEY

Nature of person being interviewed

	No.	%
Driver	59	55,7
Passenger	16	15,1
Paying passenger	31	29,2
TOTAL	106	100

TABLE : AST4 - STERKSPRUIT ROAD - TRAVEL PURPOSE SURVEY

Why are you travelling?

	Driver		Passenger		Paying Passenger	
	No.	%	No.	%	No.	%
Work	40	67,8	2	12,5	3	9,7
Social	6	10,2	2	12,5	5	16,1
Shopping	6	10,2	10	62,5	16	51,6
Religious			1	6,3		
Education	1	1,7			1	3,2
Health					4	12,9
Government	6	10,2	1	6,3	2	6,5
TOTAL	59	100	16	100	31	100

TABLE : AST5 - STERKSPRUIT ROAD - TRAVEL PURPOSE SURVEY

How often is today's trip [AST4] made on this road per month?

	Driver*	Passenger	Paying Passenger
Work	17,6	14	0,4
Social	1,8	1,5	0,4
Shopping	5,3	8,1	3,3
Religious		8	
Education	20		0,33
Health			1,25
Government	5,3	4	1

*Taxi drivers are excluded from the work trip as they bias the frequency of the work trip due to the large number of trips made. The average monthly trips of taxi drivers is 77,7 trips per month.

TABLE : AST6 - STERKSPRUIT ROAD - TRAVEL PURPOSE SURVEY

Do you make more trips on this road now than you did two years ago?

	No.	%
Increase in travel	66	62,3
No change in travel	40	37,7
TOTAL	106	100

TABLE : AST7 - STERKSPRUIT ROAD - TRAVEL PURPOSE SURVEY

IF INCREASE IN TRAVEL [AST6] : Why do you make more trips?

	No.	%
Tarring of road	30	45,4
Availability of transport	13,5	20,5
Personal reasons	6,5	9,8
Time savings	7	10,6
Decrease in accidents	4	6,1
Other	5	7,6
TOTAL	66	100