

6

ROAD PRIORITISATION METHODOLOGY

6.1 Purpose

It has been estimated that to improve the Community Access Road network in KwaZulu-Natal to a minimum acceptable standard could cost at least R1 billion. This amount does not include for annual maintenance costs which would also be needed to keep the network in a passable condition.

Whilst every effort may be made to obtain funding for these roads, it will not be possible to obtain the full amounts required, and thus only the most important roads can be built or improved. Available funds will have to be divided amongst the Magisterial Districts and then allocated to selected roads. This sounds a relatively simple task, but every person and community representative will have different priorities and will tend to favour areas and roads which are of direct benefit either to themselves or the immediate communities they serve.

Pressure will be brought to bear on those responsible for the allocation of funds and the preparation of construction programmes, and their decisions are likely to be challenged. To minimise possible conflict and ensure that funds are spent equitably and such as to benefit the maximum number of people, a set of guidelines ("prioritisation methodology") is proposed as set out in the following paragraphs in Chapter 6.

6.2 Approach

The Study Team have developed a simple approach for the distribution of funds and the prioritisation of roads which will address the Local Road backlog in the previously disadvantaged areas of the Province. Over a period of time, it is hoped that the method will be tested, and in response to the region's socio-economic policies and community needs, it will be widely applied and possibly adapted and improved.

The prioritisation methodology must be straight-forward such that everyone can understand the principles involved, and must be completely 'transparent' so that it depends on factual information rather than personal opinion.

"Some may argue that the proposed methods are not scientific enough or that the Study is encroaching on other Departments' policies and fields of expertise, but it is hoped that it will encourage all those involved in the upliftment of rural areas to come together and pool ideas and resources constructively."

Some may argue that the proposed methods are not scientific enough or that the Study is encroaching on other Departments' policies and fields of expertise, but it is hoped that it will encourage all those involved in the upliftment of rural areas to come together and pool ideas and resources constructively. There is little doubt however that improved road access is the key to unlocking development potential in rural areas and facilitating social upliftment.

The distribution of funds and the prioritisation of roads must be seen at two levels. Firstly, the calculation of the proportion of the total funds available which is allocated to each Magisterial District, and secondly which roads are the most important within each District.

Regarding the allocation of funds to each Magisterial District, the underlying considerations are that funds must be spent where they will benefit the maximum number of people, both now and in the future. One approach considered is that the allocation should be based on population numbers alone. However in the past, expenditure has been skewed and certain areas have been seriously neglected.

"The recommended method to determine the allocation or share of funding for each District is thus based on the official census population, but adjusted to take into account other factors"

The recommended method to determine the allocation or share of funding for each District is thus based on the official census population, but adjusted to take into account other factors as follows:

- **the development potential of the District,**
- **the existing level of human development, and**
- **the extent of the existing Proclaimed road network.**

Good roads help promote development, hence if more funds

can be spent in areas where there is a higher development potential, such as agricultural crop production, then these areas will show higher economic returns as a result of better accessibility. More job opportunities and increased wealth will result from the application of a rural development index which identifies those areas which have higher potential.

There are however areas which support large populations but unfortunately have limited development potential in terms of agriculture, or for that matter other commercial or industry related activities. Roads in these areas are needed to assist with social upliftment although perhaps will not create wealth in terms of economic development. The introduction of a human development index will thus ensure that these areas are not overlooked. This index takes into account life expectancy at birth, as well as education and income levels.

"This is an extremely important factor as good rural access is dependent on a balanced road network comprising both Proclaimed roads and Local Roads."

Some areas are more poorly served by Proclaimed Main and District Roads than others and the accessibility index will take this aspect into account. **This is an extremely important factor as good rural access is dependent on a balanced road network comprising both Proclaimed Roads and Local Roads.** The latter provide localised access to communities over short distances from the Proclaimed or higher order group of roads and lower standards are acceptable. As the need to travel further afield arises, a higher standard road where one can travel reasonably comfortably and faster is necessary. An area which is poorly served by the Proclaimed network needs to obtain a higher level of funding to upgrade those Local Roads which serve a higher order function and ought to be considered for District Road status. A balanced road network will then be achieved.

Hence, as an example, a Magisterial District which has a large population, good agricultural potential, a high level of poverty and is poorly served by the Proclaimed road network, would tend to get the highest proportion of the funds.

Details regarding the formula for allocating the funds to the Districts and the various indices are presented in the next section.

6.3 Determination of District Allocations

6.3.1 District Factor

The Government is committed to a major infrastructure development programme in the rural areas of the country, to begin to correct the historical backlogs in infrastructure for water supply, roads, health facilities, schools and other amenities. In a document released in October 1995 entitled '**The Rural Development Strategy of the Government of National Unity**', it is stated that:

The government's vision is that by 2020, South Africa's rural people will have -

- a more diverse agriculture,*
- greater integration between towns and the rural areas,*
- a more logical spatial network of towns, services, roads and transport systems and*
- fewer, healthier, safe, well nourished children with access to well-resourced schools."*

The government is thus committed to basic levels of infrastructure development in water supply, sanitation, access to schools and clinics, road development and energy provision. All of these will reduce the burden of poverty in rural areas, and allow rural people to use their time more productively and so contribute to national growth.

The main thrust of the 'rural development strategy' is to build a local economy based on the beneficial exploitation of the small farm sector, of agro-industries and other resource-based production, and of tourism and eco-tourism possibilities. The various strategies being contemplated for local economic development are indicated in Table 6.1 below.

TABLE 6.1 - STRATEGIES BEING CONTEMPLATED FOR LOCAL ECONOMIC DEVELOPMENT	
Promotion of Local Markets	Regular market days on which the full range of urban services can be taken to the rural community by traders and service providers
Promotion of Small, Medium and Micro Enterprises (SMME's)	The main aim is to create a national network of local service centres where a variety of services can be accessed (agricultural enterprises, agri-businesses etc.)
Promotion of Tourism and Eco-Tourism	Considering our rich historical heritage and a wide range of cultures, in addition to the wild life, scenery and coasts, tourism development has the potential to bring consumers to new areas.
Promotion of Labour Intensity	Using labour-intensive techniques for the provision of rural infrastructure will provide local employment. Programmes targeted to benefit the poor offer a fairly low wage, thereby ensuring that only the poorest benefit.
Promotion of Environmental and Social Sustainability	Tree planting programmes for fuel and for building timber are envisaged.
Promotion of Rural Infrastructure Development Against Affordability	There are strong economic arguments for building infrastructure that supports productive enterprise, and equally strong ethical arguments based on historical omission. However, the need for fiscal discipline invariably limits the extent to which backlogs can be addressed in the short term. The patterns of settlement in rural areas lack agro-ecological and socio-economic logic. Settlements are often far from job opportunities or services. Spatial integration will have to be created in planning at local and provincial level, and there will have to be a coordination of effort to reduce service and infrastructure costs while improving access.

The Provincial Department of Transport, like all other government institutions tasked with the provision of public services, must decide whether to opt for a basic needs approach, or an economic growth approach to service provision. In other words, the Department must decide whether to direct resources to communities who are presently least served, or whether to stimulate development in those areas with the strongest economies.

As indicated above the proposed strategy for the upgrading of road infrastructure serving rural

communities considers four criteria, namely:

- **Population,**
- **Development Potential,**
- **Human Development, and**
- **Accessibility.**

Quantifying and combining the above four criteria in a uniform manner using area-based statistics, provides the Department of Transport with the means to distribute funds on an equitable basis. Rural communities are largely settled on communal land (ie land which is not in private ownership) which constitutes 40% of the Province. The communal land was divided into Districts more than twenty years ago, each of which is administered by a magistrate. Using the statistics pertaining to the Magisterial Districts a District Factor has been calculated as follows:

$$\text{District Factor } D = P(a \times I_{dp} + b \times I_{cd} + c \times I_a) \times 10^{-6}$$

.....where

P	=	population
I_{dp}	=	development potential index
I_{cd}	=	community development index
I_a	=	accessibility index
a,b,c	=	weighting constants

$I_{dp} = 0$ implies that the District has zero development potential and, in terms of funding requirements for promoting development, it is a low priority.

Similarly $I_{cd} = 0$ implies that the District has a high level of human development, and, in terms of funding needs to promote human development, it is a low priority.

Similarly $I_a = 0$ implies that the District is well served with road infrastructure and in terms of funding needs for extending the formal road network it is a low priority.

6.3.2 Development Potential Index

The development potential of a rural area is largely influenced by the following factors:

Natural Water Resources

Water is a basic necessity for life and in its absence there can be no development. An abundance of water provides a multitude of choices for development.

Terrain Conditions

Terrain conditions can adversely impact on the establishment cost of basic infrastructure, such as health facilities, education facilities, roads and water supply. Terrain

conditions are characterised by a combination of topography and geology. Steep sloping ground with boulders and rocky outcrops provides the worst conditions for infrastructure development, whereas flat to rolling terrain with firm soils provides the best conditions.

Agricultural Conditions

The potential for food production through agricultural development is dependent upon a combination of factors such as climate, slope, soil type and the availability of water.

With the spatial data that has been compiled, it is now possible to measure these factors using advanced computer technology. For instance:

- For natural water resources, the total length of rivers per District may be determined.
- For terrain conditions, the total length of contour lines may be determined as an indicator of overall 'hilliness', and also the total areas of non-arable land per District.
- For agricultural conditions, the areas of high and medium potential lands per District may be totalled.

It is proposed to combine these factors in the following manner:

$$I_{DP} = [d(R-0,1A_n)+e(2A_t-C)+f(A_t+2A_h+A_m-A_n)]/A_t$$

..... where

- I_{DP} = development potential index
- R = length of rivers in District
- C = length of 100 m contours in District
- A_n = area of non-agricultural land in District
- A_h = area of high potential land in District
- A_m = area of medium potential land
- A_t = total area of District
- d,e,f = weighting constants (1; 1; 1)

Details of the Development Potential indices calculated for each of the rural Magisterial Districts appear in **Table 6.2** below.

The positions of the Magisterial Districts, as well as the KwaZulu-Natal Department of Transport Regions are shown in Map 1 at the beginning of this Report.

TABLE 6.2 : DEVELOPMENT POTENTIAL INDEX I_{dp} OF MAGISTERIAL DISTRICTS

DISTRICT	River	Contour	Non-Agric		High Agric		Med Agric		Dist Area	INDEX I_{dp}
	R	C	A_n		A_h		A_m		A_t	
	km	km	%	sq km	%	sq km	%	sq km	sq km	
EMNAMBITHI	174	1 222	6,0	61	10,2	105	16,8	172	1 025	2,19
EMZUMBE	505	3 084	0,7	10	2,4	36	29,6	439	1 482	1,50
ENSELENI	686	2 669	2,6	55	1,9	41	15,9	335	2 108	2,13
HLABISA	383	1 422	0,4	6	5,8	86	34,6	510	1 473	2,65
HLANGANANI	450	2 358	11,2	136	6,1	75	9,3	113	1 215	1,43
INGWAVUMA	1 165	1 943	4,9	199	9,4	381	0,6	23	4 063	2,85
INKANYEZI	469	2 487	1,0	13	0,9	13	15,0	209	1 391	1,61
IZINGOLWENI	453	2 021	4,6	49	5,1	54	16,0	169	1 060	1,64
MADADENI	116	225	1,8	11	4,9	29	33,2	201	604	3,13
MAHLABATHINI	541	2 565	0,9	16	3,6	63	5,9	104	1 770	1,88
MAPHUMULO	536	4 335	1,5	26	3,0	52	13,3	229	1 715	0,86
MPUMALANGA	229	1 501	4,5	24	3,2	17	28,3	152	538	0,84
MSINGA	188	3 059	7,4	128	10,8	187	9,6	166	1 738	1,48
NDWEDWE	385	2 352	1,8	19	1,5	16	14,3	149	1 044	1,17
NKANDLA	659	4 554	3,1	66	1,7	35	10,9	226	2 073	1,13
NONGOMA	645	3 349	1,3	31	3,9	89	5,9	136	2 299	1,85
NQUTHU	395	1 635	8,9	154	4,8	83	28,6	492	1 721	2,47
OKHAHLAMBA	425	2 292	4,9	70	6,1	88	21,0	302	1 440	1,89
ONGOYE	187	515	13,5	102	6,4	48	30,2	227	753	2,76
SIMDLANGENTSHA	444	2 164	3,6	40	3,6	40	7,0	78	1 118	1,47
UBOMBO	631	765	3,9	101	13,5	353	3,1	83	2 618	3,11
UMBUMBULU	320	1 786	1,2	10	6,0	51	35,1	299	851	1,64
VULAMEHLO	272	1 721	0,1	1	7,4	55	23,3	173	742	1,33
VULINDLELA	62	414	0,0	0	36,2	94	25,6	66	259	2,52

6.3.3 Community Development Index

Human development is a process of enlarging people's choices, and the purpose of development is to create an enabling environment for people to enjoy long, healthy and creative lives. In the 'Human Development Report, 1995' it is stated that there are four major elements in the concept of human development. They are:

Productivity

People must be enabled to increase their productivity and to participate fully in the process of income generation and remunerative employment.

Equity

People must have access to equal opportunities. They need to be assisted so that they can participate in, and benefit

from economic and political opportunities.

Sustainability

Access to opportunities must be ensured not only for present generations but for future generations as well.

Empowerment

Development must be by people and not only for them. People must participate fully in the decisions and processes that shape their lives.

TABLE 6.3 : COMMUNITY DEVELOPMENT INDEX I_{cd} FOR EACH MAGISTERIAL DISTRICT RANKED FROM HIGH TO LOW		
DISTRICT	HDI	I_{cd}
MSINGA	0,25	4,00
INGWAVUMA	0,26	3,85
NONGOMA	0,30	3,33
NKANDLA	0,30	3,33
VULAMEHLO	0,32	3,13
EMZUMBE	0,33	3,03
SIMDLANGENTSHA	0,33	3,03
HLABISA	0,35	2,86
OKHAHLAMBA	0,36	2,78
MAPHUMULO	0,36	2,78
HLANGANANI	0,37	2,70
NQUTHU	0,37	2,70
MAHLABATHINI	0,37	2,70
IZINGOLWENI	0,38	2,63
INKANYEZI	0,39	2,56
UBOMBO	0,39	2,56
ENSELENI	0,41	2,44
EMNAMBITHI	0,42	2,38
NDWEDWE	0,45	2,22
MADADENI	0,46	2,17
ONGOYE	0,48	2,08
UMBUMBULU	0,49	2,04
MPUMALANGA	0,49	2,04
VULINDLELA	0,50	2,00

The publication 'Human Development Report' has analysed human development around the world during the past thirty years. The **Human Development Index (HDI)** has been developed to place human progress and human deprivation in perspective. The HDI was developed to reflect the most important dimensions of human development, that is, the basic capabilities that people must have to participate in and contribute to society. These include:

- the ability to lead a long and healthy life,
- the ability to be knowledgeable, and
- the ability to have access to the resources needed for a decent standard of living.

The HDI, therefore, has three components:

- life expectancy at birth,
- educational attainment comprising adult literacy and a combined primary, secondary and tertiary enrolment ratio, and
- income.

HDI's have been calculated for most countries of the world. The HDI value for each country indicates how far that country has to go to attain certain defined goals, namely:

- an average lifespan of 85 years,
- access to education for all, and
- a decent level of income.

The HDI value can vary between 0 and 1,0 and the greater the value, the closer that country is to attaining its goals. For instance, Canada has an HDI value of 0,95 whereas South Africa as a whole is reported to have an HDI value of 0,705.

It is also possible to calculate the HDI at a District level, as has been done for all the Magisterial Districts of South Africa. In order to conform with the convention adopted for the development potential index and the accessibility index, the Community Development Index has been designated as the reciprocal of the HDI ($I_{cd} = 1/HDI$). This implies that the District with the lowest HDI will have the highest community development index and will be the top priority in terms of funding needs. (See **Table 6.3** on the previous page).

6.3.4 Accessibility Index

Investigations have suggested that the two major factors influencing the demand for roads are a high population density, and a high level of socio-economic activity. A comparison of the formal road networks in the various Districts, and the population densities, has provided a means of determining the relative backlogs in the development of an appropriate road network for the rural areas.

The Proclaimed road network and population statistics for each Magisterial District are shown in **Table 6.4** overleaf.

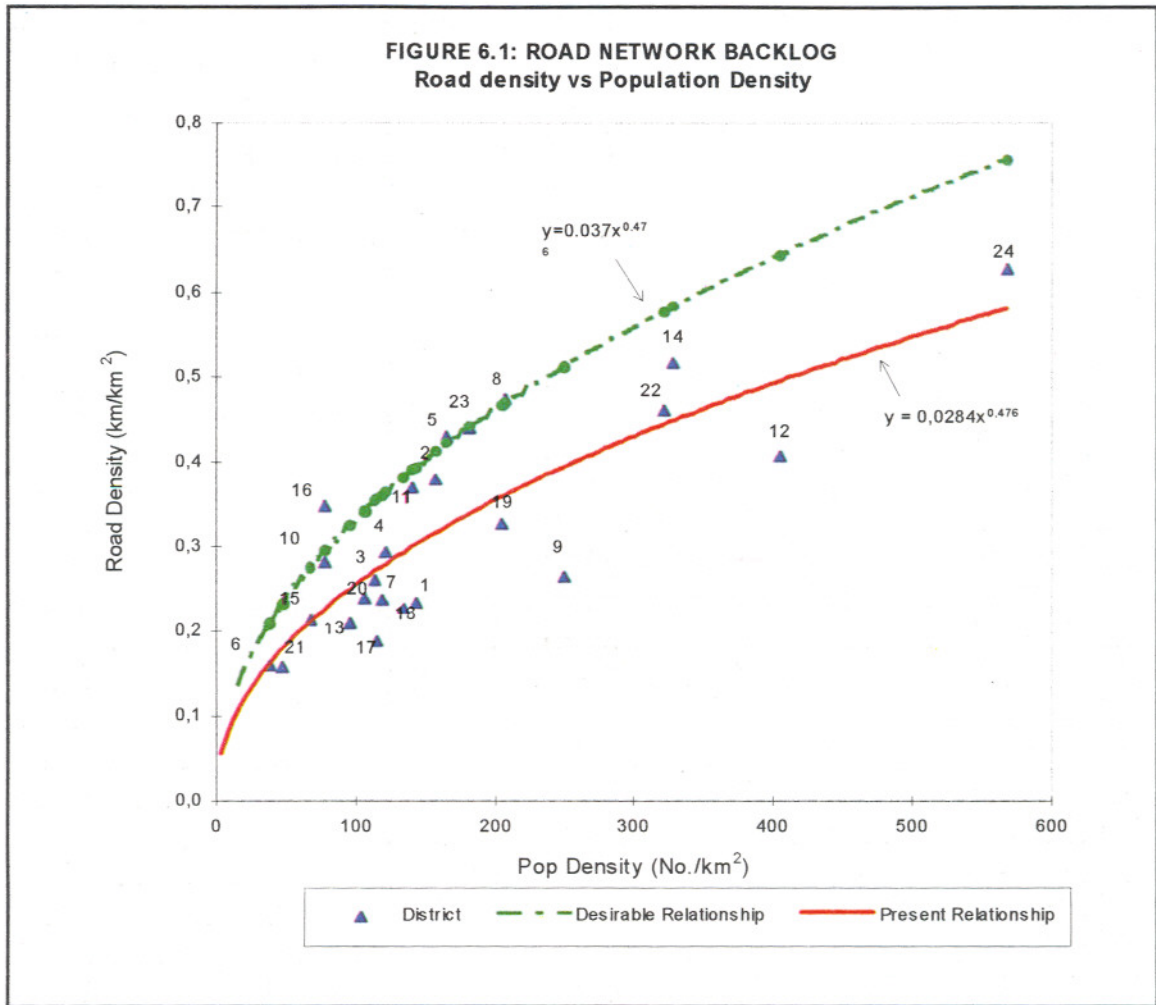
TABLE 6.4 : ROAD NETWORK AND POPULATION DATA FOR RURAL MAGISTERIAL DISTRICTS

No.	DISTRICT	AREA (km ²)	ROAD LENGTH (km)	ROAD DENSITY (km/km ²)	POPULATION *	POPULATION DENSITY (no./km ²)
1	EMNAMBITHI	1 025	240	0,23	147 282	144
2	EMZUMBE	1 482	563	0,38	235 101	159
3	ENSELENI	2 108	548	0,26	242 139	115
4	HLABISA	1 473	433	0,29	180 121	122
5	HLANGANANI	1 215	522	0,43	201 740	166
6	INGWAVUMA	4 063	650	0,16	155 591	38
7	INKANYEZI	1 391	332	0,24	165 612	119
8	IZINGOLWENI	1 060	503	0,47	221 200	209
9	MADADENI	604	160	0,26	151 652	251
10	MAHLABATHINI	1 770	497	0,28	138 865	78
11	MAPHUMULO	1 715	634	0,37	242 322	141
12	MPUMALANGA	538	220	0,41	218 128	405
13	MSINGA	1 738	366	0,21	166 584	96
14	NDWEDWE	1 044	541	0,52	343 977	329
15	NKANDLA	2 073	443	0,21	142 124	69
16	NONGOMA	2 299	802	0,35	180 879	79
17	NQUTHU	1 721	323	0,19	199 765	116
18	OKHAHLAMBA	1 440	327	0,23	193 373	134
19	ONGOYE	753	247	0,33	154 642	205
20	SIMDLANGENTSHA	1 118	269	0,24	119 466	107
21	UBOMBO	2 618	411	0,16	125 254	48
22	UMBUMBULU	851	392	0,46	274 101	322
23	VULAMEHLO	742	327	0,44	135 391	182
24	VULINDLELA	259	163	0,63	147 319	569

Populations based on 1994 Development Bank data published in 'Population of S A: Updated Estimates, Scenarios and Projections 1990 - 2020'

As people migrate into areas in search of better opportunities, and the population density increases, so does the demand for additional road access. Plotting the road network density against the population density for each of the 24 Magisterial Districts confirms the trend that population density is proportional to road network density. By means of regression analysis the mean relationship, which is a power function ($y=ax^n$), can be determined. This is indicated as a solid line in **Figure 6.1: Road Network Backlog**. Essentially the Districts plotting above the line have an above average road density, while the Districts plotting below the line have a below average road density.

FIGURE 6.1: ROAD NETWORK BACKLOG
Road density vs Population Density



Although the Districts of Hlanganani (5), Izingolweni (8), Nongoma (16) and Vulamehlo (23) have the highest road densities per population density, their road networks can in no way be construed to be excessive. For the purpose of quantifying the backlog in road provision, it is suggested that these Districts be regarded as having the desirable road densities for their respective population densities. With the exception of Nongoma, these Districts generally have road densities 30% above the average. Therefore it is possible to determine the desirable road density by increasing the present average relationship by 30%. This is depicted as a dashed line in **Figure 6.1**.

Consequently the Proclaimed road network backlog in each District can be calculated from the difference between the desirable road density and the present road density. The road network backlog is summarised in **Table 6.5**. Indications are that there is a perceived backlog of 2 681 km in the formal road network serving the rural

communities settled on communal land. This backlog can be addressed by upgrading the strategically important Community Access Roads and incorporating them into the formal road network as District Roads.

TABLE 6.5 : ROAD NETWORK BACKLOG AND ACCESSIBILITY INDEX

No.	DISTRICT	AREA (km ²)	DENSITY BACKLOG (km/km ²)	LENGTH BACKLOG (km)	PERCENTAGE OF BACKLOG (%)	ACCESSIBILITY INDEX
1	EMNAMBITHI	1 025	0,159	163	6,1	2,8
2	EMZUMBE	1 482	0,033	49	1,8	0,9
3	ENSELENI	2 108	0,094	198	7,4	3,4
4	HLABISA	1 473	0,071	105	3,9	1,8
5	HLANGANANI	1 215	0,000	0	0,0	0,0
6	INGWAVUMA	4 063	0,050	202	7,5	3,5
7	INKANYEZI	1 391	0,122	169	6,3	2,9
8	IZINGOLWENI	1 060	0,000	0	0,0	0,0
9	MADADENI	604	0,249	150	5,6	2,6
10	MAHLABATHINI	1 770	0,014	24	0,9	0,4
11	MAPHUMULO	1 715	0,020	35	1,3	0,6
12	MPUMALANGA	538	0,237	128	4,8	2,2
13	MSINGA	1 738	0,114	198	7,4	3,4
14	NDWEDWE	1 044	0,066	69	2,6	1,2
15	NKANDLA	2 073	0,063	130	4,9	2,3
16	NONGOMA	2 299	0,000	0	0,0	0,0
17	NQUTHU	1 721	0,168	289	10,8	5,0
18	OKHAHLAMBA	1 440	0,154	221	8,3	3,8
19	ONGOYE	753	0,139	104	3,9	1,8
20	SIMDLANGENTSHA	1 118	0,102	114	4,2	2,0
21	UBOMBO	2 618	0,076	200	7,4	3,5
22	UMBUMBULU	851	0,117	100	3,7	1,7
23	VULAMEHLO	742	0,001	0	0,0	0,0
24	VULINDLELA	259	0,129	33	1,2	0,6
			TOTAL	2 681	100,0	

The backlog varies from District to District. The District with the greatest backlog has the greatest need for funds, and in terms of accessibility, will have the highest accessibility index. In order to compute an accessibility index ranging from 0 to 5 it is possible to apply a factor to the percentage share of the backlog for each District. The accessibility indices are shown in **Table 6.5**.

6.3.5 District Allocations

Having developed the methodologies for measuring development potential, community development and

accessibility, a subjective analysis of the relative importance of these criteria produced the following ranking order and weighting constants:

PRIORITY	CRITERION	WEIGHTING
1	Development Potential	3
2	Accessibility	2
3	Community Development	1

The District Factor for District n is therefore determined as follows:

$$D_n = P_n(3I_{dp} + I_{cd} + 2I_a) \times 10^{-6}$$

and the share of funds to be allocated to the District would be:

$$\text{Share (\%)} = 100D_n / \sum D$$

It is therefore recommended that funds be allocated to the Districts in the proportions as shown in **Table 6.6** overleaf.

The allocation of funds to the Districts could have been according to population alone, however this would not take into account:

- historical backlogs in road infrastructure
- development potential factors, and
- human development factors,

which can be used to maximise the returns on investment.

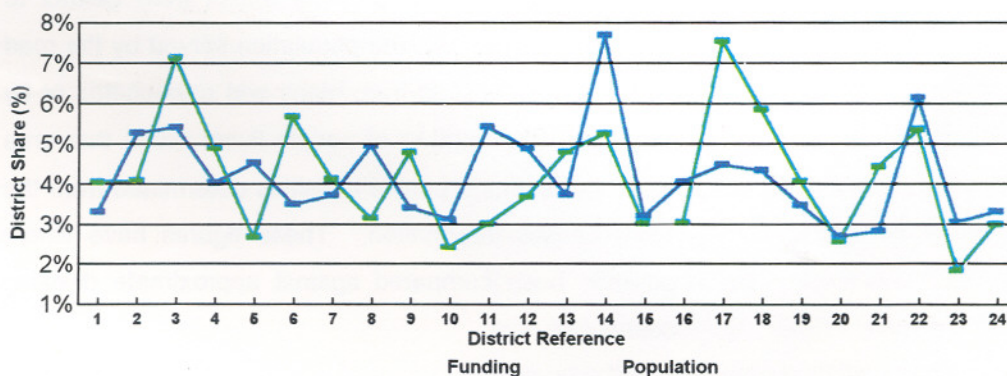
The outcome of the recommended methodology is that certain Districts such as Enseleni, Ingwavuma, Msinga, Nquthu, Okhahlamba and Ubombo will benefit most from a significantly increased portion of funds for the development of rural road infrastructure.

TABLE 6.6 : RECOMMENDED ALLOCATION OF FUNDS TO THE DISTRICTS

No.	DISTRICT	POPULATION	I _{dp}	I _{cd}	I _a	D	SHARE %
1	EMNAMBITHI	147 282	2,19	2,38	2,82	2,15	4,0
2	EMZUMBE	235 101	1,5	3,03	0,85	2,17	4,1
3	ENSELENI	242 139	2,13	2,44	3,43	3,80	7,1
4	HLABISA	180 121	2,65	2,86	1,81	2,60	4,9
5	HLANGANANI	201 740	1,43	2,70	0,00	1,41	2,6
6	INGWAVUMA	155 591	2,85	3,85	3,49	3,02	5,7
7	INKANYEZI	165 612	1,61	2,56	2,93	2,19	4,1
8	IZINGOLWENI	221 200	1,64	2,63	0,00	1,67	3,1
9	MADADENI	151 652	3,13	2,17	2,61	2,54	4,8
10	MAHLABATHINI	138 865	1,88	2,70	0,42	1,27	2,4
11	MAPHUMULO	242 322	0,86	2,78	0,60	1,59	3,0
12	MPUMALANGA	218 128	0,84	2,04	2,21	1,96	3,7
13	MSINGA	166 584	1,48	4,00	3,43	2,55	4,8
14	NDWEDWE	343 977	1,17	2,22	1,20	2,79	5,2
15	NKANDLA	142 124	1,13	3,33	2,26	1,60	3,0
16	NONGOMA	180 879	1,85	3,33	0,00	1,60	3,0
17	NQUTHU	199 765	2,47	2,70	5,00	4,02	7,5
18	OKHAHLAMBA	193 373	1,89	2,78	3,83	3,11	5,8
19	ONGOYE	154 642	2,76	2,08	1,81	2,16	4,1
20	SIMDLANGENTSHA	119 466	1,47	3,03	1,97	1,36	2,5
21	UBOMBO	125 254	3,11	2,56	3,46	2,36	4,4
22	UMBUMBULU	274 410	1,64	2,04	1,73	2,85	5,4
23	VULAMEHLO	135 391	1,33	3,13	0,01	0,97	1,8
24	VULINDLELA	147 319	2,52	2,00	0,58	1,58	3,0

Figure 6.2 below shows a comparison between population share and funding share for each of the 24 Districts.

FIGURE 6.2 : A COMPARISON BETWEEN POPULATION AND FUNDING SHARE PER DISTRICT



6.4 Selection of Road Projects

6.4.1 Rating System

When evaluating a group of roads it is often difficult to say whether road A is more important than road B. People will choose according to their perceived needs and not necessarily arrive at the same result. The level of difficulty increases when one is presented with a large list of roads, with each community pressing for their roads to be given priority.

The proposed rating system attempts to provide a uniform approach which enables one to compare roads and rank them in terms of importance.

The rating system is based on the probable use that would be made of the road by the community if it was properly maintained. Points have been allocated as listed in Table 7.2 which appears on page 7.9 of this report. Factors considered include:

Population

The number of people living adjacent the road and who would use that road and not another if it were in a reasonable condition. Population is an important factor influencing the generation of vehicle trips and the point value derived for a road will generally play a dominant role.

Since it is difficult to estimate population figures accurately, the population has been recorded in one of five ranges as defined in Table 7.3 on page 7.10.

The method of assessing population for the purposes of this study has varied to some extent from District to District, but generally, the population served by the road has been established from plans and orthophotos or by calculating the number of people living within that area using the average people densities determined from the 1990 census information. These figures have where possible been compared against approximate dwelling counts.

Other factors

Other factors consider facilities and services that occur along that particular road which are important to communities and help accumulate additional points. They include health, social and administrative services, agricultural activities, education, business and places of worship etc.

To compare the viability of both long and short roads on a more equal basis, the total points scored are divided by the length of road to give a rating value per kilometre. This effectively takes into account the relative cost of the projects. If this is not done, the longer roads will generally rank higher than the shorter roads. Where a road is less than 2 kilometres in length, the points scored are divided by 2 and not the actual length as it has been found that the very short roads gained an unfair advantage when dividing by the shorter lengths.

The points allocated to a road can be equated to a measurement of benefit that would be derived from upgrading the road. Assuming the unit of cost of upgrading is constant, the total project cost is directly proportional to the length of the project. The points to length ratio can be used to compare the relative viability of road upgrading projects in a similar way to the traditional method of using cost-benefit ratios.

The points allocated to the various facilities should reflect the relative value that communities place on a particular service. e.g. if communities consider clinic/mobile clinic to be more important than any other service, these facilities would be allocated a higher individual value. Hence roads which provide access to a clinic or mobile clinic point would generally be ranked above a similar road with no clinic or mobile clinic point. It must however be remembered that these facilities often exist where larger numbers of people live and the method favours population which usually makes up the most number of the points. Obviously when comparing roads in different areas of the District, one must not use different values for the same parameter.

The point values are likely to be a subject for debate once the Transport Forums become established and familiar with the prioritisation methodology.

6.4.2 Assessment of Priority Roads

For the purposes of this study, the Department needed to understand the access difficulties experienced by communities and the general condition of their most needed roads. Communities were asked to identify those roads which were most important to them and these were then recorded and evaluated in accordance with the above rating system. The road, track or proposed road was also given an application number and marked up on a plan.

Some communities displayed more enthusiasm about this project than others. This meant that relatively speaking, more roads were identified in those areas. It is important that those who listed fewer roads, are not viewed as having a lesser problem. Where a Local Road tended to be in a reasonable condition, because it was being maintained by another Department, it was often not brought to the study team's attention, whereas in terms of usage, it would be regarded as an important road. Some communities may also have been omitted in error and must not be disadvantaged when funds are allocated in the years to come. It was also not always possible to be accurate in assessing the correct population and facilities served by a road.

Hence when funds are allocated, details of those roads appearing on the short lists need to be confirmed by the Transport Forums before making the final choice.

6.4.3 Guide to Selection

It is not the intention to use the points system as the sole criteria for selecting the roads to be upgraded. No single method will satisfy all the demands placed on a road network.

The need for upgrading Local Roads is vast, and to ensure that there is a balanced approach to the development of an appropriate road network, it is proposed that a two part

strategy be adopted.

The first, which must receive priority attention, deals with the immediate backlog and the second involves the identification of a limited number of high priority roads in the different parts of the District to ensure that all communities, where the need is high, receive at least some attention. For example a particular community might have a number of roads that rate more highly on the point system than any other community in the District. It may not be appropriate to tackle all these roads before any funds are allocated elsewhere. Obviously it is important that reasons for choice are transparent and seen to be fair.

Roads considered to make up the backlog would be as follows :

- Roads which are needed to enhance the Proclaimed road network. The accessibility index has highlighted the approximate shortfall in kilometres in each District. Those Local Roads scoring highly would be likely candidates but one also needs to consider the actual road network deficiencies in a particular area when choosing. This clearly indicates the need for carrying out a more detailed investigation before the final selection is made.
- Roads serving clinics and regular mobile clinic bases. These facilities need to be linked to the Proclaimed road network by a reasonable standard Local Road.
- Roads serving schools (primary upwards) must be linked to the Proclaimed road network.

In the light of what has been said above, it is suggested that both the Department and the Transport Forums assess priority roads in accordance with the given criteria. If certain parties feel there are shortcomings, details should be systematically recorded at the respective Regional Offices together with the necessary motivation for change. After a reasonable time period (say 18 months of intimate use), all comments should be gathered by the Department

and investigated. Findings could be presented at a workshop involving interested parties and amendments made to the prioritisation methodology where deemed appropriate. The model must however remain simple yet effective and one must guard against the introduction of too many factors, particularly where they only have a minor impact.

To show the flexibility of the method, the following example can be considered. A community applies for a 7 km long track to be upgraded. The bulk of the population is centred around the first 4 kilometres, with very few people living along the last 3 kilometres. If the analysis is carried out for the complete length of road (ie. 7 kms), it will accumulate a number of points which are then divided by 7. If the accumulated points amounted to 210, the rating value per kilometre would be 30.

If it costs R60 000 per kilometre to upgrade, total funds needed would be R420 000. However, if only the first 4 kilometres was considered (at a cost of R240 000), the majority of the people living along that road would still benefit, and an amount of R180 000 could be re-allocated to a higher priority road elsewhere. Upon analysis of the first 4 kilometre portion of the road, the same population and facilities would be served (ie. same number of points accumulated as with the 7 kilometre length of road) but in arriving at the rating per kilometre, the total points would be divided by 4 and not 7, hence yielding a higher rating per kilometre of 52,5.

This first section of road would thus rank higher when compared with other roads than if it were assessed as a longer road. It is therefore not always appropriate to upgrade an entire length, but rather focus on that section serving the most number of people. Improvements must start from the higher order roads and extend outwards to increase the level of penetration of the road network.

In assessing existing applications during the study, roads were not broken down into sections, but taken as shown by communities. Hence, where people are clustered closer to the start of the road and it is reassessed taking into account the shorter length for possible upgrading, it is likely to rate higher. This must not be seen as a way to manipulate the system, but rather to use it effectively and spend funds wisely and where most needed.

References

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