

Datazone level Namibian Index of Multiple Deprivation 2001



*Empowered lives.
Resilient nations.*



Kavango Region

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PREFACE



This report is the result of collaborative work between the Government of the Republic of Namibia (GRN), the United Nations Development Programme (UNDP) and the Centre for the Analysis of South African Social Policy at the Oxford Institute of Social Policy at the University of Oxford.

In November 2009, the Khomas Regional Council requested UNDP to assist in designing an objective criterion or set of criteria, devoid of political and other considerations, which the Council could use in allocating development resources. Subsequent discussions led to an agreement that other stakeholders, especially the Central Bureau of Statistics needed to be involved and that the criterion or set of criteria needed to go beyond income poverty considerations. It was also agreed that rather than focus on Khomas region alone, the criterion or set of criteria needed to be applicable to, or cover the entire country. Specifically, it was agreed that a composite index of multiple deprivation, the Namibia Index of Multiple Deprivation (NIMD), be constructed at both national and regional levels. Since the scope and depth of analysis needed for the development of the NIMD required very detailed and reliable data and information, it was agreed that the 2001 census data, though 'outdated', be used as the source of information for preparing the NIMD. Accordingly, the NIMD being presented in this report reflects the situation in Kavango Region at the 2001 time-point only. UNDP and the GRN recognize that the report does not speak to possible changes in relative deprivation that may have occurred in the Kavango Region since 2001. Nevertheless the 2001 NIMD could serve as a benchmark against which change over the last decade could be measured when the

2011 Census becomes available and is subsequently used for carrying out a similar analysis.

This report presents, using tables, charts and digital maps, a profile of multiple deprivation in Kavango Region at data zone level, which is a relatively new statistical geography developed for purposes of measuring deprivation at a small area level. This technique of profiling deprivation at datazone level, each with approximately 1000 people only, enables the identification and targeting of pockets of deprivation within Kavango Region for possible use in panning for and implementation of development interventions. The aim of the exercise was to produce a profile of relative deprivation across Kavango Region in order for the most deprived areas to be identified and clearly delineated. In this way, it would be possible for regional and constituency level policy and decision makers, as well development practitioners, to consider a particular domain of deprivation, or to refer to the overarching NIMD for each constituency or datazone, in *inter alia*, allocating and applying development resources and interventions. The NIMD can also be used as a platform for effecting a paradigm shift in development planning towards increased focus on and targeting of deprived areas and sectors; as well as interrogating the causes of inequality in access to basic services within the region. The

NIMD at datazone level should be viewed as adding to the existing body of information and knowledge, including local knowledge systems, about poverty and deprivation in Kavango Region and the large family of existing planning and resource allocation tools and methodologies already in use at the regional level.

This project was undertaken by Professor Michael Noble, Dr Gemma Wright, Ms Joanna Davies, Dr Helen Barnes and Dr Phakama Ntshongwana of the Centre for the Analysis of South African Social

Policy at the Oxford Institute of Social Policy at the University of Oxford, under the leadership and guidance a national steering committee chaired by Mr Sylvester Mbangu, Director of the Central Bureau of Statistics, with active participation of representatives of the thirteen Regional Councils. In addition to providing the funds for carrying out the project, UNDP provided overall oversight and technical backstopping to the project through Ojijo Odhiambo, Senior Economist and Johannes Ashipala, National Economist. David Avenell is thanked for his assistance with producing the datazones.

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SECTION 1: INTRODUCTION



This report presents the datazone level Namibian Index of Multiple Deprivation 2001 (NIMD 2001) for the Kavango region. The NIMD is a composite index reflecting five dimensions of deprivation: income and material deprivation; employment deprivation; education deprivation; health deprivation; and living environment deprivation.

The NIMD and the component domains of deprivation were produced at datazone level using data from the 2001 Population Census. Datazones are small areas containing approximately the same number of people (average 1,000). The datazone level NIMD therefore provides a fine-grained picture of deprivation and enables pockets of deprivation to be identified in Kavango Region.

The report is structured as follows: The background information and the conceptual framework which underpins the model of multiple deprivation is described in this introductory section. In Section 2 the rationale for and process of constructing datazones are described. Section 3 introduces the domains and indicators that were included in the NIMD and summarises the methodological approach that was used in constructing the NIMD. In Section 4 datazone level results for Kavango Region are presented, while conclusions and some general policy recommendations are presented in Section 5.

1.1 Background

Initially a NIMD was created at constituency level for the Khomas Regional Council, but applicable to other regions of the country as well, using data from the 2001 Population Census at constituency level after a two-day consultative process on the domains and indicators with members of the Central Bureau of Statistics and civil servants from the Council. The objective of this phase of

the project was to construct measures of multiple deprivation at constituency level in order to provide a more detailed analysis of deprivation which would enable Khomas Regional Council, and other regional councils across Namibia, to rank their areas in order of deprivation, and also to set them in the context of all other areas in Namibia. The datazone level index presented in this report draws from the previous constituency index, and covers, in detail, the entire country including Kavango Region. In constructing the NIMD at datazone level however,

“ The NIMD and the component domains of deprivation were produced at datazone level using data from the 2001 Population Census. As will be elaborated in Section 2, datazones are small areas containing approximately the same number of people (average 1,000) ”

it became necessary to make some small changes to some of the domains and indicators. These changes are explained in detail in Section 3 of this report. As such, the constituency level index has also been revised to give a comparable measure. The initial results of the work at the datazone level were presented to, and validated by, representatives of all the 13 Regional Councils at a workshop held in Ondangwa in November 2011.

1.2 Defining poverty and deprivation

Townsend (1979) sets out the case for defining poverty in terms of relative deprivation as follows: *‘Individuals, families and groups can be said to be in poverty if they lack the resources to obtain the types of diet, participate in the activities and have the living conditions and amenities which are customary or at least widely encouraged or approved in the societies to which they belong’* (Townsend, 1979, p31).

Though ‘poverty’ and ‘deprivation’ have often been used interchangeably, many have argued that a clear distinction should be made between them (see for example the discussion in Nolan and Whelan, 1996). Based on this line of thought, it can be argued that the condition of poverty means not having enough financial resources to meet a need, whereas deprivation refers to an unmet need, which is caused by a lack of resources of all kinds, not just financial.

1.3 The concept of multiple deprivation

The starting point for the NIMD is a conceptual model of multiple deprivation. The model of multiple deprivation is underpinned by the idea

that there exists separate dimensions of deprivation which can be recognised and measured, and are experienced by individuals living in an area. Multiple deprivation is therefore conceptualised as a weighted combination of distinct dimensions or domains of deprivation. An area level score for each domain is produced and these are then combined to form an overall Index of Multiple Deprivation. Although the area itself is not deprived, it can nonetheless be characterised as deprived *relative* to other areas, in a particular dimension of deprivation, on the basis of the proportion of people in the area experiencing the type of deprivation in question. In other words, the experiences of the people in an area give the area its deprivation characteristics. It is important to emphasize that the area itself is not deprived, though the presence of a concentration of people experiencing deprivation in an area may give rise to a compounding deprivation effect, but this is still measured by reference to those individuals. Having attributed the aggregate of individual experience of deprivation to the area however, it is possible to say that an area is deprived in that particular dimension. And having measured specific dimensions of deprivation, these can be understood as domains of multiple deprivation. In his article ‘Deprivation’ Townsend also lays down the foundation for articulating multiple deprivation as an aggregation of several types of deprivation (Townsend, 1987). Townsend’s formulation of multiple deprivation is the starting point for the model of small area deprivation which is presented here.

SECTION 2: DATAZONES



Datazones are a new statistical geography for Namibia created especially for this version of the NIMD 2001. This section provides a non-technical overview of the process of creating the datazones and summarises their characteristics.

The methodology adopted is based on a similar process undertaken in South Africa (Avenell et al., 2009) which in turn was adapted from techniques developed in the United Kingdom (see, for example, Martin et al., 2001). Datazones were built up from Census Enumeration Areas (EAs) to create a standard uniform geography across Kavango Region based on the existing EA geography which nest within the nine constituency boundaries. Though a datazone may be created from a single EA, it is usually created by merging one or more contiguous EAs which share common characteristics in accordance with a set of pre-defined rules. The actual creation of datazones was undertaken using a variety of geographical programming techniques (see Avenell et al., 2009). A set of rules governing the merging process was drawn up to ensure that the datazones had, as close as was possible, the following characteristics:

Population size: Datazones are designed to have a similar resident population size - this allows comparability across the region. The target population size was 1,000 with a minimum of 500 and maximum of 1,500. A total 202 datazones were created for the Kavango Region.

Population density: Datazones should comprise EAs of similar population density. This is important to ensure that urban areas become distinct from rural areas. The datazone algorithm incorporated thresholds to ensure that, wherever possible, urban areas became tightly bounded.

Internal homogeneity: It is important that datazones comprise EAs of similar characteristics. This helps to ensure that the datazone geography created is 'meaningful' in that, for example, in urban areas housing of a similar type is grouped together within one datazone and that those living in EAs within a single datazone share similar socio-economic characteristics. In order to achieve this all EAs were analysed using a technique known as cluster analysis. This technique groups EAs across the country and the region into a small number of 'families' based on a variety of relevant characteristics. The datazones were checked and validated by obtaining aerial photography underlays for the mapping software and visually inspecting boundary positions.

“ Though a datazone may be created from a single EA, it is usually created by merging one or more contiguous EAs which share common characteristics in accordance with a set of pre-defined rules. ”

SECTION 3: METHODOLOGY

3.1 An introduction to the domains and indicators

Domains

The NIMD, as presented in this report, was produced using the 2001 Namibian Population Census which was supplied by the Namibian Central Bureau of Statistics for the purposes of this project. Whilst the intention should always be concept-led rather than 'data-driven', the project team was restricted to selecting indicators from the range of questions included within the 2001 Census. The NIMD was produced at datazone level (and also at constituency level on a comparable basis). There are 202 datazones and nine constituencies in Kavango.

The NIMD contains five domains of deprivation:

- Material Deprivation¹
- Employment Deprivation
- Health Deprivation
- Education Deprivation
- Living Environment Deprivation

Each domain is presented as a separate domain index reflecting a particular aspect of deprivation. Each domain seeks to measure only one dimension of deprivation, avoiding overlaps between the domains and providing a direct measure of the deprivation in question. Individuals can however, experience more than one type of deprivation at any given time and it is therefore conceivable

that the same person can be captured in more than one domain. So, for example, if someone was unemployed, had no qualifications and had no access to basic material goods they would be captured in the Employment Deprivation, Education Deprivation and Material Deprivation domains. The indicators were chosen following an extensive consultation process with representatives of the Central Bureau of Statistics, Khomas Regional Council and UNDP².

“ The NIMD was produced using the 2001 Namibian Population Census which was supplied by the Namibian Central Bureau of Statistics for the purposes of this project ”

Indicators

Each domain index contains a number of indicators. There are 11 indicators in total in the NIMD. The aim for each domain was to include a parsimonious (i.e. economical in number) collection of indicators that comprehensively captured the deprivation for

¹ This refers to material goods, that is, assets or possessions.

² During the consultation process a number of other domains were discussed. These included: access to recreation facilities, level of participation in community activities, crime, food security, provision of emergency services, and availability of affordable transport. Unfortunately data relating to these issues were not available within the Census. These issues could be incorporated into further iterations of the NIMD if appropriate administrative or geographical data becomes available.

each domain, but within the constraints of the data available from the 2001 Census. When identifying indicators for the domains, it was important to ensure that they are direct measures of the domain of deprivation in question and specific to that domain.

In the construction of that index the indicators were discussed at length during the consultation process and every effort was made to ensure that they were appropriate for the Namibian context. The domains need to allow different geographical areas to be distinguished from one another; therefore it would be unhelpful to identify a deprivation which is experienced by most people in most areas as this would not enable the areas to be ranked relative to each other in terms of deprivation.

In the following sub-sections the domains and indicators which make up the NIMD 2001 are described.

“ With the exception of changes to three indicators in the newly constituted Living Environment Deprivation Domain, the indicators are the same as those used in the previous constituency level index. ”

“ In any event, the 2001 Census did not have an income question and so an income poverty indicator, if included, would need to be modelled from a different data source such as the Namibian Household Income and Expenditure Survey ”

3.2 Material Deprivation Domain

Purpose of the domain

This domain measures the proportion of the population experiencing material deprivation in an area by reference to the percentage of the population who are deprived of access to basic material possessions.

Background

In other indices that have followed this model (e.g. UK indices), an Income Deprivation Domain was created. However, there is an argument that such a domain is inappropriate within an Index of Multiple Deprivation, because - as explained above - deprivation can be regarded as the outcome of lack of income rather than the lack of income itself. To follow Townsend, within a multiple deprivation measure, only the deprivations resulting from a

low income would be included so low income itself would not be a component, but lack of material possessions would be included. In any event, the 2001 Census did not have an income question and so an income poverty indicator, if included, would need to be modelled from a different data source such as the Namibian Household Income and Expenditure Survey. Such modelling work is being undertaken separately for the Central Bureau of Statistics (now Namibia Statistics Agency) by Lux Development and will provide a complementary small area measure of income poverty. For these reasons, a material deprivation domain was produced. A lack of access to basic material goods can be understood as a proxy for low income. The 2001 Census included questions about access to material goods (e.g. television, radio, newspaper, telephone and computer) which are internationally accepted and widely used as measures of variations in living standards.

Of the possible material goods that could be included as indicators, access to a television/radio and telephone/cell phone were selected as they represent important modes of communication and a means of accessing information crucial to one's life and livelihood. The quality of the services provided however, were not be taken into account.

Indicators

- Number of people living in a household with no access to a television or a radio; or
- Number of people living in a household with no access to a telephone/cell phone.

Combining the indicators

A simple proportion of people living in households experiencing either one or both of the deprivations was calculated (i.e. the number of people living in a household with no access to a television/radio and/or with no access to a telephone/cell phone divided by the total population).

3.3 Employment Deprivation Domain

Purpose of the domain

This domain measures employment deprivation conceptualised as involuntary exclusion of the working age population from the world of work by reference to the percentage of the working age population who are unemployed.

Background

The 2001 Census recorded employment status in line with the International Labour Organisation (ILO) 'labour force framework' and the 'priority rules' which give precedence to employment over all other activities '*regardless of the amount of time devoted to it, which in extreme cases may be only one hour*' (Husmanns, 2007, p6). Therefore a person was considered to be employed if during the seven days prior to the Census night they worked for at least one hour for pay, profit or family gain. It follows that unemployment was defined as a situation of a total lack of work. The definition of unemployment adopted by the 13th International Conference of Labour Statistics (ICLS) stipulates three criteria which must be simultaneously met for a person to be considered unemployed. According

to this official definition, the unemployed are those persons within the economically active population (aged 15-65 inclusive) who during the reference period (for the 2001 Census this is the seven days prior to Census night) were:

1. Without work, i.e. in a situation of total lack of work; and
2. Currently available for work, i.e. not a student or homemaker or otherwise unavailable for work; and
3. Seeking work, i.e. taking steps to seek employment or self-employment.

Using the 2001 Census however, it was not possible to measure whether unemployed people were available for work and seeking work. Though other indices have also included people of working age who cannot work because of illness or disability, as they are involuntarily excluded from the world of work and internationally are regarded as the 'hidden unemployed' (Beatty et al., 2000), the consultation group wanted to limit this domain to the economically active population and therefore disabled or long-term sick people were not included. The age band was modified to 15-59 inclusive to reflect a concept of working age relevant to Namibia.

Indicator

- Number of people aged 15-59 inclusive who are unemployed.

Combining the indicators

The domain was calculated as those identified as

unemployed and aged 15 to 59 inclusive divided by the number of people who are economically active in that age group.

3.4 Health Deprivation Domain

Purpose of the domain

This domain identifies areas with relatively high rates of people who die prematurely. The domain measures premature mortality but not aspects of behaviour or environment that may be predictive of *forthcoming* health deprivation.

Background

Although the consultation process raised the importance of measuring people's health status; and access to health facilities and healthcare, these issues could not be measured using the 2001 Census data. It was therefore not possible to include any measures of morbidity or access to health services. Instead a form of standardised mortality ratio known as Years of Potential Life Lost (YPLL) was used. An internationally recognised measure of poor health, the YPLL measure is the level of unexpected mortality weighted by the age of the individual who has died (for details about how this indicator was constructed see Blane and Drever, 1998). An area with a relatively high death rate in a young age group (including areas with high levels of infant mortality) will therefore *ceteris paribus*, have a higher overall YPLL score than an area with a similarly relatively high death rate for an older age group.

“ The YPLL measure is related to life expectancy in an area. Areas with low life expectancy will have high YPLL scores ”

The YPLL indicator is a directly age and gender standardised measure of premature death (i.e. death under the age of 75)³. The YPLL measure is related to life expectancy in an area. Areas with low life expectancy will have high YPLL scores. Equally high levels of infant mortality and perinatal mortality as well as high levels of serious illness such as HIV/AIDS and tuberculosis will all contribute to reduced life expectancy in an area and therefore high YPLL scores. Thus, although the YPLL is a mortality measure, it does, implicitly, reflect the extent of serious ill-health in an area. And although it would have been possible to use infant mortality, under-five mortality, and life expectancy as indicators, YPLL in effect combines all these issues into a single indicator and is therefore a broader and more useful overview of health deprivation in an area.

Indicator

- Years of potential life lost

3.5 Education Deprivation Domain

Purpose of the domain

This domain measures deprivation in educational attainment for people aged 15 to 59 inclusive.

Background

Elsewhere in the Southern Africa Development Community (SADC) region it has been shown that the level of educational attainment in the working age adult population is closely linked to an individual's employment status and future opportunities for those individuals and their dependants (Bhorat et al., 2004).

The 2001 Census includes a record of the level of education completed and a record of illiteracy. These two questions provide the best available measures of educational attainment and make up the indicators for this domain. The consultation process additionally raised the importance of affordable education and availability of tertiary education opportunities, but again, these could not be adequately captured using the 2001 Census.

Indicators

- Number of 15-59 year olds inclusive with no schooling completed at secondary level or above; or
- Number of 15-59 year olds inclusive who are illiterate.

³. Because the direct method of standardisation makes use of individual age/gender death rates it is often associated with small numbers. An empirical Bayes or 'shrinkage' technique is therefore used to smooth the individual age/gender death rates in order to reduce the impact of small number problems on the YPLL.

Combining the indicators

A simple proportion of the working age population (aged 15 to 59 years old inclusive) who had not completed schooling at secondary level or who are illiterate was calculated (i.e. the number of people with no schooling completed at secondary level or above or who are illiterate divided by the population aged 15 to 59 inclusive).

3.6 Living Environment Deprivation Domain

Purpose of the domain

This domain measures both inadequacy in housing conditions and a lack of basic services to the home.

Background

The 2001 Census questionnaire provides indicators on households' access to basic amenities. These aspects of the immediate environment in which people live impact on the quality of their life and provide good measures of deprivation in terms of access to services.

Measuring access to electricity as a basic amenity is a useful indicator of living environment deprivation. Three Census indicators were considered: main source of energy for cooking, lighting and heating. Although cost, availability and effectiveness are factors in the consumption of all energy supplies, it has been argued that in certain instances, the choice of fuel for cooking may be influenced by cultural preference rather than availability alone, whereas the use of electricity for lighting would generally be the preferred choice, if available,

and therefore provides a more valid measure of deprivation in terms of access to energy for lighting (Bhorat et al., 2004). This was the measure used in the previous constituency level index. However, at datazone level, all individuals in a high proportion of datazones were found to lack electricity for lighting. These datazones would all be given the same overall score for this domain, and so it would not be possible to discriminate between datazones in terms of their level of deprivation. For this reason the indicator was altered slightly to include paraffin alongside electricity (and solar power) as the measure of access to energy for lighting. The inclusion of paraffin however, does not imply any judgement about its suitability for lighting purposes, but is rather a means of enabling datazones to be properly ranked on this domain.

Access to clean drinking water and sanitation facilities is essential for the good health of the population and thus an important indicator to include in this domain. An indicator of no access to

“Access to clean drinking water and sanitation facilities is essential for the good health of the population and thus an important indicator to include in this domain”

piped water within the home or within 200 metres of the home was included. The threshold of 200 metres was regarded by the consultation group as preferable to a threshold of 400 metres (the MDG measure). Though in the previous (constituency) index people without flush toilets or ventilated pit latrines were regarded as deprived, investigation of this indicator at datazone level revealed that again, a high proportion of datazones scored 100 percent. Therefore, as with the access to energy indicator, an additional criterion was added: long drop pit latrines were included alongside flush toilets and ventilated pit latrines. Again, the inclusion of long drop pit latrines does not imply adequacy, but is included simply as a means of discriminating between datazones.

The quality of housing construction provides an important indicator for the quality of day-to-day life and vulnerability to shocks such as adverse weather conditions (Bhorat et al., 2004; Programme of Action Chapter 2 World Summit for Social Development Copenhagen 1995). There was much discussion during the consultation process about traditional dwellings and their adequacy. Though the 2001 Census contains fairly precise information about materials used in the construction process, there is no way of identifying whether the resultant buildings were of a high quality or not. It was therefore agreed that only shacks could be reliably identified as constituting inadequate housing.

The crowding indicator is calculated by dividing the number of people in the household by the number of rooms excluding bathrooms, toilets, kitchens, stoops and verandas. Different versions

of the crowding indicator were considered. It was felt that the most appropriate measure of crowding was to classify three or more people per room as a deprivation. Setting the capacity cut-off at two or more people per room was considered. However, it was felt that this lower capacity would capture too many non-deprived people, for example relatively well-off couples sharing a one room urban apartment.

Indicators

- Number of people living in a household without the use of electricity, paraffin or solar power for lighting; or
- Number of people living in a household without access to a flush toilet or pit latrine (ventilated or long drop); or
- Number of people living in a household without piped water/borehole/borehole with covered tank (but not open tank)/protected well inside their dwelling or yard or within 200 metres; or
- Number of people living in a household that is a shack; or
- Number of people living in a household with three or more people per room.

Combining the indicators

A simple proportion of people living in households experiencing one or more of the deprivations was calculated (i.e. the number of people living in a household without electricity, paraffin or solar power for lighting and/or without adequate toilet facilities and/or without adequate water provision and/or living in a shack and/or in overcrowded conditions divided by the total population).

3.7 Constructing the domain indices

In all domains apart from the Health Deprivation Domain, the overall score is a simple proportion of the relevant population, and so can be easily interpreted.

As Censuses can be regarded as a sample from a super-population, it is important to consider and deal with large standard errors. A technique that takes standard errors into account but still enables one to then combine the domains into an overall index of multiple deprivation is called Bayesian shrinkage estimation. Specifically, the scores for datazones can be unreliable when the deprived population is small and so the shrinkage technique was applied to each of the domains. The 'shrunk' estimate is the weighted average of the original datazone level estimate and an appropriate larger spatial unit. The weight is based on the standard error of the original datazone estimate and the amount of variation within the constituency. For further details about this technique see Annex 2 of the 2001 NIMD National Report available at <http://www.undp.org.na/publications.aspx> and also Noble et al. (2006b).

3.8 Standardising and transforming the domain indices

Having obtained a set of domain indices, these needed to be combined into an overall Namibia Index of Multiple Deprivation and in order to combine domain indices which are each based on different metrics there needed to be some way to standardise the scores before any combination

“As Censuses can be regarded as a sample from a super-population, it is important to consider and deal with large standard errors. A technique that takes standard errors into account but still enables one to then combine the domains into an overall index of multiple deprivation is called Bayesian shrinkage estimation”

could take place. A form of standardisation and transformation is required that meets the following criteria. First it must ensure that each domain has a common distribution; second, it must not be scale dependent (i.e. conflate size with level of deprivation); third, it must have an appropriate degree of cancellation built into it; and fourth, it must facilitate the identification of the most deprived datazones. The exponential transformation of the ranks best meets these criteria and was applied in the NIMD 2001. For further details about this

“A form of standardisation and transformation is required that meets the following criteria. First it must ensure that each domain has a common distribution; second, it must not be scale dependent (i.e. conflate size with level of deprivation); third, it must have an appropriate degree of cancellation built into it; and fourth, it must facilitate the identification of the most deprived datazones. The exponential transformation of the ranks best meets these criteria and was applied in the NIMD 2001. For further details see Annex 3 and Noble et al. (2006b)”

technique see Annex 3 of the 2001 NIMD National Report available at <http://www.undp.org.na/publications.aspx> and also Noble et al. (2006b).

3.9 Weights for the domain indices when combining into an overall Index of Multiple Deprivation

Domains are conceived as independent dimensions of multiple deprivation, each with their own additive impact on multiple deprivation. The strength of this impact, though, may vary between domains depending on their relative importance. As a starting point, equal weights for the domains were recommended and this was supported by the consultation group. Each domain was therefore assigned a weight of 1. The NIMD was therefore constructed by adding the standardised and transformed domain indices with equal weights.

SECTION 4: DATAZONE LEVEL NAMIBIAN INDEX OF MULTIPLE DEPRIVATION 2001: KAVANGO REGION

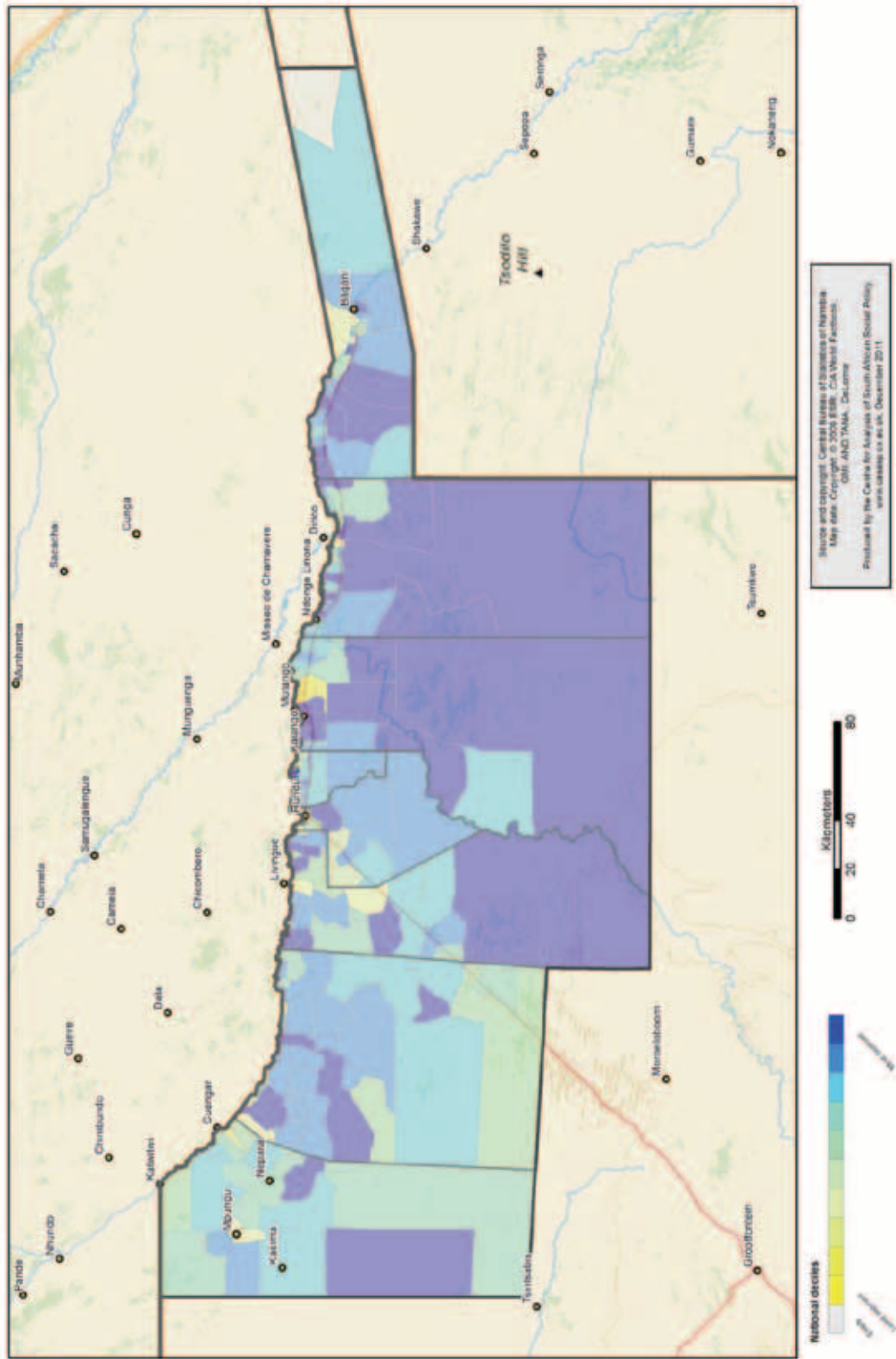
4.1 Multiple Deprivation

In this section a profile of multiple deprivation in the Kavango Region at both constituency and datazone levels is presented. Using the data from the NIMD it is possible to compare the 202 datazones and nine constituencies within Kavango. Map 1 shows the datazones in Kavango in relation to the overall

NIMD (i.e. the five separate domains of deprivation combined together). The lightest shading relates to the least deprived datazones. Map 2 is a zoom-in of Map 1, showing the datazones within the Rundu area (as these are small in physical size and therefore hard to distinguish on Map 1). These maps provide an easy to interpret picture of the pattern of multiple deprivation in the Kavango Region.

Map 1

Namibian Index of Multiple Deprivation 2001
Kavango Region



Map 2

Namibian Index of Multiple Deprivation 2001
Rundu, Kavango Region

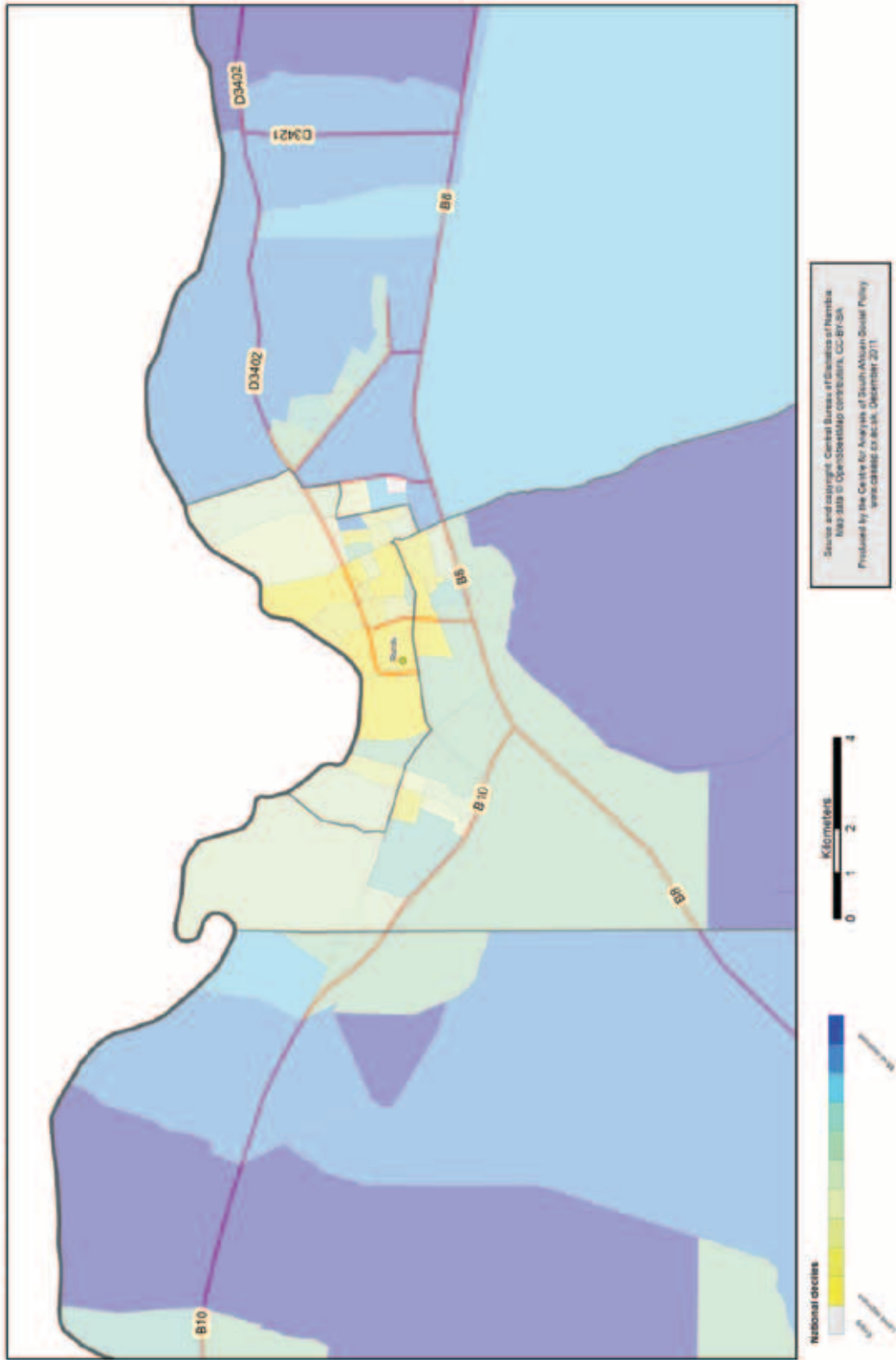


Table 1 below shows some of the data underlying Maps 1 and 2 shown above. The NIMD 2001 score, national rank (where 1=most deprived and 1,871=least deprived) and Kavango rank (where 1=most deprived and 202=least deprived) for the 20 most deprived datazones in Kavango are shown. Appendix 2 provides this information for all of the datazones in Kavango.

The most deprived datazone in Kavango is in

Ndiyona constituency, and is therefore given a rank of 1 among the datazones in Kavango. This datazone also ranks as the most deprived datazone nationally. Forty-two of the datazones in Kavango are in the most deprived 10% of datazones in Namibia in terms of multiple deprivation (the cut-off for the 10% most deprived is a rank of 187). The least deprived datazone in Kavango is located in Rundu Urban which is ranked at 1,756 nationally.

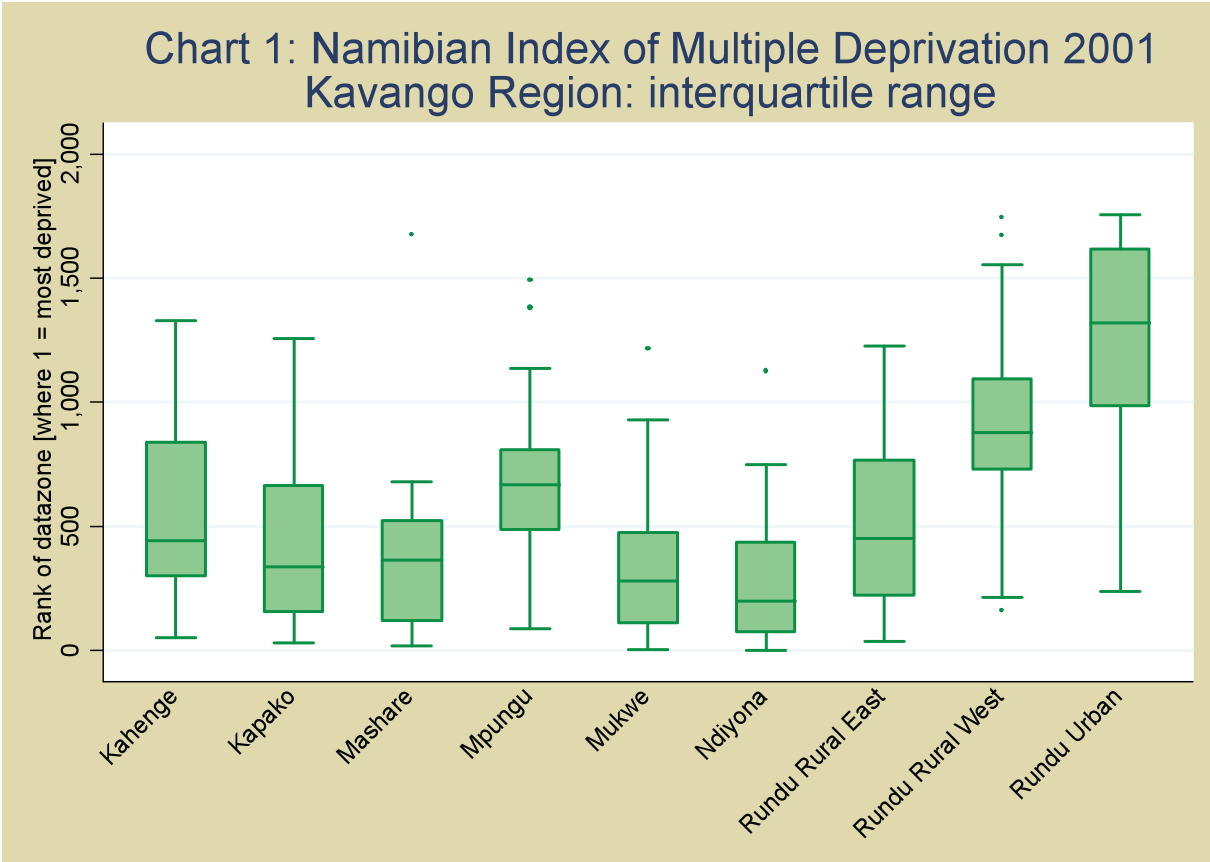
Table 1: The 20 most deprived datazones in the Kavango Region

Datazone	Constituency	NIMD score	NIMD rank - national	NIMD rank - within Kavango
482	Ndiyona	387.4	1	1
481	Ndiyona	364.3	2	2
455	Mukwe	360.1	4	3
469	Mukwe	344.6	12	4
459	Mukwe	343.8	13	5
460	Mukwe	343.2	14	6
480	Ndiyona	339.9	16	7
411	Mashare	338.2	18	8
417	Mashare	322.1	28	9
392	Kapako	321.3	30	10
409	Mashare	320.6	31	11
386	Kapako	320.3	33	12
544	Rundu Rural East	317.8	35	13
461	Mukwe	317.6	36	14
487	Ndiyona	314.8	39	15
474	Ndiyona	314.5	40	16
410	Mashare	313.8	41	17
542	Rundu Rural East	310.1	43	18
352	Kahenge	306.7	50	19
388	Kapako	301.1	61	20

The nine constituencies in Kavango vary in terms of the range of deprivation of their datazones. Chart 1 shows the minimum, maximum and median rank of datazones in each constituency, and the interquartile range for the overall NIMD. This is based on the *national* ranks (i.e. where the most deprived datazone in Namibia is ranked 1, and the

least deprived datazone is ranked 1,871).

Interpretating the Charts: For details on how to interpret the chart please see the ‘How to interpret interquartile range charts’ description in section 4.1 of the national report available at <http://www.undp.org.na/publications.aspx>



The vertical green line for each constituency shows the range of the ranks of the datazones in a constituency (including the dots which for some constituencies appear at either end of the line). Several of the constituencies have a large range of deprivation, particularly Rundu Rural West and Rundu Urban.

The green box for each constituency shows the range of the NIMD ranks of the middle 50% of datazones in the constituency (the interquartile range). The horizontal line within the box for each constituency represents the rank of the median datazone within that constituency. Most of the constituencies have a median rank which is situated towards the most

deprived end of the distribution. However, Rundu Urban and to a lesser extent Rundu Rural West have higher (less deprived) median ranks.

If the box is relatively short this indicates that datazones are ranked in a narrow range, with similar NIMD ranks (and therefore similar levels of multiple deprivation). Several of the constituencies have a narrow range for the middle 50%, in particular Mpungu, Mukwe, Ndiyona and Rundu Rural West. If the box sits towards the bottom of the chart it tells us that datazones in the constituency are concentrated in the most deprived part of the national distribution of the NIMD. If the box sits towards the top of the chart it tells us that datazones in the constituency are concentrated in the least deprived part of the national distribution. Datazones in all of the constituencies apart from Rundu Rural West and Rundu Urban are concentrated at the most deprived end of the distribution.

Further analysis shows that six of the nine constituencies have datazones in the most deprived 10 percent of datazones *within Kavango* on the overall NIMD. The six constituencies and the number that are in the most deprived 10 percent of datazones within Kavango are as follows: Kahenge (1 of 36), Kapako (3 of 27), Mashare (4 of 17), Mukwe (5 of 26), Ndiyona (5 of 20) and Rundu Rural East (2 of 16).

4.2 Domains of deprivation

Although it is not possible to calculate multiple deprivation rates as such, each of the individual domains of deprivation can be presented at constituency level, and for all domains except health the domain scores can be compared. Table 2 provides the domain scores for each constituency in Kavango, excluding health as the health score is not calculated as a rate. The other four domains are in the form of simple deprivation rates. So for example, 64.8 percent of the population in Kapako constituency experienced material deprivation in 2001. The within Kavango ranks are shown as well as the domain scores, for each constituency in Kavango (where 1=most deprived).

In terms of material deprivation, the most deprived constituency in Kavango is Mashare (with a very high 93 percent of the population experiencing material deprivation in 2001), followed closely by Ndiyona (92 percent). In relation to employment deprivation, the most deprived constituency is Ndiyona (with 40 percent of the relevant population being employment deprived in 2001), followed by Mukwe (35 percent) and Rundu Rural East (33 percent). In all of the constituencies apart from Rundu Urban, 70 percent or more of the relevant population was education education deprived in 2001. The most deprived constituency is Kahenge (with 77 percent of the relevant population being education deprived in 2001). In terms of living

environment deprivation, in seven of the nine constituencies almost all (over 98 percent) of the population experienced living environment deprivation in 2001. Rundu Rural West and Rundu Urban were the two least deprived constituencies in terms of living environment deprivation in 2001 at 92 percent and 71 percent, respectively.

The most deprived constituency is different for each domain. For instance, Rundu Urban is the least deprived constituency on three of the domains: material, education and living environment deprivation. However, on the employment domain Rundu Urban was the fourth most deprived constituency with 28 percent of the relevant

population being employment deprived in 2001.

The domain scores and ranks for each of the datazones in Kavango are presented in Appendix 2. As in Table 2, four of the five domains are expressed as rates. Health deprivation is expressed as the years of potential life lost in that datazone. A datazone with a relatively high death rate in a young age group (including areas with high levels of infant mortality) will *ceteris paribus*, have a higher score than an area with a similarly relatively high death rate for an older age group. The measure is related to life expectancy in an area, so datazones with low life expectancy will have high scores on this domain.

Table 2: Domain scores and ranks for each constituency in the Kavango Region

Constituency	Material deprivation rate (%)	Material deprivation rank (within Kavango)	Employment deprivation rate (%)	Employment deprivation rank (within Kavango)	Education deprivation rate (%)	Education deprivation rank (within Kavango)	Living environment deprivation rate (%)	Living environment deprivation rank (within Kavango)
Kahenge	72.3	5	6.7	8	76.9	1	99.4	2
Kapako	64.8	7	13.4	7	76.0	3	99.6	1
Mashare	93.0	1	23.1	6	69.8	8	99.2	4
Mpungu	69.9	6	5.2	9	75.4	5	98.5	6
Mukwe	86.4	3	34.5	2	76.6	2	98.6	5
Ndiyona	92.3	2	40.2	1	75.7	4	99.2	3
Rundu Rural East	85.5	4	33.2	3	71.9	6	98.3	7
Rundu Rural West	63.9	8	23.5	5	70.5	7	92.3	8
Rundu Urban	55.9	9	28.3	4	56.2	9	71.1	9

Table 3 shows the percentage of each constituency's datazones that are in the most deprived 10 percent of datazones *nationally* for each domain. All of the constituencies in Kavango have datazones that feature in the most deprived 10 percent of datazones nationally for at least one domain. Four constituencies, Kapako, Mashare, Mukwe and Ndiyona have datazones in the most deprived 10 percent for all domains. Each of the constituencies has at least one datazone in the most deprived 10

percent nationally in terms of health deprivation. This is the only domain for which Rundu Urban has datazones in the most deprived 10 percent nationally. Just under two thirds (65 percent) of the datazones in Mashare are in the most deprived 10 percent of datazones nationally in terms of material deprivation, while over half of the datazones in Kahenge and Kapako are in the most deprived 10 percent in terms of education and living environment deprivation, respectively.

Table 3: Percentage of datazones in most deprived 10 percent of datazones in the Namibia (National)

Constituency	Number of datazones	Material deprivation	Employment deprivation	Health deprivation	Education deprivation	Living env. deprivation
Kahenge	36	11.1	0.0	11.1	58.3	27.8
Kapako	27	18.5	11.1	11.1	25.9	55.6
Mashare	17	64.7	5.9	23.5	23.5	47.1
Mpungu	20	5.0	0.0	5.0	25.0	15.0
Mukwe	26	38.5	7.7	7.7	30.8	34.6
Ndiyona	20	25.0	15.0	15.0	30.0	15.0
Rundu Rural East	16	6.3	0.0	6.3	0.0	37.5
Rundu Rural West	21	0.0	0.0	4.8	0.0	19.0
Rundu Urban	19	0.0	0.0	21.1	0.0	0.0

Table 4 shows the percentage of each constituency's datazones that are in the most deprived 10 percent of datazones *within Kavango* for each domain. Mukwe and Kapako are the only constituencies that have datazones in the most deprived 10 percent for all five domains. Kahenge, Mashare, Mpungu and Ndiyona have datazones that feature in the 10 percent most deprived for four of the domains. Each of the nine constituencies has at least one

datazone in the most deprived 10 percent in terms of health deprivation. Almost half of the datazones in Mashare are in the 10 percent most deprived in terms of material deprivation. Rundu Urban only has datazones in the most deprived 10 percent of datazones for employment and health deprivation, but nevertheless has the highest percentage of datazones in the most deprived 10 percent in terms of health deprivation.

Table 4: Percentage of datazones in most deprived 10 percent of datazones in the Kavango Region

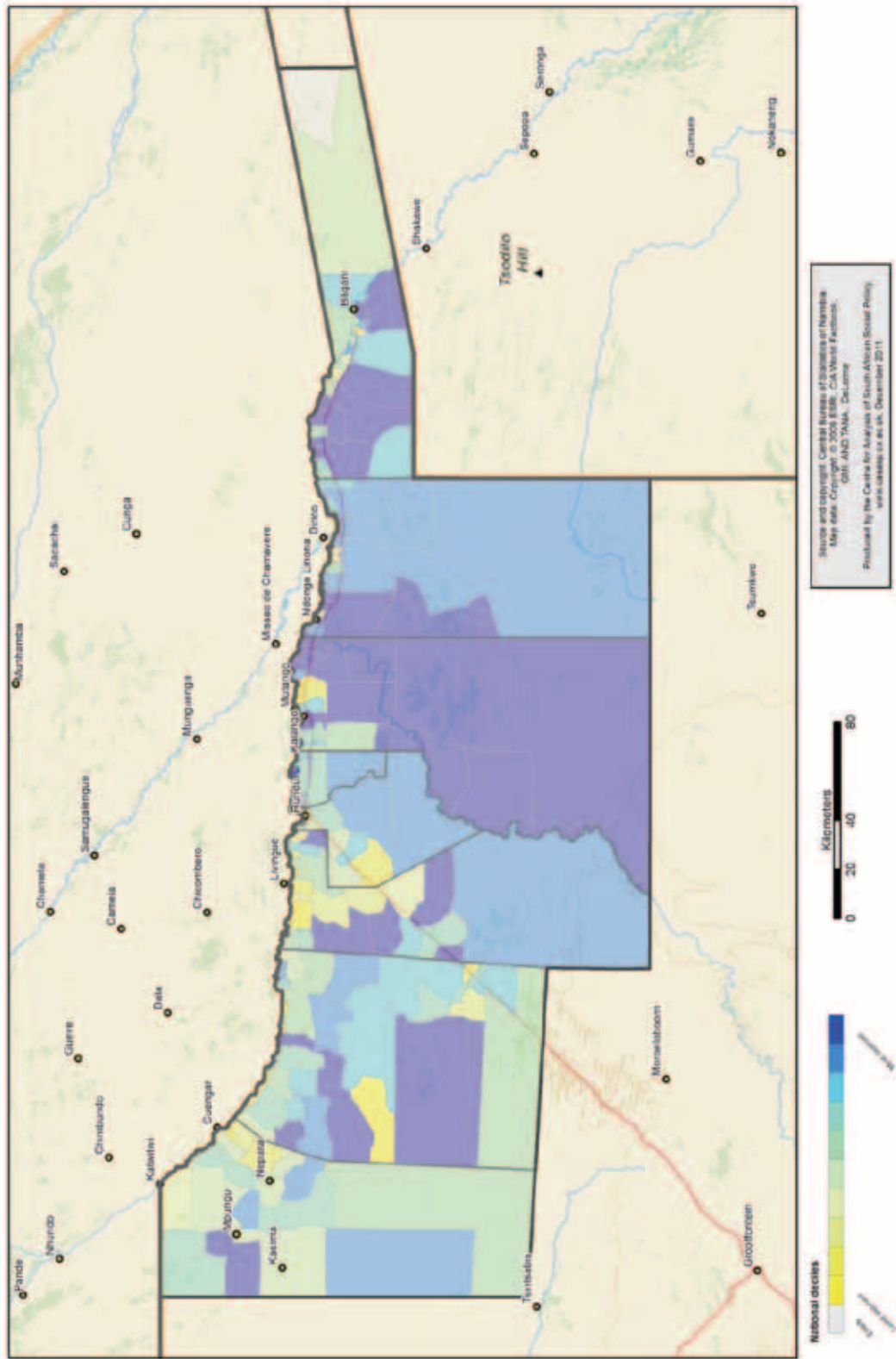
Constituency	Number of datazones	Material deprivation	Employment deprivation	Health deprivation	Education deprivation	Living env. deprivation
Kahenge	36	5.6	0.0	11.1	19.4	2.8
Kapako	27	3.7	11.1	11.1	7.4	18.5
Mashare	17	47.1	11.8	11.8	0.0	23.5
Mpungu	20	5.0	0.0	5.0	10.0	5.0
Mukwe	26	11.5	19.2	3.8	23.1	7.7
Ndiyona	20	25.0	30.0	15.0	15.0	0.0
Rundu Rural East	16	0.0	12.5	6.3	0.0	25.0
Rundu Rural West	21	0.0	4.8	4.8	0.0	14.3
Rundu Urban	19	0.0	5.3	21.1	0.0	0.0

The following maps present each of the five domains at datazone level for Kavango and for the Rundu (the regional capital) area. As with Maps 1 and 2, the lightest shading relates to the least

deprived datazones. It is intended that these maps should provide accessible profiles of the domains of deprivation in the Kavango Region.

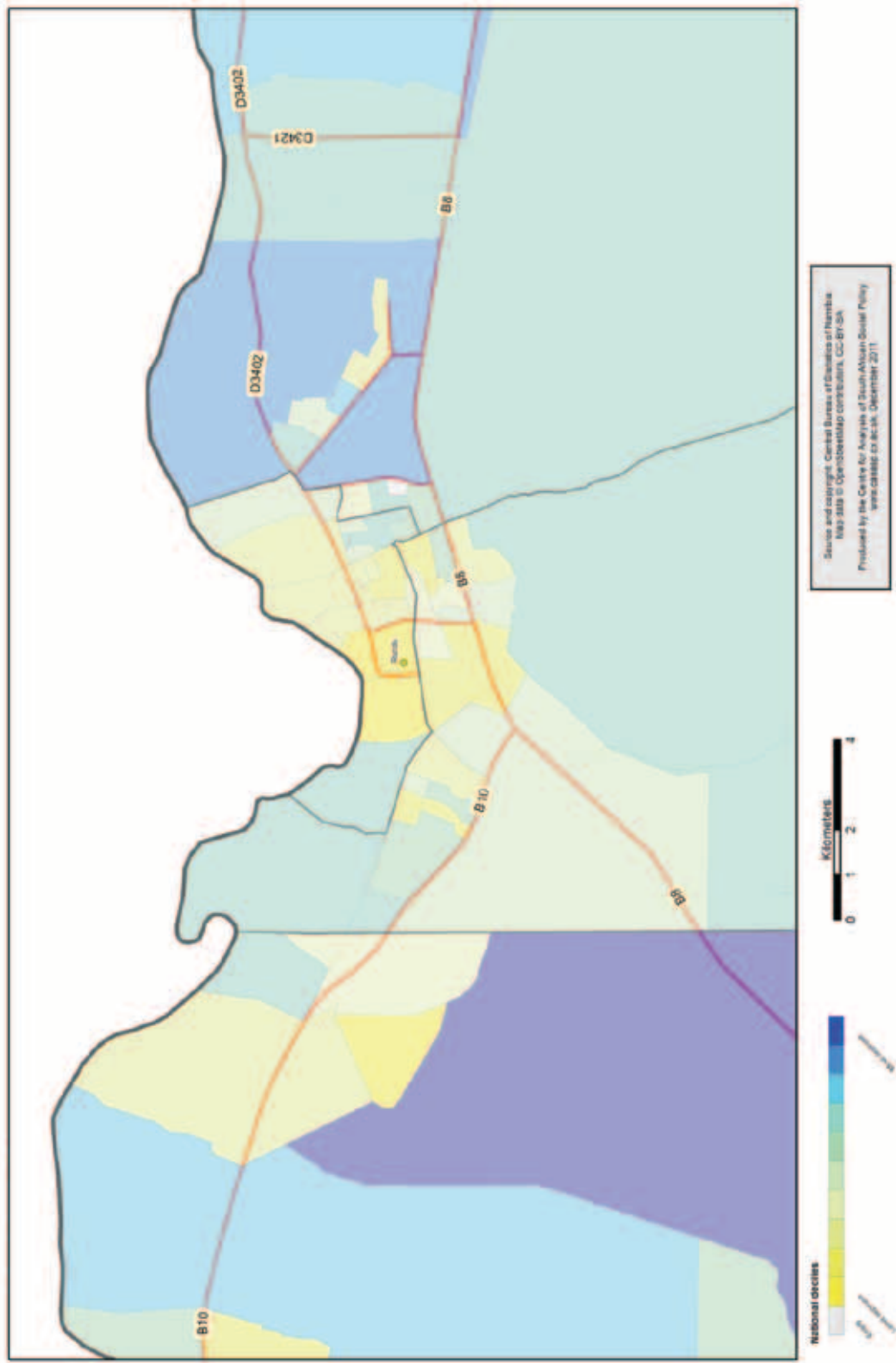
Map 3

**Namibian Index of Multiple Deprivation 2001 - Material Deprivation Domain
Kavango Region**



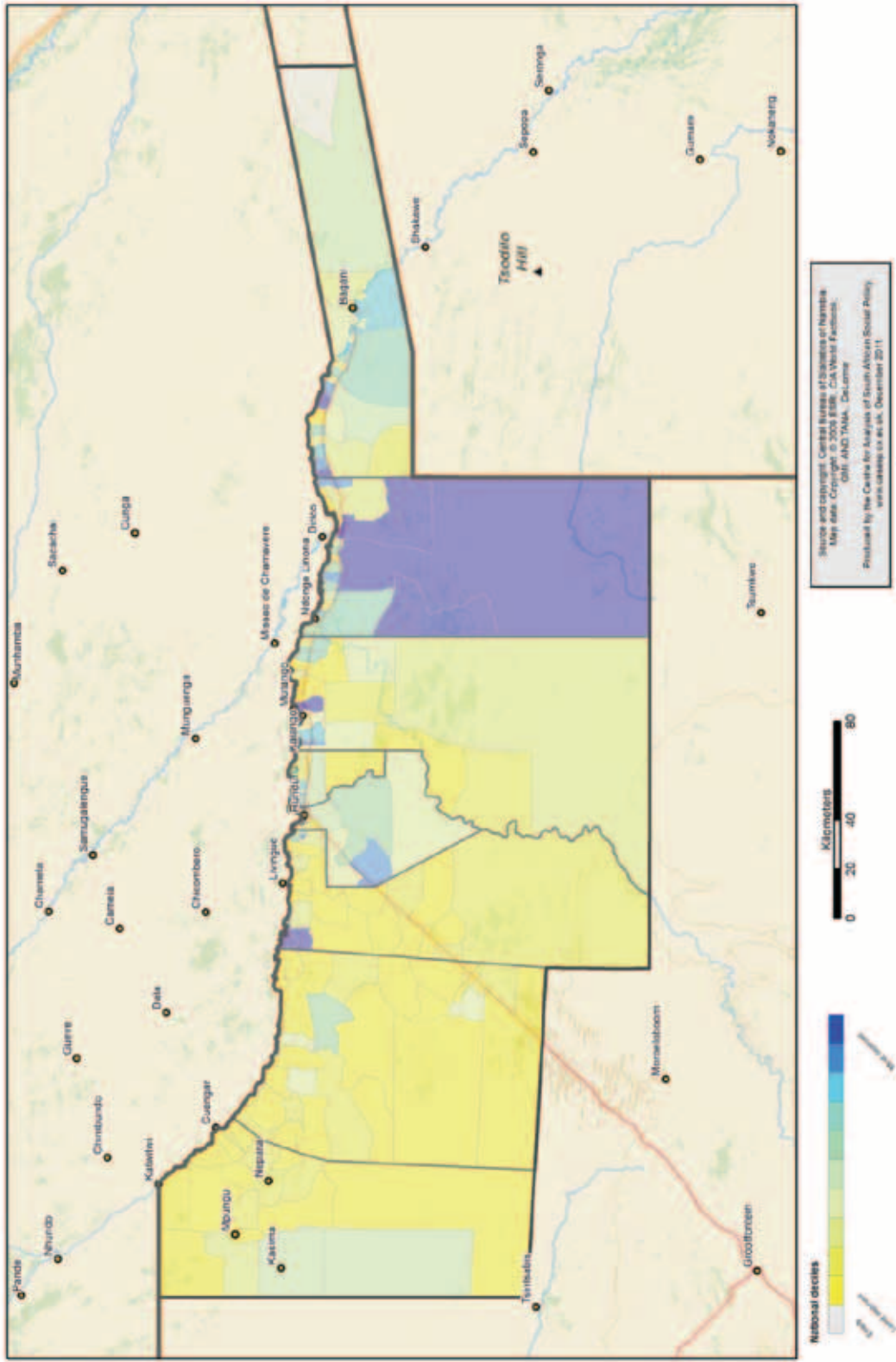
Map 4

Namibian Index of Multiple Deprivation 2001 - Material Deprivation Domain
Rundu, Kavango Region



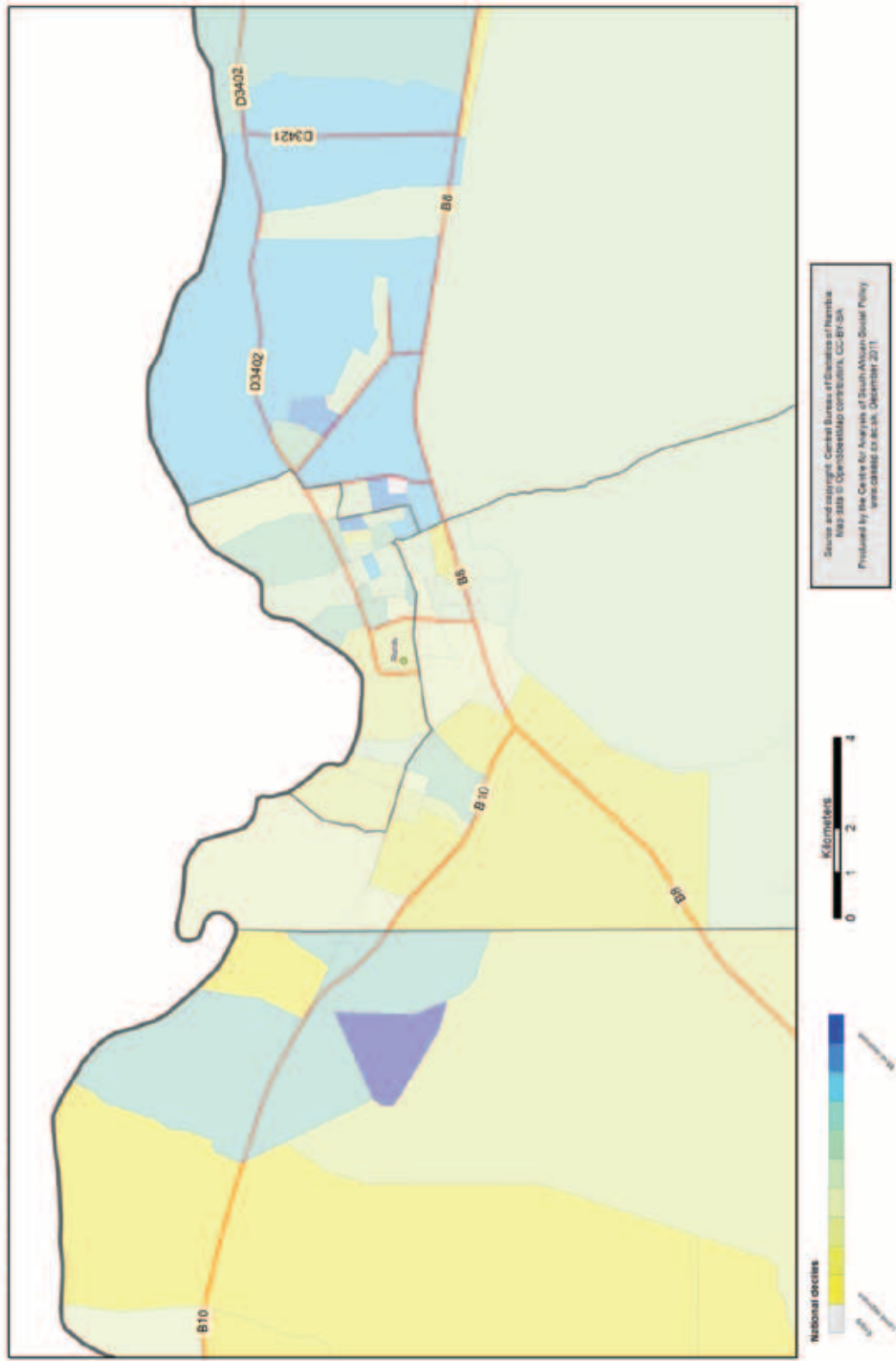
Map 5

Namibian Index of Multiple Deprivation 2001 - Employment Deprivation Domain
Kavango Region



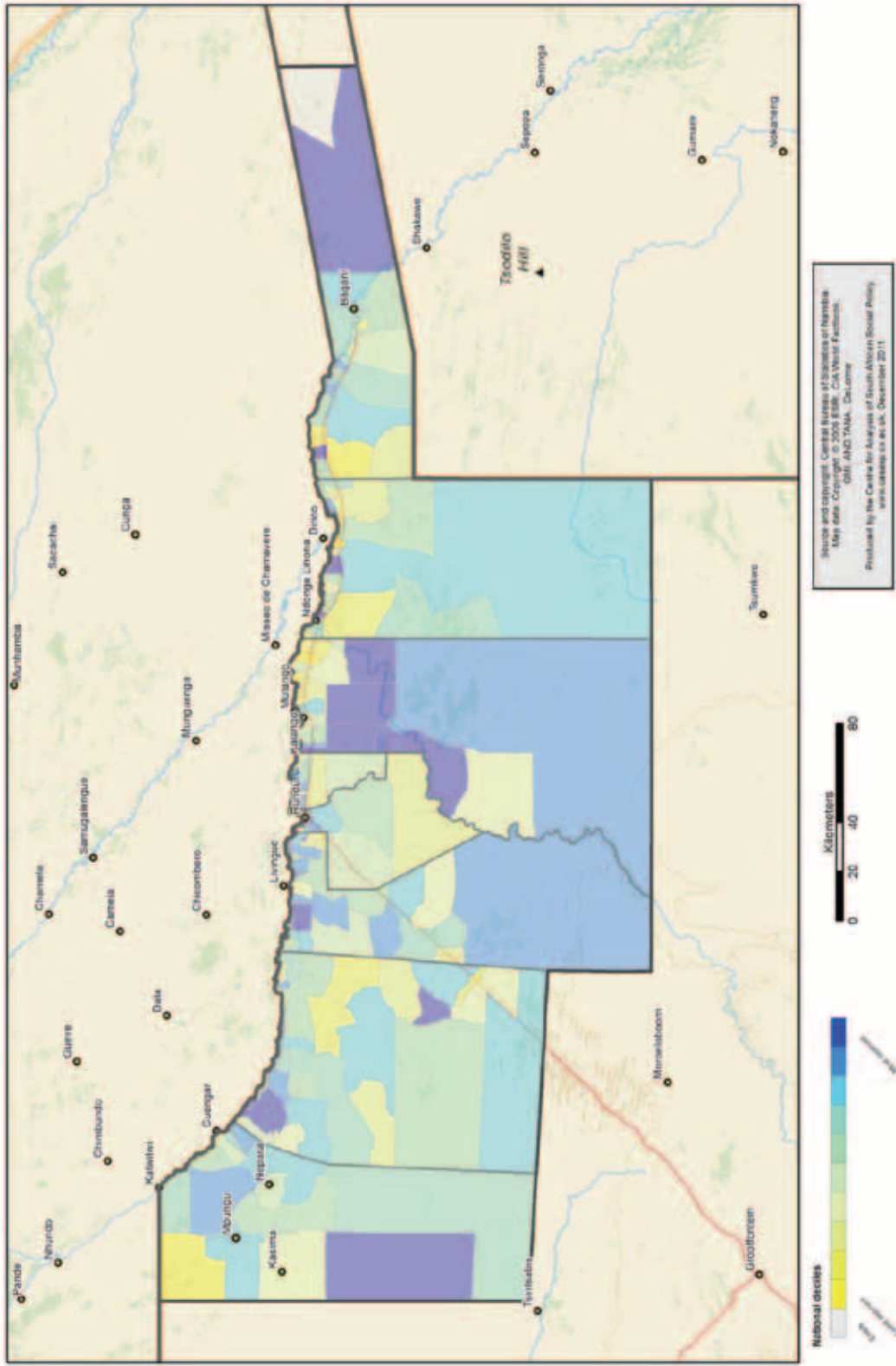
Map 6

Namibian Index of Multiple Deprivation 2001 - Employment Deprivation Domain
Rundu, Kavango Region



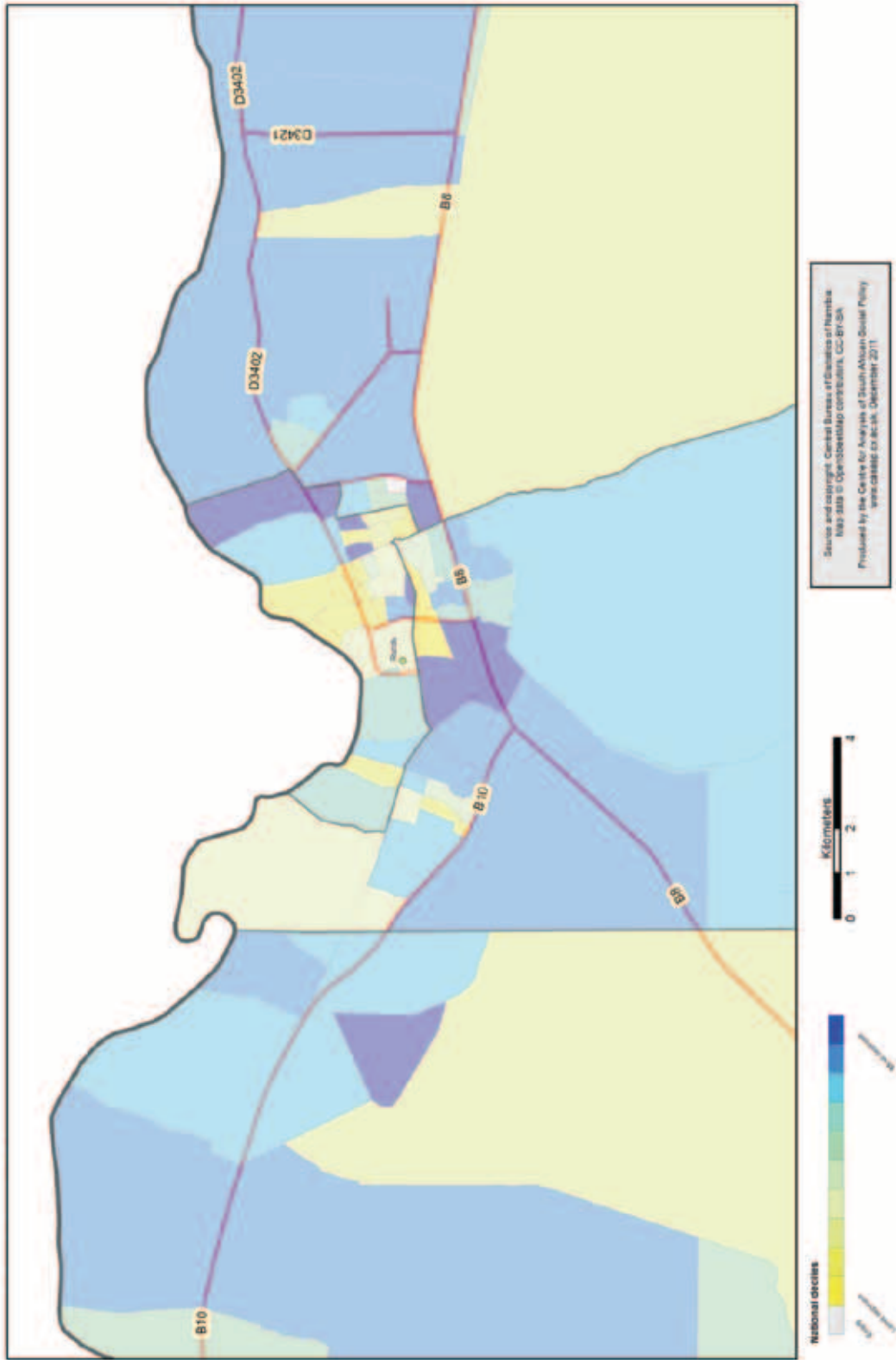
Map 7

**Namibian Index of Multiple Deprivation 2001 - Health Deprivation Domain
Kavango Region**



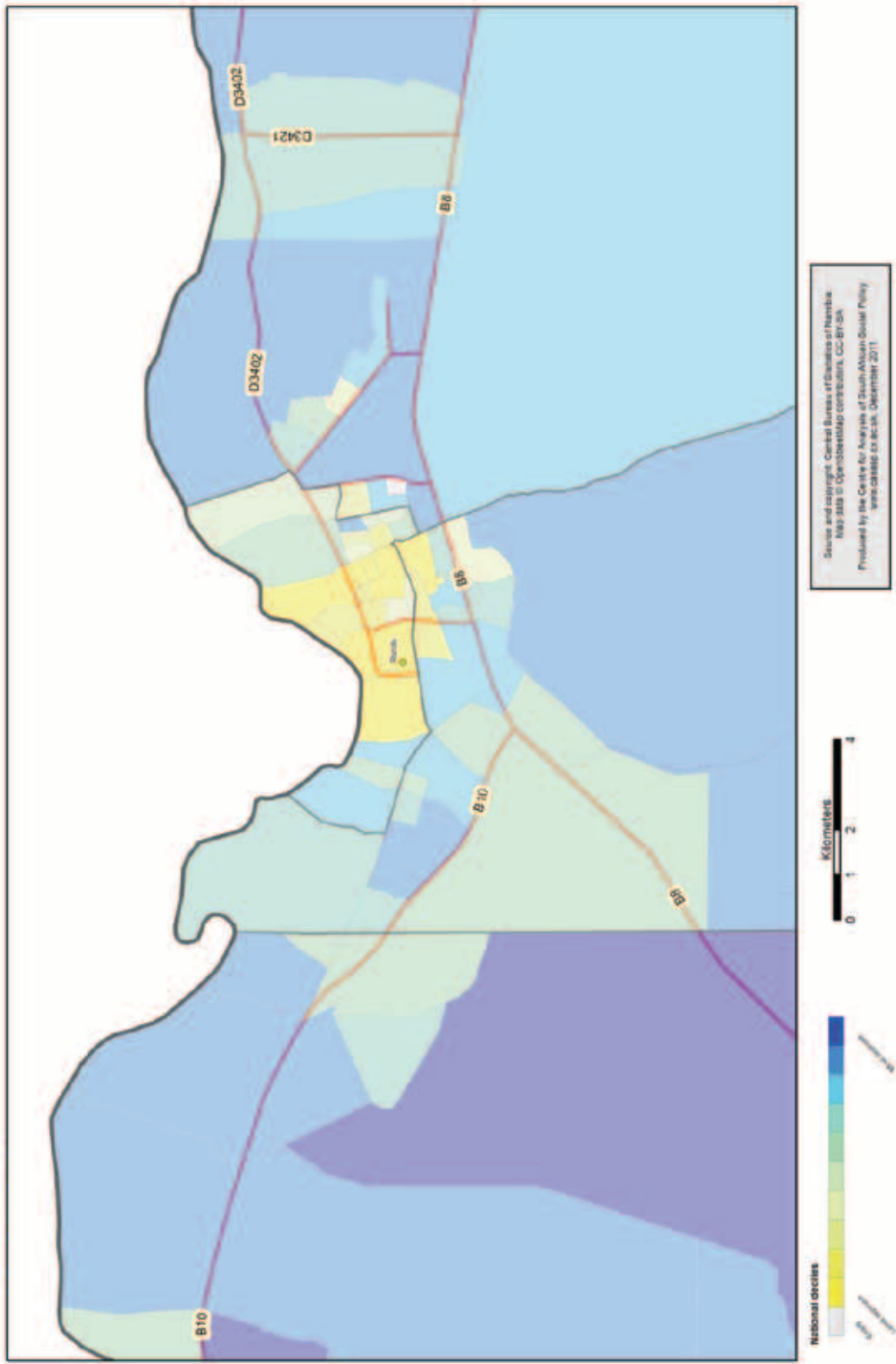
Map 8

Namibian Index of Multiple Deprivation 2001 - Health Deprivation Domain
Rundu, Kavango Region



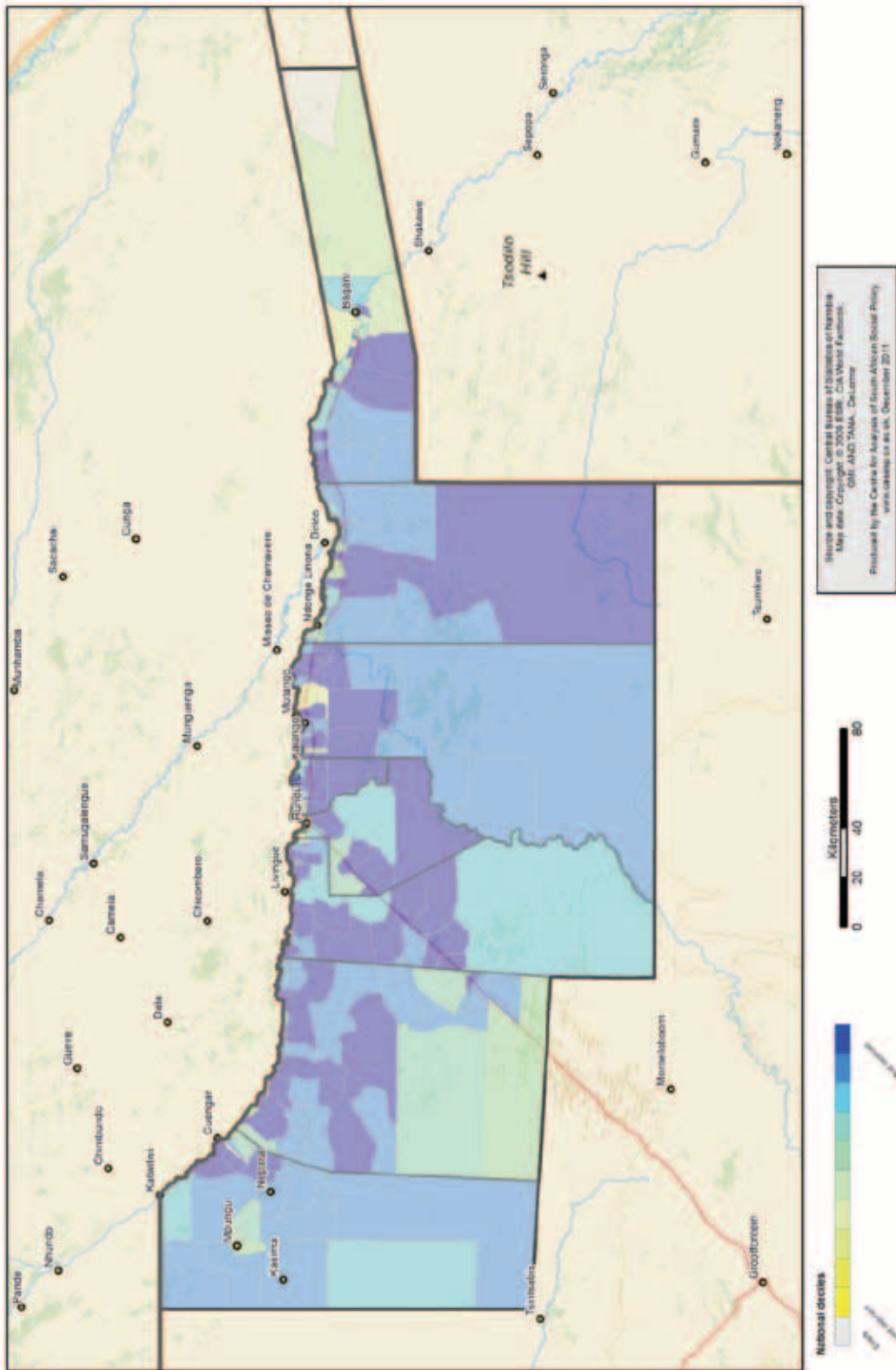
Map 10

Namibian Index of Multiple Deprivation 2001 - Education Deprivation Domain
Rundu, Kavango Region



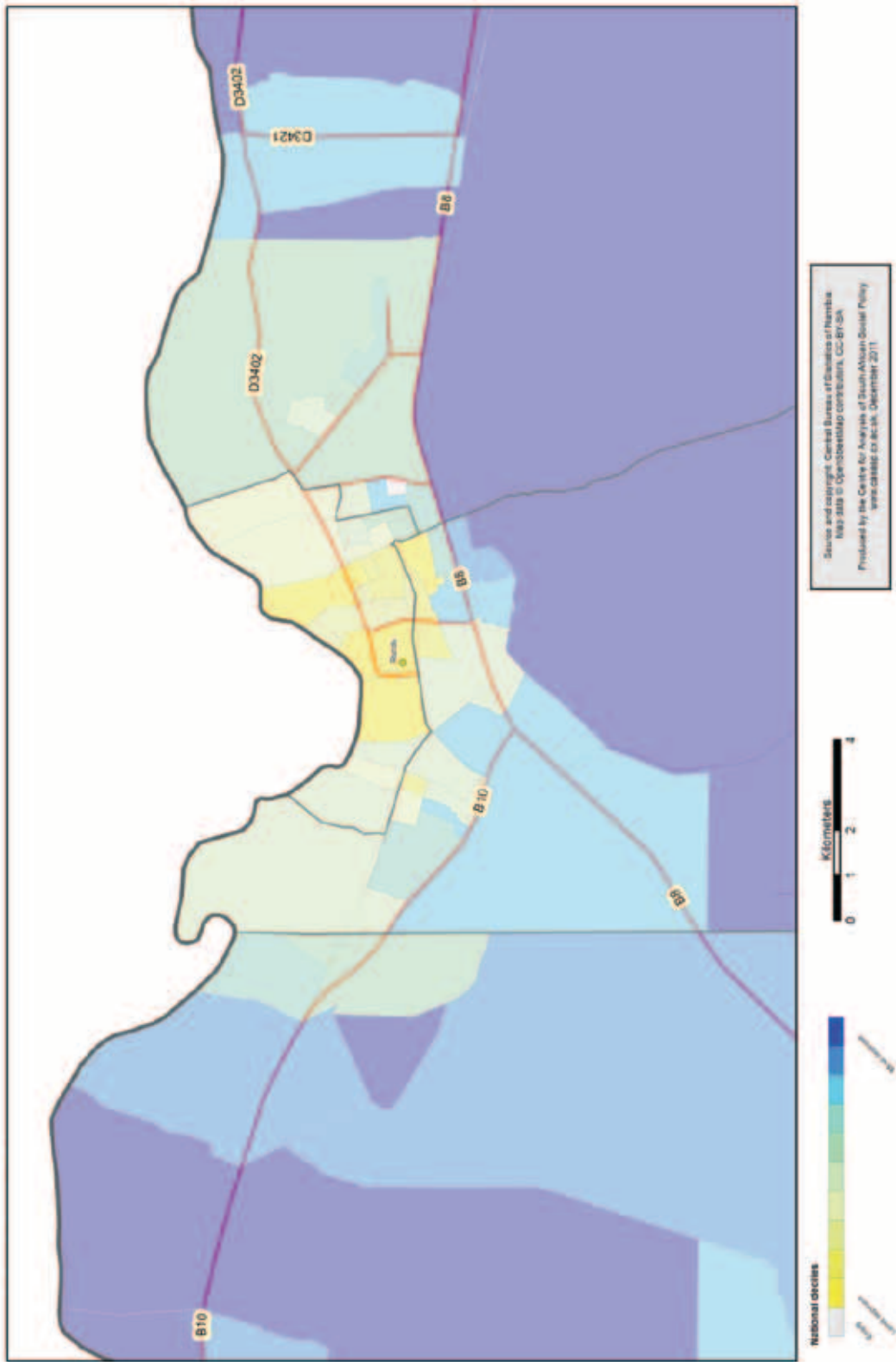
Map 11

**Namibian Index of Multiple Deprivation 2001 - Living Environment Deprivation Domain
Kavango Region**



Map 12

Namibian Index of Multiple Deprivation 2001 - Living Environment Deprivation Domain
Rundu, Kavango Region



SECTION 5: CONCLUSIONS AND SOME POLICY RECOMMENDATIONS



The analysis presented in this report has identified particular areas – both datazones and constituencies – where deprivation is high relative to other areas in Kavango region. This analysis can support pro-poor policy formulation processes and programmatic interventions in many ways.

By providing reliable and objective information on, and profiling the distribution of, multiple deprivation and the distribution of the individual domains of deprivation across the region, the analysis presented in this report can provide planners; policy and decision makers at the regional level with the evidence base on which to plan and make decisions regarding resource allocation and the geographic areas (constituencies and datazones) and sectors in which to prioritise public investments, government support and service delivery. Specifically, the analysis can be useful in the following ways:

Interrogating the causes of inequality: The report could be used by the regional authorities to initiate the process of interrogating the causal factors of such wide inter- and intra-constituency (datazone level) variations with respect to specific domains and the overall combined and weighted index of deprivation.

Better planning and targeting of development resources: Regional Councils have two distinct sources of development revenue – transfers from central government and locally generated resources. The NIMD allows for better planning for and targeting of such resources on the basis of relative deprivation to the datazone level. Priorities can then be identified at the datazone level that could be addressed through integrated development approaches. Importantly, funds could be targeted to and ring-fenced for those sectors/ domains in which specific constituencies and

“By providing reliable and objective information on, and profiling the distribution of multiple deprivation and the individual domains of deprivation across the country, the NIMD can provide policy and decision makers with the evidence base on which to make decisions regarding resource allocation and the geographic areas and sectors in which to prioritise public investments, government support and service delivery relating to the various domains of deprivation”

datazones are particularly deprived or to the most deprived datazones within the constituency. It is also conceivable that constituencies and datazones characterised by severe multiple deprivation could be targeted for integrated development projects and programmes. The most deprived areas vary by domain, and not all areas show a uniform degree of deprivation across the domains. This should be taken into account when selecting a measure of deprivation to use as it is important to choose the most appropriate measure for the particular policy purpose.

Temporal analysis of nature, scope and effects of poverty reduction programmes: By describing the geographical distribution and extent of individual dimensions of deprivation and of overall multiple deprivation at constituency and datazone levels, this report also provide a baseline map of deprivation against which progress in poverty reduction in these areas can be measured over time, that is

between successive censuses. The NIMD is based on data relating to 2001 time- line and significant changes may have taken place since then. It will thus be necessary to conduct further analyses using the 2011 Census data and information in order to shed light on the extent to which changes have occurred in the region and possible reasons for any noted changes.

It should be noted however, that the NIMD, as presented in this report, provides a profile of *relative* deprivation in Kavango region and even the least deprived areas, such as Rundu Urban constituency, contain deprivation. They are simply less deprived than other areas with higher levels of deprivation such as Ndiyona constituency. As such, spatially targeted policy initiatives should be regarded as a complement to, rather than a substitution for, mainstream pro-poor policies and strategies that the Regional Council and National Government are already implementing in Kavango region.

ANNEX 1: INDICATORS INCLUDED IN THE NIMD 2001

Material Deprivation Domain

Numerator

- Number of people living in a household with no access to a television or a radio; or
- Number of people living in a household with no access to a telephone/cell phone

Denominator

Total population

Employment Deprivation Domain

Numerator

- Number of people aged 15-59 who are unemployed

Denominator

Total economically active population aged 15-59 inclusive

Health Deprivation Domain

Numerator

- Years of potential life lost

Education Deprivation Domain

Numerator

- Number of 15-59 year olds (inclusive) with no schooling completed at secondary level or above; or

- Number of 15-59 year olds (inclusive) who are illiterate

Denominator

Population aged 15-59 (inclusive)

Living Environment Deprivation Domain

Numerator

- Number of people living in a household without the use of electricity, paraffin or solar power for lighting; or
- Number of people living in a household without access to a flush toilet or pit latrine (ventilated or long drop); or
- Number of people living in a household without piped water/borehole/borehole with covered tank (but not open tank)/protected well inside their dwelling or yard or within 200 metres; or
- Number of people living in a household that is a shack; or
- Number of people living in a household with three or more people per room

Denominator

Total population

ANNEX 2: DOMAIN AND OVERALL NIMD SCORES AND RANKS

This table presents the scores and ranks for every datazone in Kavango for the five domains and the overall NIMD. For all domains except health the score is calculated as a rate. So for example, 50.2% of the population in datazone 343 in Kahenge constituency experienced material deprivation in 2001. Health is expressed as the years of potential life lost (a measure of premature mortality) in that datazone, and a higher score indicates greater health deprivation. The within Kavango ranks are shown for each datazone (where 1=most deprived).

Constituency	Material deprivation score	Material deprivation rank	Employment deprivation score	Employment deprivation rank	Health deprivation score	Health deprivation rank	Education deprivation score	Education deprivation rank	Living environment deprivation score	Living environment deprivation rank	NIMD score	NIMD rank
Kahenge	50.2	160	8.6	134	1065.5	37	82.5	13	99.9	93	237.0	79
Kahenge	91.6	84	0.6	196	1647.8	7	66.9	173	99.9	88	224.8	99
Kahenge	22.5	189	3.1	164	892.5	63	72.2	136	99.2	131	157.9	169
Kahenge	77.2	125	4.0	156	577.1	117	80.7	28	99.9	10	242.2	74
Kahenge	92.2	81	4.9	153	1015.9	40	61.0	187	99.9	55	199.0	128
Kahenge	91.0	89	3.3	161	1606.1	8	80.0	34	99.9	49	289.8	25
Kahenge	98.1	44	1.0	188	401.7	150	83.6	9	99.9	94	246.1	65
Kahenge	61.4	148	2.7	171	668.7	97	78.9	48	99.9	60	210.0	119
Kahenge	98.2	42	31.7	59	116.5	190	76.9	75	99.9	63	240.8	76
Kahenge	99.9	4	8.1	136	673.0	96	81.9	17	99.9	45	306.7	19
Kahenge	95.8	64	23.9	85	564.7	119	76.9	76	99.8	98	235.2	83
Kahenge	56.4	154	25.1	78	487.6	133	73.2	126	99.8	100	179.4	149
Kahenge	99.7	12	2.0	177	263.1	169	80.8	27	99.8	112	245.8	66
Kahenge	95.2	70	10.4	129	868.6	66	79.6	39	99.9	78	258.5	52
Kahenge	98.0	46	1.2	185	782.4	80	79.6	40	99.9	84	258.4	53
Kahenge	92.7	78	0.6	195	926.7	54	80.4	30	99.9	56	258.9	49
Kahenge	98.0	45	10.0	130	127.8	187	81.8	18	99.8	106	227.7	94
Kahenge	35.5	179	2.7	170	2080.7	2	68.1	168	95.9	168	166.3	165
Kahenge	93.6	75	0.7	193	247.5	172	84.7	5	99.8	108	214.3	112
Kahenge	98.7	34	0.4	201	525.0	129	79.5	42	98.5	145	224.2	100
Kahenge	10.7	199	3.2	162	257.4	171	84.4	6	99.8	96	172.9	158
Kahenge	91.2	86	2.4	173	1857.4	3	80.0	33	99.8	101	279.1	33
Kahenge	95.3	68	1.1	187	814.2	73	81.1	24	98.6	142	229.8	91

Kahenge	17.7	195	2.9	166	875.7	65	70.2	150	99.9	54	174.5	157
Kahenge	90.3	97	1.3	183	96.0	193	77.0	73	99.9	86	179.5	148
Kahenge	45.4	166	18.6	97	315.6	167	80.2	31	99.9	90	189.6	141
Kahenge	94.8	72	6.5	143	316.2	166	78.7	51	99.9	92	210.3	118
Kahenge	42.6	169	23.6	86	626.8	106	77.8	65	99.9	53	213.0	114
Kahenge	74.5	129	3.7	158	776.6	82	75.7	91	96.4	162	167.5	164
Kahenge	66.4	141	7.2	140	400.2	151	70.0	155	98.1	152	128.1	183
Kahenge	26.9	186	5.2	151	460.5	139	73.7	117	96.1	166	119.0	187
Kahenge	77.0	126	1.6	181	949.8	51	79.8	37	99.9	44	245.1	68
Kahenge	89.0	98	3.9	157	676.0	94	79.1	45	99.9	34	242.3	72
Kahenge	20.4	191	1.1	186	907.6	60	66.9	174	99.9	79	155.8	171
Kahenge	72.8	132	25.1	79	984.8	48	76.9	74	99.9	43	253.9	57
Kahenge	98.9	28	20.7	92	891.0	64	83.9	7	99.8	107	299.7	21
Kapako	10.9	198	7.7	137	1412.5	15	78.0	59	99.9	26	246.4	64
Kapako	82.1	116	17.6	103	1173.4	27	77.8	64	99.9	30	271.3	36
Kapako	80.9	119	18.0	99	468.3	136	68.9	162	99.9	31	191.2	138
Kapako	29.5	182	0.8	192	518.6	130	79.3	43	99.9	73	183.1	144
Kapako	92.2	80	2.8	167	1036.0	38	76.3	82	99.9	13	266.0	41
Kapako	44.7	167	38.0	47	810.4	74	78.1	56	99.9	62	241.8	75
Kapako	88.9	99	2.8	168	1114.0	31	77.9	62	98.8	139	223.6	102
Kapako	90.6	93	76.5	5	810.3	75	78.1	57	99.9	64	320.3	12
Kapako	53.9	157	41.3	39	766.1	85	68.3	167	97.1	157	167.7	163
Kapako	10.4	200	77.8	4	1483.8	12	71.2	142	99.9	27	301.1	20
Kapako	98.8	32	17.7	102	221.7	178	78.8	50	99.9	77	244.5	69
Kapako	98.8	31	0.4	202	373.1	153	68.3	166	99.9	41	211.4	117
Kapako	42.5	170	2.0	176	464.5	138	70.2	152	99.2	132	128.4	182
Kapako	99.4	16	2.4	174	1014.1	41	79.6	38	99.9	9	321.3	10
Kapako	93.5	76	0.5	197	684.3	93	80.8	26	99.8	97	234.5	86
Kapako	58.8	151	6.6	142	912.4	57	74.0	112	99.9	39	215.5	110
Kapako	98.8	30	2.3	175	318.3	164	74.4	108	99.9	50	230.4	89
Kapako	91.0	90	2.9	165	659.0	102	78.2	55	99.9	24	243.8	70

Kapako	98.6	36	6.3	144	210.2	180	70.2	151	99.9	37	211.6	116
Kapako	97.2	53	10.6	128	1194.1	24	83.1	10	99.7	115	286.6	27
Kapako	18.7	193	50.5	24	736.4	88	77.1	72	96.7	159	199.0	127
Kapako	82.1	117	67.2	9	567.5	118	76.5	81	99.9	20	293.0	22
Kapako	54.5	156	46.5	32	991.6	46	79.0	47	99.9	15	291.0	23
Kapako	15.4	196	13.8	112	1697.8	6	75.1	100	99.9	48	240.2	77
Kapako	41.3	173	3.1	163	1181.7	26	81.5	19	99.9	12	262.3	45
Kapako	28.4	183	2.7	169	316.5	165	75.6	92	99.6	122	139.1	177
Kapako	76.4	127	4.4	155	510.8	131	76.5	79	99.5	123	177.7	152
Mashare	99.2	22	39.1	43	51.9	199	65.3	181	99.9	11	236.2	81
Mashare	99.0	26	38.1	45	101.7	192	60.9	188	99.9	32	216.0	109
Mashare	99.8	7	13.2	115	261.7	170	69.1	160	99.8	104	212.7	115
Mashare	99.3	19	11.6	125	1271.7	23	79.3	44	99.9	51	320.6	11
Mashare	99.3	17	1.6	180	1288.8	21	80.2	32	99.9	66	313.8	17
Mashare	99.9	2	20.8	90	1535.2	10	77.7	66	99.9	68	338.2	8
Mashare	90.7	92	46.5	33	480.2	134	79.0	46	99.9	17	282.9	30
Mashare	99.7	13	8.2	135	341.4	163	73.9	113	99.8	102	227.7	96
Mashare	99.9	3	12.8	118	985.9	47	71.1	143	99.9	70	279.7	32
Mashare	82.6	115	24.2	84	1601.3	9	65.4	180	99.9	22	249.9	61
Mashare	99.2	21	21.4	89	366.3	155	79.8	35	99.9	81	265.7	42
Mashare	95.2	71	67.3	8	767.2	84	74.8	106	99.9	14	322.1	9
Mashare	19.9	192	0.9	190	188.0	182	66.2	177	87.8	187	58.2	197
Mashare	98.4	39	13.4	114	121.6	188	70.2	153	99.9	69	197.5	129
Mashare	99.3	18	5.3	149	363.0	157	46.9	196	99.9	16	203.3	123
Mashare	96.1	63	54.9	18	1002.5	43	66.4	175	96.2	164	230.2	90
Mashare	99.9	1	3.5	159	418.9	148	69.4	158	99.9	58	235.0	84
Mpungu	91.2	87	3.4	160	931.1	53	69.0	161	99.8	111	196.6	130
Mpungu	62.7	145	1.7	179	364.8	156	75.1	99	99.9	19	190.5	139
Mpungu	39.8	174	1.0	189	746.8	86	65.9	178	81.8	190	95.4	192
Mpungu	12.1	197	0.9	191	606.5	113	56.8	192	99.9	89	111.1	188
Mpungu	39.3	175	0.7	194	1091.3	34	74.3	110	97.9	154	169.7	161

Mpungu	48.9	162	2.0	178	738.9	87	77.6	67	99.1	134	175.8	155
Mpungu	31.6	181	6.0	145	843.7	69	78.6	52	99.9	36	220.4	107
Mpungu	64.9	142	0.4	200	829.0	70	75.9	88	99.9	76	202.6	124
Mpungu	62.1	146	7.2	139	430.7	143	81.4	21	99.8	113	193.7	133
Mpungu	87.9	104	1.4	182	537.3	128	80.9	25	99.9	72	223.1	103
Mpungu	60.1	150	31.0	62	299.4	168	83.8	8	99.9	75	221.6	106
Mpungu	98.4	40	11.5	126	910.7	59	76.8	78	99.9	83	267.7	39
Mpungu	77.3	124	1.3	184	673.1	95	77.5	68	99.9	95	201.6	125
Mpungu	91.3	85	5.3	150	581.6	115	73.3	123	99.9	42	214.2	113
Mpungu	96.9	59	24.4	83	1289.0	20	82.2	15	99.1	133	290.5	24
Mpungu	72.5	135	0.5	198	996.0	45	78.0	58	99.8	110	217.3	108
Mpungu	88.3	102	0.5	199	60.2	198	79.6	41	99.9	59	192.7	135
Mpungu	99.2	20	15.0	109	794.7	79	73.4	120	99.9	85	260.4	46
Mpungu	72.6	133	4.5	154	800.1	77	69.9	156	95.6	170	143.9	176
Mpungu	97.1	56	9.2	132	473.7	135	76.2	86	98.2	151	196.2	131
Mukwe	75.0	128	58.6	14	1002.4	44	70.5	148	99.3	129	242.2	73
Mukwe	80.7	120	16.2	107	795.7	78	81.2	23	99.9	38	258.7	51
Mukwe	51.7	159	41.4	38	579.7	116	78.4	53	98.8	140	206.3	120
Mukwe	83.7	113	14.7	110	1099.9	33	71.4	140	98.9	137	200.8	126
Mukwe	52.9	158	41.8	36	665.5	100	70.3	149	96.5	161	168.1	162
Mukwe	97.8	48	50.0	25	236.4	176	75.0	103	99.9	40	269.1	38
Mukwe	79.8	121	19.3	95	651.4	104	67.8	170	89.0	184	134.2	180
Mukwe	92.1	82	37.8	48	421.8	147	75.8	89	99.9	33	249.0	62
Mukwe	35.6	178	52.6	22	467.3	137	72.2	135	97.1	156	172.4	159
Mukwe	96.9	58	30.1	67	150.7	185	75.1	101	98.6	143	192.7	134
Mukwe	98.9	27	46.8	30	548.3	124	77.8	63	95.1	172	254.6	55
Mukwe	98.5	37	47.7	26	610.9	112	73.0	128	99.9	47	286.8	26
Mukwe	98.7	35	53.0	20	1274.8	22	76.2	84	99.9	18	360.1	3
Mukwe	95.4	67	17.0	105	826.2	71	77.4	69	99.6	118	239.0	78
Mukwe	68.3	140	30.2	66	1440.3	14	78.9	49	92.8	178	228.9	93
Mukwe	99.0	25	39.1	44	614.5	110	86.0	3	99.9	7	343.8	5

Mukwe	99.8	5	30.2	65	894.7	61	88.2	1	99.9	67	343.2	6
Mukwe	99.8	8	20.7	91	800.7	76	87.4	2	99.9	91	317.6	14
Mukwe	99.2	23	12.6	121	0.0	201	82.9	12	99.9	61	253.3	58
Mukwe	95.6	65	5.8	147	239.6	174	83.0	11	99.9	80	227.7	95
Mukwe	90.5	95	72.1	6	548.6	122	71.9	138	99.9	29	285.0	29
Mukwe	99.1	24	12.0	123	77.1	197	81.4	20	99.9	71	247.6	63
Mukwe	88.9	100	43.8	35	146.9	186	72.4	134	99.9	28	223.0	104
Mukwe	98.8	33	5.2	152	687.5	91	78.0	60	99.6	119	245.7	67
Mukwe	94.5	73	55.6	17	662.9	101	73.7	116	99.9	52	278.1	34
Mukwe	99.8	6	78.5	3	667.7	98	78.0	61	99.5	124	344.6	4
Ndiyona	90.5	94	36.5	52	1329.1	18	71.3	141	96.9	158	229.0	92
Ndiyona	56.4	155	8.6	133	1452.3	13	73.4	121	96.7	160	190.0	140
Ndiyona	64.2	144	38.0	46	436.0	142	73.8	115	99.9	46	214.3	111
Ndiyona	97.7	50	28.8	70	51.8	200	59.3	190	98.7	141	144.3	175
Ndiyona	99.7	10	52.8	21	623.2	107	79.8	36	99.7	116	314.5	16
Ndiyona	97.8	47	17.2	104	238.9	175	73.6	119	99.8	109	203.5	122
Ndiyona	73.0	131	47.7	27	1747.4	5	75.7	90	98.4	146	267.4	40
Ndiyona	95.6	66	2.6	172	1140.3	28	76.2	85	99.0	135	233.6	87
Ndiyona	97.3	52	7.4	138	551.5	121	82.1	16	99.9	87	251.2	59
Ndiyona	95.3	69	63.9	11	612.1	111	76.9	77	99.8	105	285.6	28
Ndiyona	97.3	51	82.5	2	558.4	120	81.3	22	99.9	74	339.9	7
Ndiyona	98.3	41	70.9	7	894.4	62	82.4	14	99.9	57	364.3	2
Ndiyona	99.8	9	93.0	1	711.2	90	85.3	4	99.8	103	387.4	1
Ndiyona	99.4	15	14.4	111	548.4	123	78.4	54	99.8	99	262.6	44
Ndiyona	99.7	11	40.2	40	176.1	183	77.2	71	99.8	114	260.3	47
Ndiyona	99.4	14	29.5	69	502.6	132	80.5	29	99.7	117	275.5	35
Ndiyona	97.8	49	39.5	41	343.0	162	75.5	94	99.6	120	234.6	85
Ndiyona	98.4	38	60.1	13	583.5	114	74.4	109	99.9	25	314.8	15
Ndiyona	96.5	60	33.0	57	686.5	92	74.7	107	98.3	147	225.3	98
Ndiyona	96.1	62	54.1	19	849.4	68	72.8	130	99.9	82	281.2	31
Rundu Rural W.	26.9	185	17.8	101	1327.7	19	72.4	132	93.8	177	171.0	160

Rundu Rural W.	61.5	147	27.8	74	667.2	99	70.6	145	99.4	127	176.0	154
Rundu Rural W.	48.5	163	25.9	77	940.9	52	72.4	133	99.4	128	192.0	136
Rundu Rural W.	78.0	123	7.0	141	726.3	89	70.6	146	98.3	149	158.4	168
Rundu Rural W.	39.1	176	24.8	82	976.9	49	64.5	182	99.9	65	181.4	146
Rundu Rural W.	18.4	194	12.7	119	344.7	161	69.2	159	85.4	189	85.2	194
Rundu Rural W.	24.3	187	12.9	117	94.0	194	74.9	104	98.9	138	123.1	184
Rundu Rural W.	74.2	130	35.1	54	427.7	145	73.2	125	90.5	181	155.3	172
Rundu Rural W.	71.9	137	17.9	100	911.1	58	68.4	165	55.9	195	135.4	178
Rundu Rural W.	42.5	171	31.4	60	1187.5	25	71.7	139	95.1	171	182.0	145
Rundu Rural W.	81.3	118	5.8	146	914.2	56	74.9	105	98.5	144	191.3	137
Rundu Rural W.	64.5	143	9.3	131	1083.1	35	67.2	172	99.6	121	175.8	156
Rundu Rural W.	84.6	111	25.0	80	777.2	81	77.2	70	99.9	1	270.1	37
Rundu Rural W.	97.1	55	37.1	49	547.9	125	75.0	102	99.5	125	236.7	80
Rundu Rural W.	97.2	54	18.2	98	240.5	173	76.5	80	99.9	2	250.3	60
Rundu Rural W.	23.1	188	60.3	12	408.7	149	72.8	131	99.9	21	232.3	88
Rundu Rural W.	92.4	79	35.1	55	429.7	144	75.6	93	99.9	5	258.8	50
Rundu Rural W.	72.5	134	19.3	96	437.7	141	73.1	127	98.3	148	157.0	170
Rundu Rural W.	91.1	88	21.5	88	359.6	158	70.5	147	95.0	173	147.7	174
Rundu Rural W.	49.2	161	19.5	94	0.0	201	51.0	195	39.4	198	40.6	201
Rundu Rural W.	28.2	184	28.5	71	373.0	154	37.3	199	32.3	199	58.6	196
Rundu Urban	46.1	164	47.5	29	457.8	140	46.8	197	46.9	196	98.6	191
Rundu Urban	37.8	177	24.9	81	162.1	184	42.8	198	26.6	201	45.3	200
Rundu Urban	34.3	180	32.1	58	852.5	67	67.9	169	80.0	191	134.3	179
Rundu Urban	60.6	149	21.8	87	1398.5	16	66.2	176	87.9	186	161.8	166
Rundu Urban	72.2	136	57.7	16	1507.4	11	75.1	98	94.2	175	254.6	56
Rundu Urban	90.4	96	13.7	113	104.5	191	59.1	191	91.4	179	88.6	193
Rundu Urban	71.0	139	31.0	63	2253.1	1	64.4	185	88.7	185	186.1	142
Rundu Urban	84.0	112	27.9	73	218.5	179	65.8	179	95.9	167	121.0	185
Rundu Urban	86.3	108	35.2	53	199.7	181	53.0	193	85.7	188	101.9	189
Rundu Urban	83.4	114	45.3	34	92.9	195	68.4	164	97.4	155	151.5	173
Rundu Urban	88.2	103	30.6	64	772.9	83	73.6	118	90.2	182	184.8	143
Rundu Urban	5.4	201	15.7	108	348.5	160	31.5	201	27.4	200	37.4	202

Rundu Urban	85.9	109	12.6	120	121.5	189	67.8	171	89.3	183	101.6	190
Rundu Urban	87.1	106	12.6	122	620.4	109	73.8	114	91.3	180	159.0	167
Rundu Urban	45.6	165	36.7	51	90.1	196	52.1	194	75.2	192	68.9	195
Rundu Urban	42.1	172	20.6	93	1033.6	39	64.5	183	65.8	194	120.3	186
Rundu Urban	57.2	152	41.5	37	1828.4	4	63.3	186	69.0	193	178.1	151
Rundu Urban	1.8	202	16.3	106	636.5	105	27.9	202	18.0	202	54.1	199
Rundu Urban	21.5	190	27.7	75	348.9	159	37.1	200	46.7	197	55.9	198
Rundu Rural E.	85.0	110	57.9	15	537.9	127	72.9	129	99.2	130	227.4	97
Rundu Rural E.	57.2	153	27.2	76	923.0	55	60.2	189	94.4	174	132.9	181
Rundu Rural E.	71.4	138	65.0	10	821.8	72	68.6	163	94.0	176	204.6	121
Rundu Rural E.	91.6	83	31.1	61	969.5	50	64.4	184	96.3	163	179.2	150
Rundu Rural E.	44.1	168	27.9	72	1070.0	36	74.2	111	98.2	150	194.8	132
Rundu Rural E.	86.9	107	36.8	50	622.0	108	70.1	154	96.1	165	176.5	153
Rundu Rural E.	93.4	77	12.9	116	423.7	146	72.2	137	99.5	126	180.6	147
Rundu Rural E.	97.0	57	11.7	124	544.5	126	73.4	122	99.9	35	235.7	82
Rundu Rural E.	98.1	43	5.6	148	377.1	152	76.2	83	99.9	3	254.7	54
Rundu Rural E.	96.4	61	47.5	28	1130.2	30	76.0	87	95.7	169	263.7	43
Rundu Rural E.	87.8	105	29.7	68	228.0	177	73.2	124	99.9	4	224.0	101
Rundu Rural E.	88.7	101	46.8	31	1100.8	32	70.9	144	99.0	136	242.9	71
Rundu Rural E.	94.0	74	39.3	42	1130.3	29	75.4	96	99.9	8	310.1	18
Rundu Rural E.	90.7	91	10.7	127	657.5	103	69.6	157	99.9	6	222.9	105
Rundu Rural E.	98.8	29	34.3	56	1006.9	42	75.5	95	99.9	23	317.8	13
Rundu Rural E.	78.9	122	51.3	23	1363.1	17	75.3	97	98.0	153	259.5	48

REFERENCES

- Avenell, D., Noble, M. and Wright, G. (2009) 'South African datazones: A technical report about the development of a new statistical geography for the analysis of deprivation in South Africa at a small area level', CASASP Working Paper No. 8, Oxford: Centre for the Analysis of South African Social Policy, University of Oxford.
- Barnes, H., Noble, M., Wright, G. and Dawes, A. (2009) 'A geographical profile of child deprivation in South Africa', *Child Indicators Research*, 2(2): 181-199.
- Barnes, H., Wright, G., Noble, M. and Dawes, A. (2007) *The South African Index of Multiple Deprivation for Children 2001*, Cape Town: Human Sciences Research Council Press.
- Beatty, C., Fothergill, S. and Macmillan, R. (2000) 'A theory of employment, unemployment and sickness', *Regional Studies* 34(7), 617-630.
- Bhorat, H., Poswell, L. and Naidoo, P. (2004) *Dimensions of Poverty in Post-Apartheid South Africa*, Cape Town: Development Policy Research Unit, University of Cape Town.
- Blane, D. and Drever, F. (1998) 'Inequality among men in standardised years of potential life lost, 1970-93', *British Medical Journal*, 317: 255-256
- Central Bureau of Statistics (2008) *A Review of Poverty and Inequality in Namibia*, Windhoek: Central Bureau of Statistics, National Planning Commission.
- Husmanns, R. (2007) *Measurement of Employment, Unemployment and Underemployment – Current International Standards and Issues in their Application*, International Labour Organisation, United Nations.
- Martin, D., Nolan, A. and Tranmer, N. (2001) 'The application of zone-design methodology in the 2001 UK Census', *Environment and Planning*, 33: 1949-1962.
- McLennan, D., Barnes, H., Noble, M., Davies, J., Garratt, E. and Dibben, C. (2011) *The English Indices of Deprivation 2010*, London: Department for Communities and Local Government.
- Noble, M., Babita, M., Barnes, H., Dibben, C., Magasela, W., Noble, S., Ntshongwana, P., Phillips, H., Rama, S., Roberts, B., Wright, G. and Zungu, S. (2006a) *The Provincial Indices of Multiple Deprivation for South Africa 2001*, Oxford: University of Oxford, UK.
- Noble, M., Barnes, H., Wright, G., McLennan, D., Avenell, D., Whitworth, A. and Roberts, B. (2009a) *The South African Index of Multiple Deprivation 2001 at Datazone Level*, Pretoria: Department of Social Development.
- Noble, M., Barnes, H., Wright, G. and Roberts, B. (2009b) 'Small area indices of multiple deprivation in South Africa', *Social Indicators Research*, 95(2): 281-297.

- Noble, M., McLennan, D., Wilkinson, K., Whitworth, A., Barnes, H. and Dibben, C. (2008) *The English Indices of Deprivation 2007*, London: Department for Communities and Local Government.
- Noble, M., Smith, G.A.N., Wright, G., Dibben, C. and Lloyd, M. (2001) *The Northern Ireland Multiple Deprivation Measure 2001*, Occasional Paper No 18, Belfast: Northern Ireland Statistics and Research Agency.
- Noble, M., Smith, G.A.N., Wright, G., Dibben, C., Lloyd, M. and Penhale, B. (2000) *Welsh Index of Multiple Deprivation 2000*, National Assembly for Wales.
- Noble, M., Whitworth, A., Allen, J., Wright, G. and Roberts, B. (2007) *Developing Small Area Indices of Multiple Deprivation in Southern Africa: A Scoping Study*. Report for the Southern Africa Trust.
- Noble, M., Wright, G., Lloyd, M., Dibben, C., Smith, G.A.N. and Ratcliffe, A. (2003) *Scottish Indices of Deprivation 2003*, Edinburgh: Scottish Executive.
- Noble, M., Wright, G., Smith, G.A.N. and Dibben, C. (2006b) 'Measuring multiple deprivation at the small-area level', *Environment and Planning A*, 38(1): 169-185.
- Nolan, B. and Whelan, C.T. (1996) *Resources, Deprivation, and Poverty*, Oxford: Oxford University Press.
- Townsend, P. (1987) 'Deprivation', *Journal of Social Policy*, 16: 125-145.
- Townsend, P. (1979) *Poverty in the United Kingdom: A Survey of Household Resources and Standards of Living*, Harmondsworth, Middlesex: Allen Lane and Penguin Books.
- United Nations Development Programme (2009) *Human Development Report 2009 - Overcoming Barriers: Human Mobility and Development*, New York: Palgrave Macmillan.
- United Nations Development Programme Namibia (2007) *UNDP Namibia Economic Review 2007*, Windhoek: UNDP Namibia.
- Wright, G., Barnes, H., Noble, M. and Dawes, A. (2009a) *The South African Index of Multiple Deprivation for Children 2001 at Datazone Level*, Pretoria: Department of Social Development.
- Wright, G. and Noble, M. (2009) *The South African Index of Multiple Deprivation 2007 at Municipality Level*, Pretoria: Department of Social Development.
- Wright, G., Noble, M., Barnes, H. and Noble, S. (2009b) *The South African Index of Multiple Deprivation for Children 2007 at Municipality Level*, Pretoria: Department of Social Development.

