Datazone level Namibian Index of Multiple Deprivation 2001

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Erongo 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of the NIMD required very detailed and reliable data and information, it was agreed that the 2001 census data, though 'outdated', be used as the source of information for preparing the NIMD.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 Caprivi 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 Caprivi 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 Caprivi 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 Caprivi 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 Caprivi 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 Caprivi region and the large family of existing planning and resource allocation tools and methodologies already in use at the regional and constituency levels.

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 the 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 Erongo 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 Caprivi 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 Caprivi 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, 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, civil servants from the Council and staff members of UNDP. 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 Caprivi region. In constructing the NIMD at datazone level however, it became necessary to make some small changes to some of the domains and indicators initially used in the constituency level study. 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 in this report.

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 Caprivi region based on the existing EA geography which nest within the six 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 84 datazones were created for the Caprivi 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 are 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.

> "The NIMD and the component domains of deprivation were produced at datazone level using data from the 2001 Population Census."

SECTION 3: METHODOLOGY

3.1 An introduction to the domains and indicators

Domains

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. Whilst the intention should always to 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 84 datazones and 6 constituencies in Caprivi region.

The NIMD contains five domains of deprivation:

- Material Deprivation
- 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 UNDP .

> "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 each domain, but within the constraints of the data available from the 2001 Census. When identifying

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

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.

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.

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.

3.2 Material Deprivation Domain

> "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"

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' (Hussmanns, 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 YPLL scores"

The YPLL indicator is a directly age and gender standardised measure of premature death (i.e. death under the age of 75) . 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.

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 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 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 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

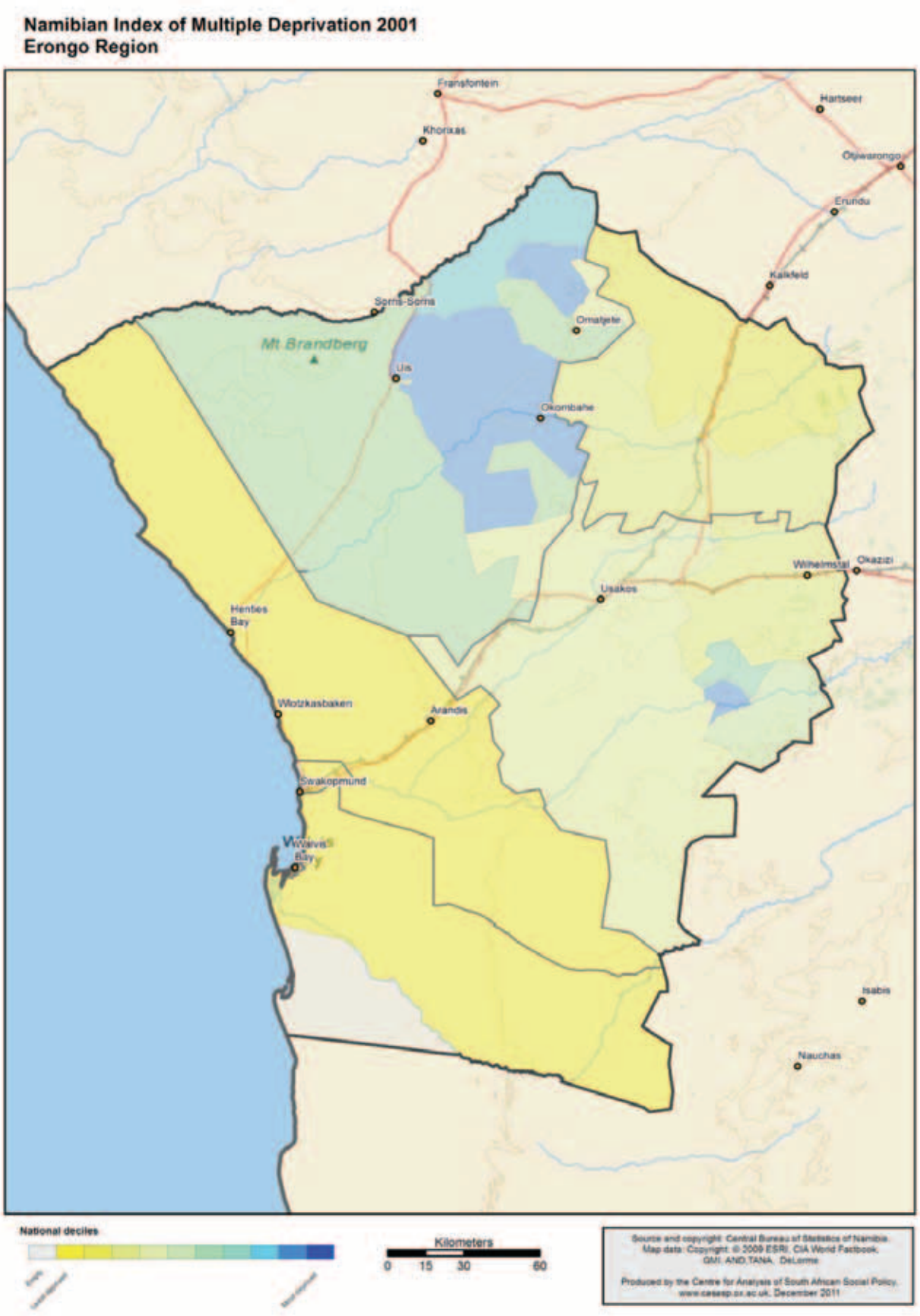
Domains are conceived as independent dimensions of multiple deprivation, each with their own additive impact on multiple deprivation. The strength of this impact, though, may vary between domains depending on their relative importance. As a starting point, equal weights for the domains were recommended 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: ERONGO REGION

4.1 Multiple Deprivation

In this section a profile of multiple deprivation in Erongo region, at both constituency and datazone levels, is presented. Using the data from the NIMD it is possible to compare the 104 datazones and seven constituencies within Erongo region. Map 1 shows the datazones in Erongo 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 Swakopmund and Walvis Bay areas (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 Erongo region.

Map 1


Namibian Index of Multiple Deprivation 2001
Erongo Region
Fransfontein
Khorixas
Hartseer
Otjiwarongo
Erundu
Kalkfeld
Sorris-Sorris
Mt Brandberg
Uis
Omatjete
Okombahe
Wilhelmstal
Okazizi
Usakos
Henties Bay
Wlotzkasbaken
Arandis
Swakopmund
Walvis Bay
Isabis
Nauchas
National deciles
Kilometers
0 15 30 60
Source and copyright: Central Bureau of Statistics of Namibia.
Map data: Copyright © 2009 ESRI, CIA World Factbook, GMI, AND,TANA, DeLorme
Produced by the Centre for Analysis of South African Social Policy.
www.casasp.ox.ac.uk. December 2011

Map 2

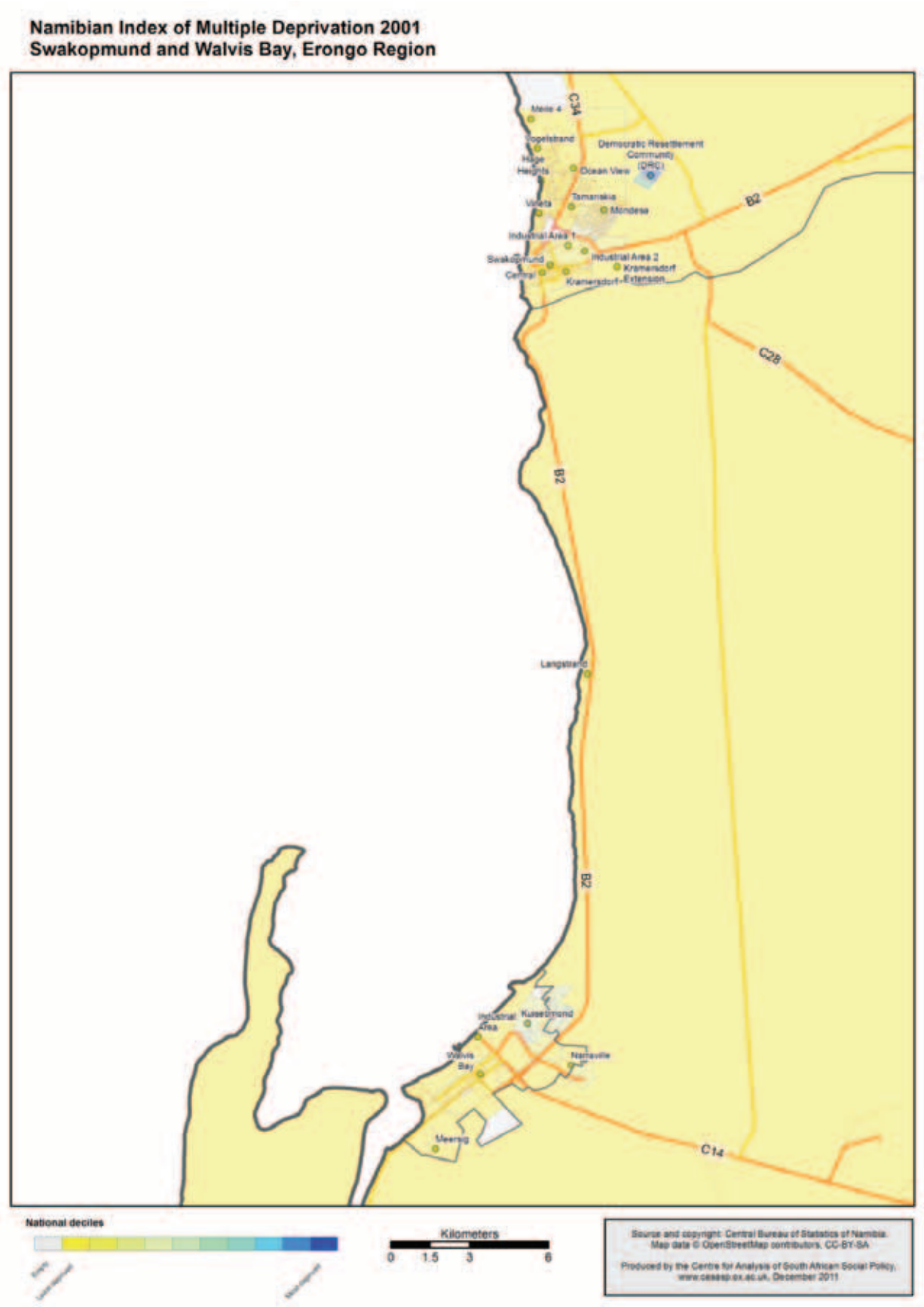

Namibian Index of Multiple Deprivation 2001
Swakopmund and Walvis Bay, Erongo Region
C34
B2
C28
B2
B2
C14
Democratic Resettlement Community (DRC)
Ocean View
Tamariskia
Mondesa
Industrial Area 1
Industrial Area 2
Kramersdorf
Kramersdorf Extension
Langstrand
Kuisebmond
Walvis Bay
Narraville
Meersig
National deciles
Kilometers
0 1.5 3 6
Source and copyright: Central Bureau of Statistics of Namibia.
Map data © OpenStreetMap contributors, CC-BY-SA
Produced by the Centre for Analysis of South African Social Policy,
www.caseap.ox.ac.uk, December 2011

Table 1 shows some of the data underlying these maps. The NIMD 2001 score, national rank (where 1=most deprived and 1,871=least deprived) and Erongo rank (where 1=most deprived and 104=least deprived) for the 20 most deprived datazones in Erongo are shown. Appendix 2 provides this information for all of the datazones in Erongo.

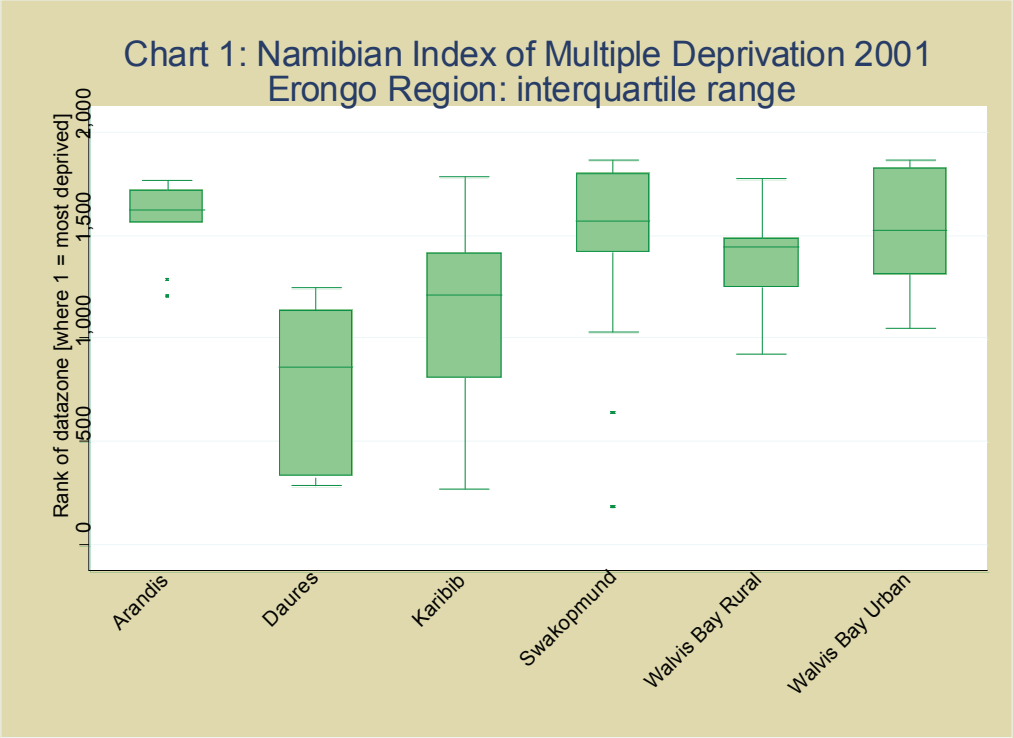
The most deprived datazone in Erongo is in Swakopmund constituency, and is therefore given a rank of 1 among the datazones in Erongo. If ranked alongside all datazones in Namibia, it ranks at 189. Therefore none of the datazones in Erongo are in the most deprived 10 percent of datazones in Namibia in terms of multiple deprivation (the cut-off for the 10 percent most deprived is a rank of 187). The least deprived datazone in Erongo is located in Walvis Bay Urban which is ranked at 1,861 in Namibia as a whole.

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

Datazone	Constituency	NIMD score	NIMD rank – national	NIMD rank – within Erongo
126	Swakopmund	263.8	189	1
106	Karibib	249.4	274	2
96	Daures	247.1	286	3
100	Daures	243.2	311	4
99	Daures	241.0	329	5
104	Daures	214.9	534	6
127	Swakopmund	202.0	641	7
109	Karibib	192.6	724	8
116	Karibib	186.8	774	9
120	Omaruru	186.0	781	10
112	Karibib	182.2	806	11
98	Daures	178.4	850	12
102	Daures	177.6	860	13
105	Daures	170.4	915	14
162	Walvis Bay Rural	168.3	926	15
146	Swakopmund	156.8	1028	16
95	Daures	155.1	1041	17
117	Karibib	154.7	1045	18
190	Walvis Bay Urban	153.3	1053	19
158	Walvis Bay Rural	150.6	1075	20

The seven constituencies in Erongo 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). Omaruru constituency is omitted from the chart because it comprises just seven datazones, which is too few to calculate a meaningful interquartile range.

Interpreting 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, like Arandis and Swakopmund, appear at either end of the line). Daures and Karibib have the widest range of ranks with some of the least deprived datazones in Namibia as well as some of the most deprived.

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. The median rank in Daures is lower (more deprived) than in the other constituencies. If the box is relatively short, like in the case of Arandis, this indicates that datazones are ranked in a narrow range, with similar NIMD ranks (and therefore similar levels of multiple deprivation). If this 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. Most of the constituencies

have datazones that are concentrated at the least deprived end of the distribution. However, the datazones in Daures are concentrated mainly at the most deprived end of the distribution, and the datazones in Karibib are concentrated towards the middle of the distribution.

Further analysis shows that the datazones in the most deprived 10 percent of datazones *within Erongo* on the overall NIMD are located in four constituencies. These four constituencies and the number of datazones that are in the most deprived 10 percent of datazones within Erongo are as follows: Daures (4 of 11), Karibib (3 of 13), Omaruru (1 of 7) and Swakopmund (2 of 23).

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 Erongo, 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, 31 percent of the population in Omaruru constituency experienced material deprivation in 2001. The within Erongo ranks are shown as well as the domain scores, for each constituency in Erongo (where 1=most deprived). In terms of material deprivation, the most deprived constituency in Erongo is Daures (with 72 percent of the population experiencing material deprivation). The least deprived in terms of material deprivation are Walvis Bay Rural (15 percent) and Walvis Bay Urban (13 percent). In relation to employment deprivation, the most deprived constituency is Daures (with 46 percent of the relevant population being employment deprived), followed by Walvis Bay Rural (41 percent). The same constituency, Daures, is also the most deprived in terms of education deprivation (with 73 percent of the relevant population being education deprived), followed by Karibib (71 percent).

In terms of living environment deprivation Daures is again the most deprived constituency (with 84 percent of the total population experiencing living environment deprivation), followed by Walvis Bay Rural and Karibib, both of which have approximately two thirds of people experiencing living environment deprivation.

The domain scores and ranks for each of the datazones in Erongo 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 have a higher score than an area with a similarly relatively high death rate for an older age group, all else being equal. 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 Erongo Region

Constituency	Material deprivation rate (%)	Material deprivation rank (within Erongo)	Employment deprivation rate (%)	Employment deprivation rank (within Erongo)	Education deprivation rate (%)	Education deprivation rank (within Erongo)	Living environment deprivation rate (%)	Living environment deprivation rank (within Erongo)
Arandis	24.4	5	35.9	3	60.8	5	35.8	7
Daures	72.3	1	45.9	1	73.0	1	83.9	1
Karibib	34.0	2	28.8	6	71.4	2	66.3	3
Omaruru	31.0	3	28.1	7	65.4	4	61.8	4
Swakopmund	28.5	4	29.6	5	56.9	7	47.9	5
Walvis Bay Rural	15.0	6	40.7	2	69.0	3	67.5	2
W/Bay Urban UUUrbanUrban	12.5	7	34.0	4	58.9	6	45.8	6

Table 3 shows the percentage of each constituency's datazones that are in the most deprived 10 percent of datazones *nationally* for each domain. There are five constituencies with datazones in the most deprived 10 percent of datazones nationally on at least one domain (only Arandis and Walvis Bay Rural do not). Each of the five constituencies has at least one datazone in the most deprived 10 percent of datazones in terms of education deprivation. In terms of employment and health deprivation, all of the datazones in the most deprived 10 percent nationally are in either Daures or Karibib. Daures is the only constituency that has datazones in the most deprived 10 percent in terms of material deprivation. None of the constituencies have datazones in the most deprived 10 percent nationally in terms of living environment deprivation.

Table 3: Percentage of datazones in most deprived 10 percent of datazones in Namibia

Constituency	Number of datazones	Material deprivation	Employment deprivation	Health deprivation	Education deprivation	Living env. deprivation
Arandis	9	0.0	0.0	0.0	0.0	0.0
Daures	11	18.2	9.1	9.1	27.3	0.0
Karibib	13	0.0	7.7	7.7	15.4	0.0
Omaruru	7	0.0	0.0	0.0	14.3	0.0
Swakopmund	23	0.0	0.0	0.0	8.7	0.0
W/Bay Rural	17	0.0	0.0	0.0	0.0	0.0
W/Bay Urban	24	0.0	0.0	0.0	4.2	0.0

Table 4 shows the percentage of each constituency's datazones that are in the most deprived 10 percent of datazones *within Erongo* for each domain. Daures, Karibib and Swakopmund are the only constituencies that have at least one datazone in the most deprived 10 percent of datazones for each domain. Daures has a higher percentage of datazones in the most deprived 10 percent compared to all other constituencies for each of the five domains. Over half of the datazones in Daures are in the most deprived 10 percent of datazones in terms of living environment deprivation and material deprivation. Omaruru has just one datazone in the most deprived 10 percent for education deprivation only. Arandis is the only constituency which does not have any datazones in the most deprived 10 percent for any of the domains.

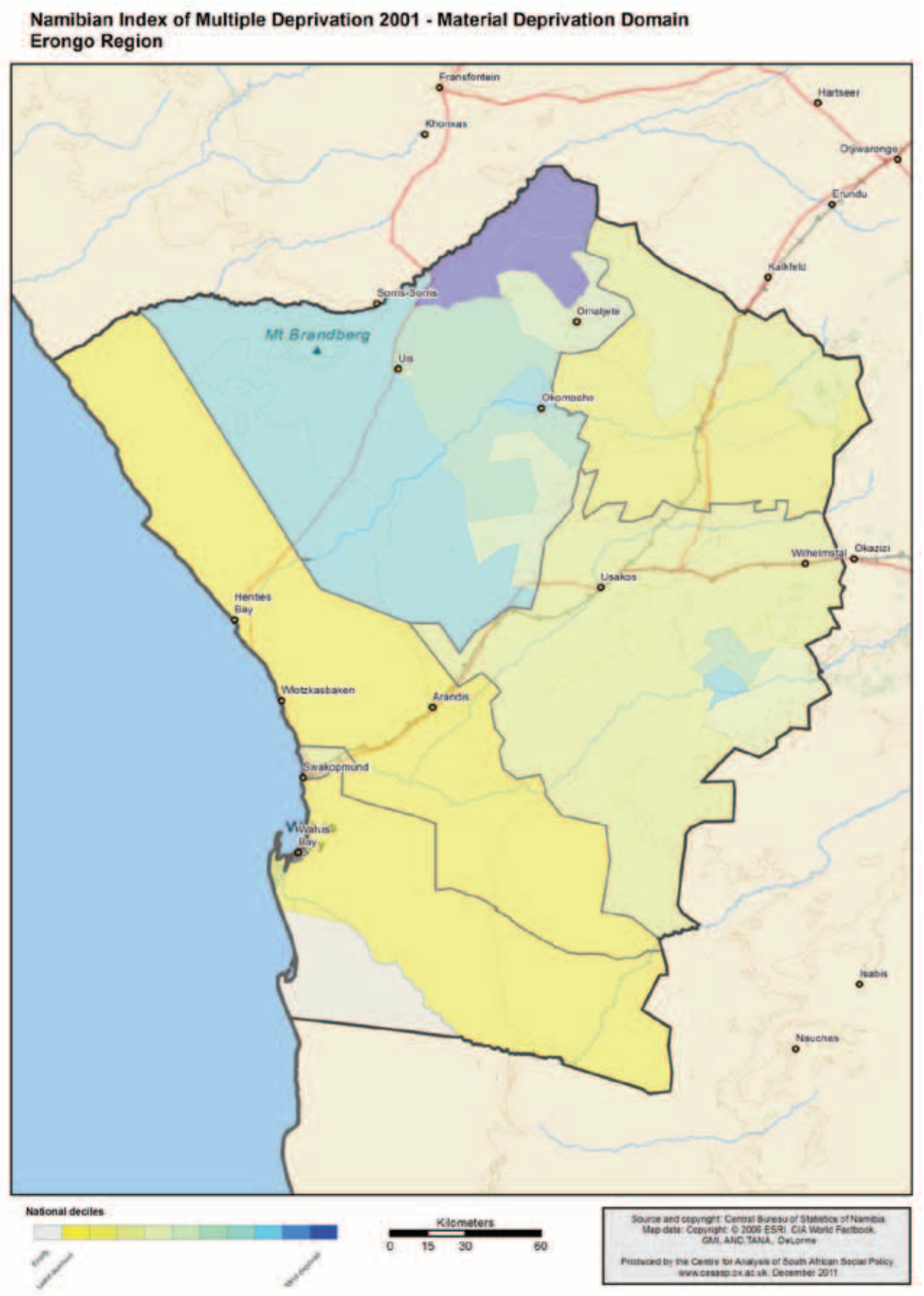
Table 4: Percentage of datazones in most deprived 10 percent of datazones in the Erongo Region

Constituency	Number of datazones	Material deprivation	Employment deprivation	Health deprivation	Education deprivation	Living env. deprivation
Arandis	9	0.0	0.0	0.0	0.0	0.0
Daures	11	63.6	36.4	36.4	36.4	54.5
Karibib	13	15.4	15.4	15.4	15.4	15.4
Omaruru	7	0.0	0.0	0.0	14.3	0.0
Swakopmund	23	4.3	4.3	8.7	8.7	8.7
W/Bay Rural	17	0.0	11.8	5.9	0.0	0.0
W/Bay Urban	24	0.0	4.2	4.2	4.2	0.0

The following maps present each of the five domains at datazone level for Erongo and for the Swakopmund 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 Erongo Region.

> “Some datazones do not have a score for the overall NIMD or separate domains and are therefore shaded in grey. Using Google Earth Historical Imagery it was possible to investigate these datazones and confirm that they did not have anyone living in them in 2001”

Map 3


Namibian Index of Multiple Deprivation 2001 - Material Deprivation Domain
Erongo Region
Fransfontein
Khorixas
Hartseer
Otjiwarongo
Erundu
Kalkfeld
Sorris-Sorris
Mt Brandberg
Omatjete
Uis
Okomosche
Wilhelmstal
Okazizi
Usakos
Henties Bay
Wotzkasbaken
Arandis
Swakopmund
Walvis Bay
Isabis
Nauches
National deciles
Kilometers
0 15 30 60
Source and copyright: Central Bureau of Statistics of Namibia
Map data: Copyright: © 2006 ESRI, CIA World Factbook, GMI, AND, TANA, DeLorme
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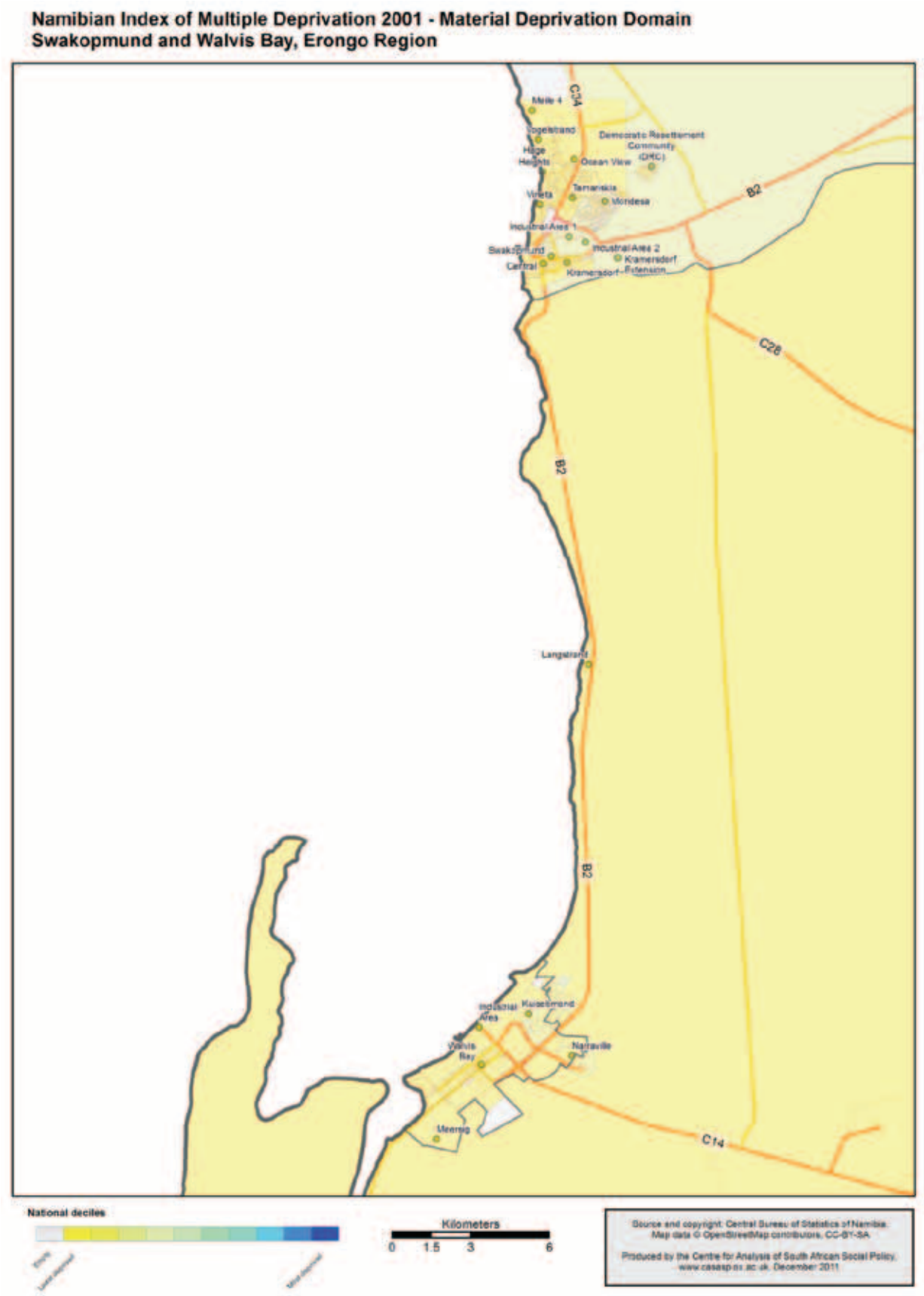
Map 4


Namibian Index of Multiple Deprivation 2001 - Material Deprivation Domain
Swakopmund and Walvis Bay, Erongo Region
C34
Mile 4
Democratic Resettlement Community (DRC)
Ocean View
Tamariskia
Mondesa
B2
Industrial Area 1
Industrial Area 2
Kramersdorf
Kramersdorf-Extension
C28
Langstrand
Industrial Area
Walvis Bay
Narraville
Meersig
C14
National deciles
Kilometers
0 1.5 3 6
Source and copyright: Central Bureau of Statistics of Namibia
Map data © OpenStreetMap contributors, CC-BY-SA
Produced by the Centre for Analysis of South African Social Policy
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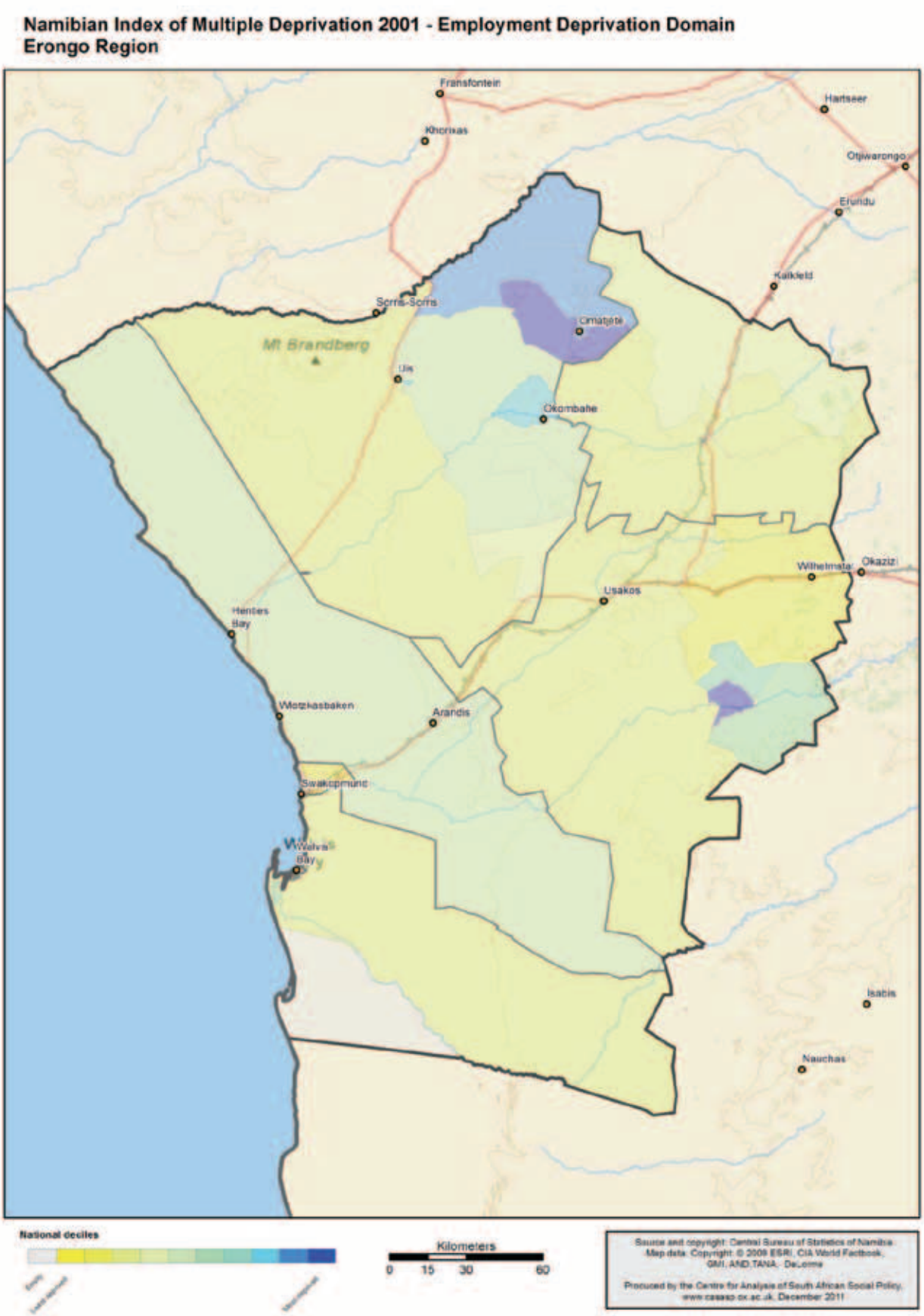
Map 5


Namibian Index of Multiple Deprivation 2001 - Employment Deprivation Domain
Erongo Region
Fransfontein
Khorixas
Hartseer
Otjiwarongo
Erundu
Kalkfeld
Scrris-Scrris
Omatjete
Mt Brandberg
Uis
Okombahe
Wilhelmsta
Okaziz
Usakos
Henties Bay
Arandis
Swakopmund
Walvis Bay
Isabis
Nauchas
National deciles
Kilometers
0 15 30 60
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Map data. Copyright: © 2009 ESRI, CIA World Factbook, GMI, AND,TANA, DeLorme
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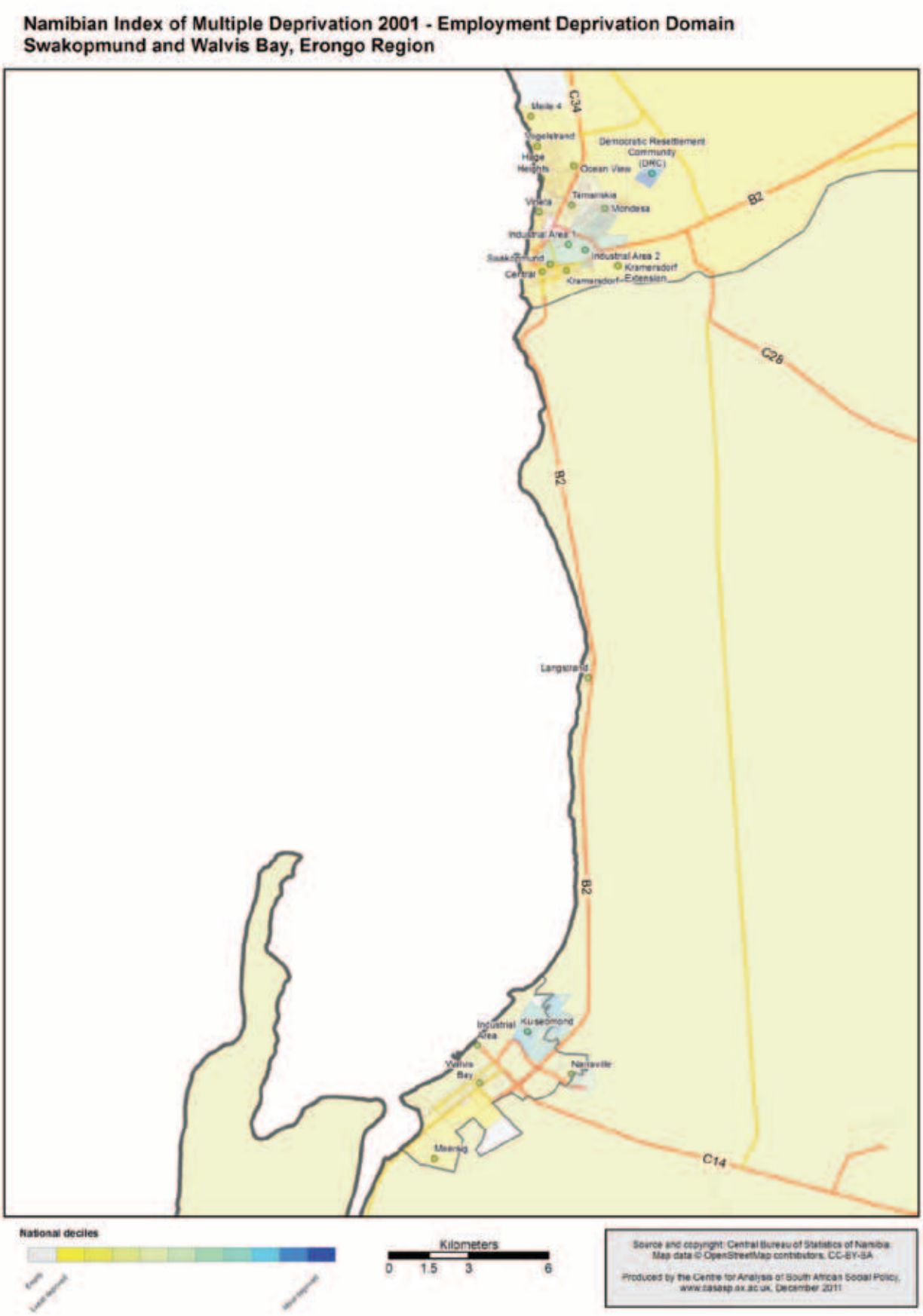
Map 6


Namibian Index of Multiple Deprivation 2001 - Employment Deprivation Domain
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C34
Mile 4
Vogelstrand
Hage Heights
Democratic Resettlement Community (DRC)
Ocean View
Tamariskia
Mondesa
Vineta
B2
Industrial Area 1
Industrial Area 2
Kramersdorf
Kramersdorf Extension
Central
C28
B2
Langstrand
B2
Industrial Area
Kuisebmond
Walvis Bay
Narraville
Meersig
C14
National deciles
Kilometers
0 1.5 3 6
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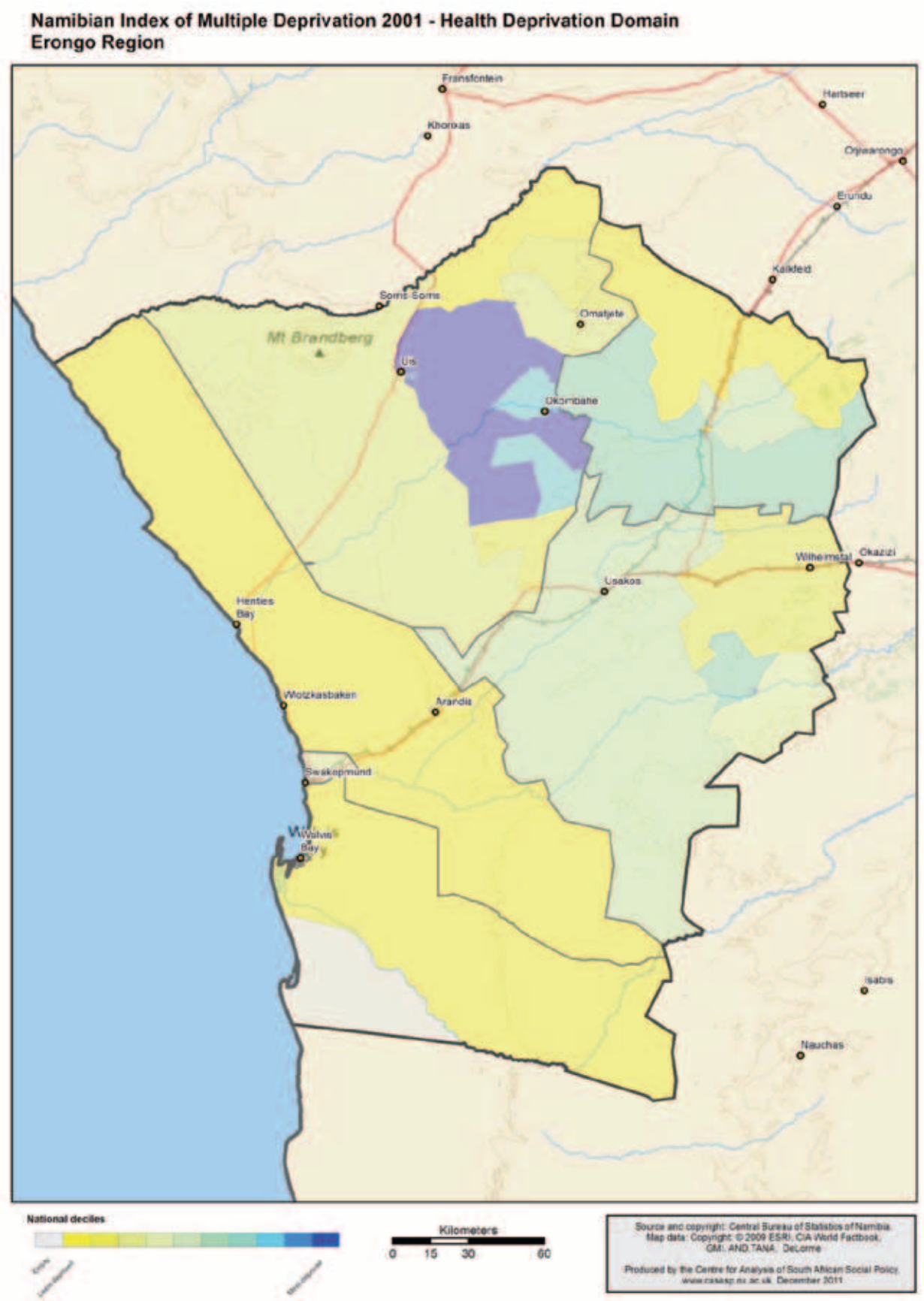
Map 7


Namibian Index of Multiple Deprivation 2001 - Health Deprivation Domain
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Khorixas
Hartseer
Otjiwarongo
Erundu
Kalkfeld
Sorris Sorris
Omatjete
Mt Brandberg
Uis
Okombahe
Wilhelmstal
Okazizi
Usakos
Henties Bay
Wlotzkasbaken
Arandis
Swakopmund
Walvis Bay
Isabis
Nauchas
National deciles
Kilometers
0 15 30 60
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GMI, AND,TANA, DeLorme
Produced by the Centre for Analysis of South African Social Policy
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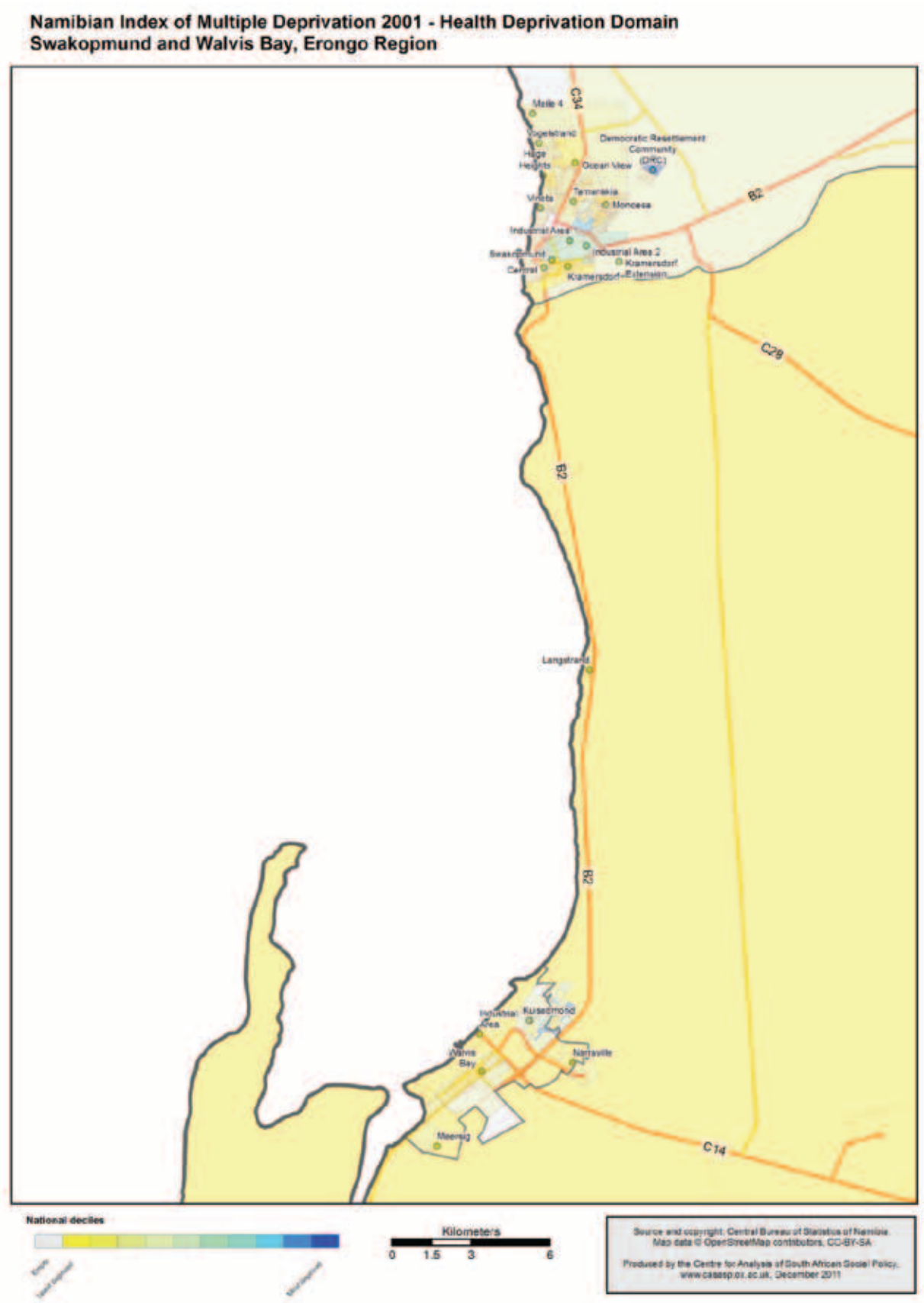
Map 8


Namibian Index of Multiple Deprivation 2001 - Health Deprivation Domain
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C34
B2
C28
B2
B2
C14
Langstrand
Kuisebmond
Narraville
Walvis Bay
Meersig
Ocean View
Democratic Resettlement Community (DRC)
Mondesa
Industrial Area 2
Kramersdorf
Kramersdorf Extension
National deciles
Kilometers
0 1.5 3 6
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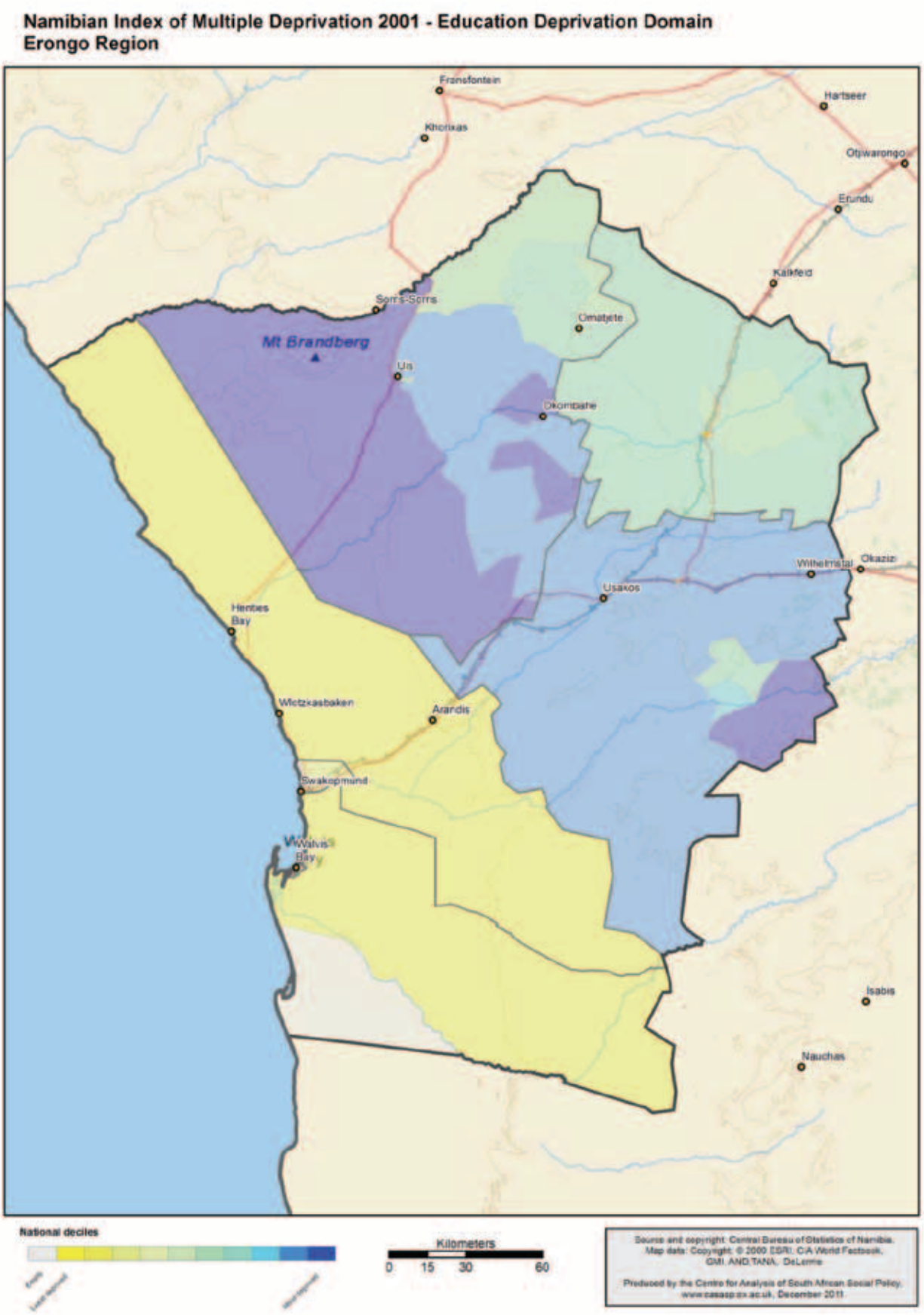
Map 9


Namibian Index of Multiple Deprivation 2001 - Education Deprivation Domain
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Khorixas
Otjiwarongo
Erundu
Kalkfeld
Sorris-Sorris
Omatjete
Mt Brandberg
Uis
Okombahe
Wilhelmstal
Okaziz
Usakos
Henties Bay
Wlotzkasbaken
Arandis
Swakopmund
Walvis Bay
Isabis
Nauchas
National deciles
Kilometers
0 15 30 60
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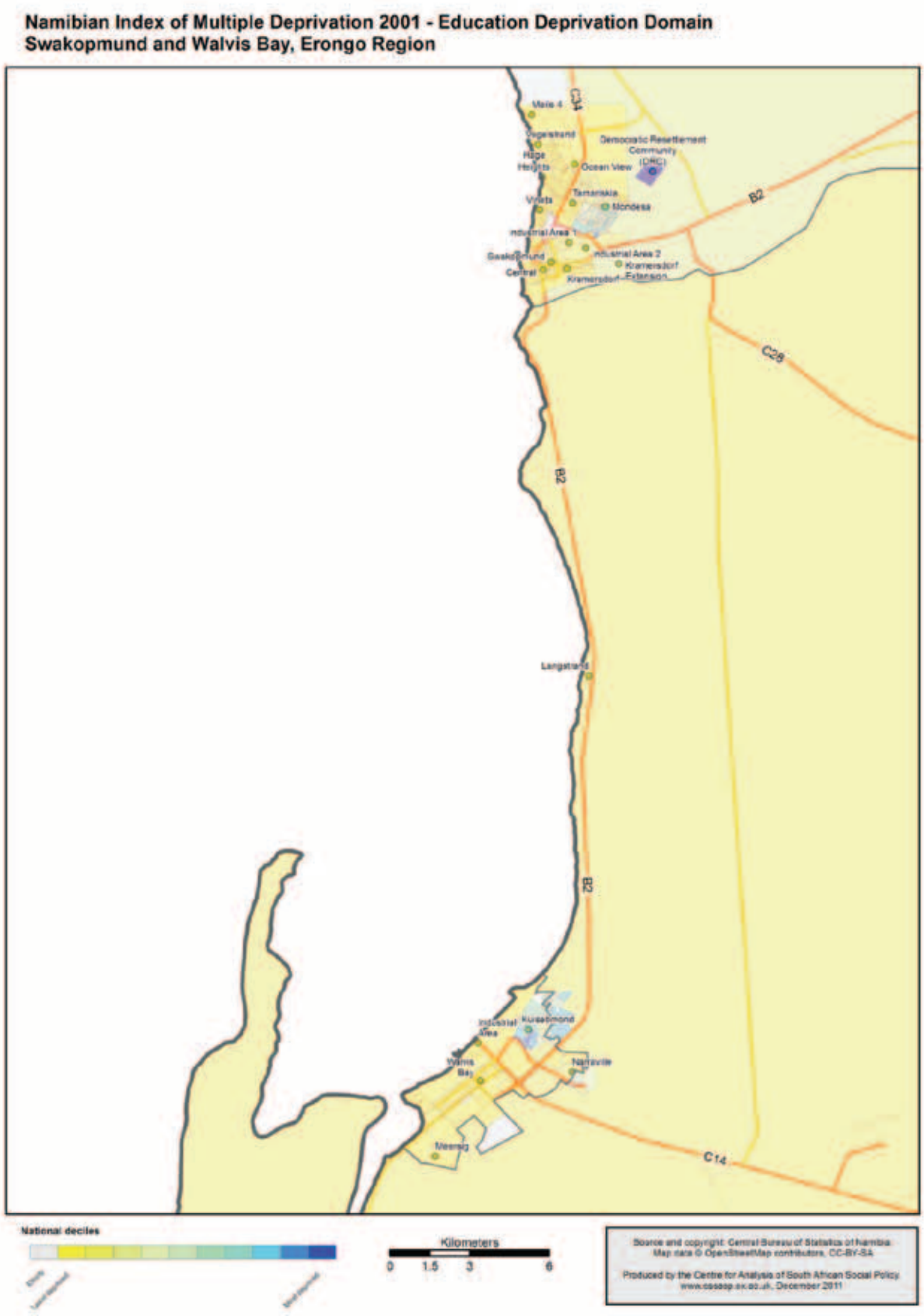
Map 10


Namibian Index of Multiple Deprivation 2001 - Education Deprivation Domain
Swakopmund and Walvis Bay, Erongo Region
C34
B2
C28
B2
B2
C14
Democratic Resettlement Community (DRC)
Ocean View
Tamariskia
Mondesa
Industrial Area 1
Industrial Area 2
Kramersdorf
Kramersdorf Extension
Central
Langstrand
Industrial Area
Kuisebmond
Narraville
Walvis Bay
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National deciles
Kilometers
0 1.5 3 6
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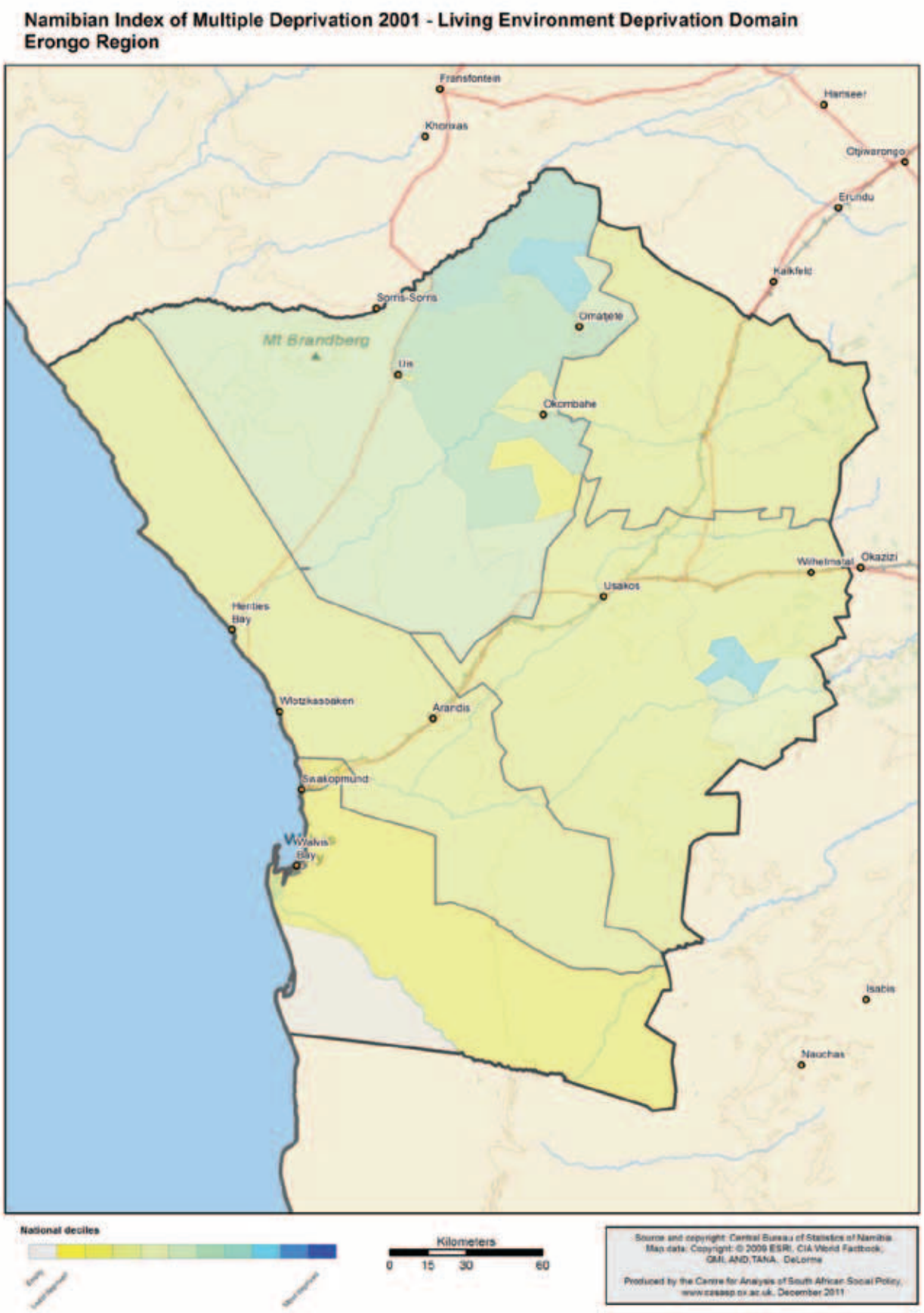
Map 11


Namibian Index of Multiple Deprivation 2001 - Living Environment Deprivation Domain
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Otjiwarongo
Erundu
Kalkfeld
Sorris-Sorris
Omaruru
Mt Brandberg
Uis
Okombahe
Wilhelmstal
Okazizi
Usakos
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Wlotzkasbaken
Arandis
Swakopmund
Walvis Bay
Isabis
Naochas
National deciles
Kilometers
0 15 30 60
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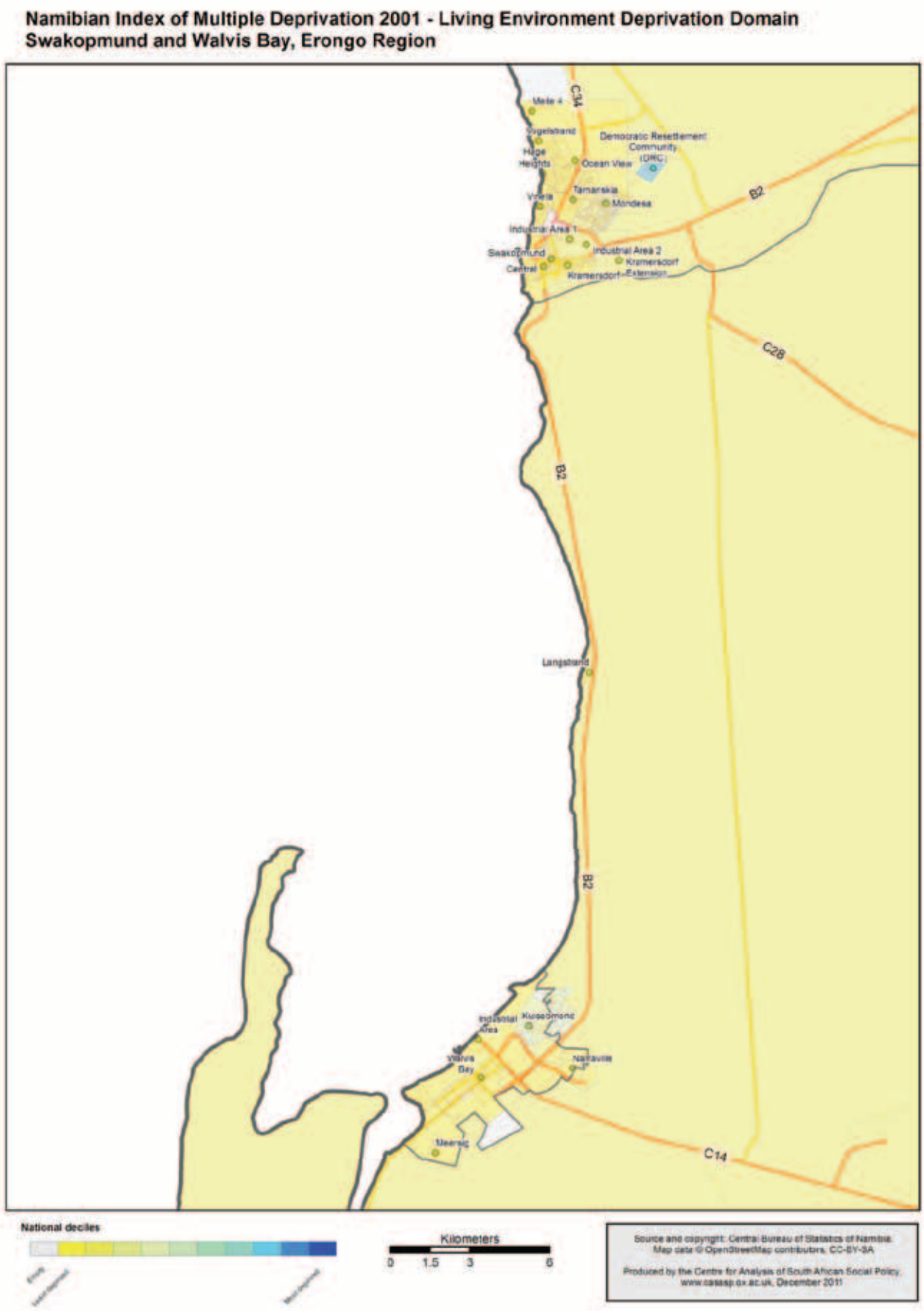
Map 12


Namibian Index of Multiple Deprivation 2001 - Living Environment Deprivation Domain
Swakopmund and Walvis Bay, Erongo Region
C34
Mole 4
Vogelstrand
Huge Heights
Democratic Resettlement Community (DRC)
Ocean View
Tamariska
Mondesa
Vineta
Industrial Area 1
Swakopmund Central
Industrial Area 2
Kramersdorf
Kramersdorf-Extension
B2
C28
Langstrand
Industrial Area
Kuisebmond
Walvis Bay
Narraville
Meersig
C14
National deciles
Kilometers
0 1.5 3 6
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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 Erongo 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:

Temporal analysis of nature, scope and effects of poverty reduction programmes: By describing the geographical distribution and extent of individual dimensions of deprivation and overall multiple deprivation at constituency and datazone levels, this report provides a baseline map of deprivation against which progress in poverty reduction in these areas can be measured over time, that is between successive censuses (2001 and 2011 censusses). 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. 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

> “There are many ways on which the NIMD profiles presented in this report can support pro-poor policy formulation processes and pragrammatic interventions. By providing reliable and objective information on, and profiling the distribution of multiple deprivation and the individual domains of deprivation across the country”

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 constituency and datazone levels 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 datazones are particularly deprived or to the most deprived constituencies and datazones within a 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.

It should be noted however, that the NIMD, as presented in this report, provides a profile of relative deprivation in Erongo region and even the least deprived areas, such as Swakopmund and Arandis constituencies, contain pockets of deprivation. They are simply less deprived than other areas with higher levels of deprivation such as Daures 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 Erongo 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: THE SHRINKAGE TECHNIQUE[4]

This table presents the scores and ranks for every datazone in Erongo for the five domains and the overall NIMD. For all domains except health the score is calculated as a rate. So for example, 16.9% of the population in datazone 86 in Arandis 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 Erongo ranks are shown for each datazone (where 1=most deprived).

Datazone	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
86	Arandis	16.9	54	38.2	47	153.3	77	56.2	78	14.0	92	56.1	79
87	Arandis	0.9	101	42.6	31	501.5	21	61.0	71	12.5	95	84.9	64
88	Arandis	25.1	44	30.7	62	147.3	80	56.1	79	16.3	89	48.8	81
89	Arandis	14.0	62	19.9	78	202.2	62	46.2	89	26.9	81	35.8	84
90	Arandis	56.0	15	38.3	46	49.8	91	75.8	18	56.3	61	125.3	34
91	Arandis	49.9	20	42.7	30	100.3	84	75.0	20	81.6	22	135.3	29
92	Arandis	51.6	17	35.6	53	366.6	32	55.3	82	54.4	65	83.1	65
93	Arandis	3.4	94	25.3	71	32.5	95	56.7	77	74.2	32	43.3	82
94	Arandis	7.9	81	41.7	37	226.6	55	60.3	75	21.0	85	67.9	71
95	Daures	47.1	23	49.0	11	937.4	6	67.0	55	38.3	75	155.1	17
96	Daures	99.5	1	66.4	3	100.9	83	69.2	44	99.0	3	247.1	3
97	Daures	64.6	11	22.7	75	140.6	81	76.2	17	90.5	12	130.9	32
98	Daures	69.0	9	29.6	65	770.3	9	79.0	6	55.3	64	178.4	12
99	Daures	86.7	6	27.5	68	1348.5	1	78.5	10	96.3	7	241.0	5
100	Daures	91.8	5	44.4	22	909.9	7	81.4	2	79.2	26	243.2	4
101	Daures	35.9	37	47.8	17	326.9	36	74.1	21	68.1	41	141.5	25
102	Daures	67.6	10	67.8	2	181.1	68	69.7	38	97.1	6	177.6	13
103	Daures	60.3	13	57.1	4	159.8	76	67.2	54	94.9	8	142.8	23
104	Daures	99.3	2	55.8	7	79.1	87	67.4	53	98.3	5	214.9	6
105	Daures	92.0	4	15.1	88	252.7	49	79.0	7	94.7	9	170.4	14
106	Karibib	94.9	3	74.8	1	741.1	10	72.4	29	93.0	10	249.4	2
107	Karibib	37.3	35	7.5	103	164.2	73	77.2	12	79.8	25	105.2	48
108	Karibib	40.8	29	14.4	90	405.7	26	76.4	16	75.7	29	121.7	38
109	Karibib	83.3	7	41.5	38	631.0	11	69.1	47	99.0	4	192.6	8
110	Karibib	8.8	73	25.1	72	257.1	48	65.4	62	46.1	73	64.5	74
111	Karibib	7.5	83	44.3	23	547.1	16	68.9	48	53.3	67	120.2	40
112	Karibib	50.9	18	48.2	14	530.5	17	79.7	3	59.9	55	182.2	11
113	Karibib	8.0	80	14.0	91	202.6	61	50.8	86	31.8	78	31.7	87

114	Karibib	45.0	25	42.7	29	230.8	54	76.5	15	59.6	57	140.2	26
115	Karibib	7.7	82	7.7	101	197.9	64	70.3	36	48.0	71	63.4	75
116	Karibib	39.5	31	55.8	6	530.4	18	77.2	13	88.6	13	186.8	9
117	Karibib	53.7	16	35.5	54	269.2	47	79.1	5	83.9	20	154.7	18
118	Karibib	10.7	70	19.0	79	1272.9	2	69.4	43	47.2	72	135.1	30
119	Omaruru	34.8	39	24.3	73	0.0	102	69.4	42	74.3	31	78.3	69
120	Omaruru	62.6	12	38.8	43	529.0	19	79.4	4	91.0	11	186.0	10
121	Omaruru	15.1	55	20.4	76	49.4	92	46.0	90	28.4	79	29.0	89
122	Omaruru	7.5	84	30.6	63	223.0	56	64.1	67	35.1	76	61.5	76
123	Omaruru	42.1	28	44.0	24	460.6	24	59.9	76	65.4	45	102.9	50
124	Omaruru	29.2	41	17.4	82	385.5	29	68.9	49	67.5	42	87.8	61
125	Omaruru	22.1	47	14.6	89	622.1	12	71.0	34	76.2	28	108.5	46
126	Swakopmund	46.3	24	44.8	20	1006.0	5	82.6	1	99.8	1	263.8	1
127	Swakopmund	17.5	53	54.9	8	322.0	38	78.8	8	99.2	2	202.0	7
128	Swakopmund	8.0	79	7.5	102	274.5	42	23.5	100	13.6	93	25.0	92
129	Swakopmund	4.5	92	10.1	94	34.8	94	22.0	101	2.3	104	11.5	102
131	Swakopmund	8.3	76	8.9	96	216.5	60	19.6	102	9.7	99	21.4	97
132	Swakopmund	2.6	96	16.5	85	220.2	57	39.7	94	27.3	80	30.5	88
133	Swakopmund	8.4	75	20.0	77	62.9	88	50.7	87	10.4	98	26.6	91
134	Swakopmund	13.5	64	18.8	80	238.2	52	49.7	88	21.6	84	37.5	83
135	Swakopmund	36.4	36	27.4	69	57.6	89	60.8	72	62.6	51	56.9	78
136	Swakopmund	22.1	48	26.7	70	271.1	43	68.1	51	60.9	54	82.2	66
137	Swakopmund	57.2	14	34.8	55	270.6	45	71.4	33	84.6	19	123.9	35
138	Swakopmund	23.4	45	32.1	59	108.7	82	65.9	59	53.1	68	70.5	70
139	Swakopmund	44.5	26	30.8	61	381.3	30	64.1	69	57.3	59	86.7	62
140	Swakopmund	44.2	27	36.5	51	794.0	8	69.5	41	56.4	60	139.2	27
141	Swakopmund	49.1	21	43.4	26	176.7	70	65.7	61	53.9	66	97.3	56
142	Swakopmund	38.9	32	41.9	36	9.1	101	66.7	57	62.8	50	88.7	60
143	Swakopmund	35.4	38	34.4	56	251.2	50	65.8	60	75.4	30	89.3	59
144	Swakopmund	48.3	22	33.0	57	399.0	27	69.2	46	45.7	74	106.9	47
145	Swakopmund	6.4	86	9.5	95	199.7	63	24.4	99	9.3	100	20.8	98
146	Swakopmund	72.8	8	43.9	25	316.4	39	75.1	19	70.8	36	156.8	16

147	Swakopmund	39.6	30	31.8	60	481.1	22	55.6	81	55.9	62	81.5	67
148	Swakopmund	2.2	97	8.6	98	55.5	90	19.4	103	11.1	97	11.2	103
149	Swakopmund	38.3	33	8.6	97	338.2	34	61.2	70	51.6	70	55.1	80
151	Walvis Bay R.	13.1	66	32.3	58	150.4	79	66.1	58	23.6	83	65.4	73
152	Walvis Bay R.	26.5	43	29.2	66	151.5	78	64.1	68	20.7	86	59.4	77
153	Walvis Bay R.	14.8	57	23.7	74	18.2	98	55.2	83	19.5	88	33.5	86
154	Walvis Bay R.	1.9	99	40.7	41	547.6	15	64.1	66	68.5	38	100.0	52
155	Walvis Bay R.	9.7	71	48.4	13	197.4	65	70.7	35	74.1	34	116.1	42
156	Walvis Bay R.	32.3	40	46.9	19	173.5	71	65.1	63	69.4	37	96.6	57
157	Walvis Bay R.	5.2	90	44.7	21	340.1	33	66.7	56	58.6	58	99.6	53
158	Walvis Bay R.	6.7	85	48.9	12	620.1	13	72.2	30	80.1	24	150.6	20
159	Walvis Bay R.	1.9	100	37.2	49	88.6	86	72.0	31	85.8	17	102.1	51
160	Walvis Bay R.	14.2	60	49.3	10	380.7	31	73.7	23	87.0	15	146.8	21
161	Walvis Bay R.	3.4	93	38.8	44	218.6	59	72.7	26	81.0	23	112.0	43
162	Walvis Bay R.	13.8	63	41.1	40	1055.3	4	72.6	28	76.8	27	168.3	15
163	Walvis Bay R.	37.6	34	43.4	27	326.1	37	74.0	22	85.8	18	142.1	24
164	Walvis Bay R.	50.7	19	27.7	67	250.4	51	69.7	39	68.2	39	99.4	54
165	Walvis Bay R.	0.2	103	36.9	50	390.6	28	71.6	32	87.8	14	118.9	41
166	Walvis Bay R.	0.1	104	50.6	9	178.0	69	73.5	24	85.9	16	130.7	33
168	Walvis Bay R.	14.8	58	17.1	83	16.4	99	54.3	84	61.5	53	33.9	85
169	Walvis Bay U.	8.1	77	10.7	93	163.1	74	43.9	91	11.4	96	22.5	94
170	Walvis Bay U.	6.4	87	5.7	104	271.0	44	30.2	98	4.9	103	22.4	95
173	Walvis Bay U.	8.6	74	15.9	87	0.0	102	38.4	96	20.6	87	20.0	99
174	Walvis Bay U.	12.8	67	11.9	92	0.0	102	39.3	95	15.5	91	17.1	100
175	Walvis Bay U.	9.4	72	16.0	86	184.1	67	40.5	93	13.2	94	28.1	90
176	Walvis Bay U.	4.8	91	17.6	81	12.5	100	52.4	85	24.9	82	24.7	93
177	Walvis Bay U.	8.1	78	16.6	84	20.5	97	41.5	92	16.0	90	21.4	96
178	Walvis Bay U.	12.7	68	41.2	39	275.5	41	67.9	52	67.4	43	98.7	55
179	Walvis Bay U.	20.3	51	42.6	32	194.3	66	64.4	64	68.1	40	86.5	63
180	Walvis Bay U.	14.9	56	43.1	28	295.6	40	69.6	40	62.5	52	108.8	45
181	Walvis Bay U.	5.2	89	42.0	35	334.8	35	68.7	50	66.3	44	104.3	49

182	Walvis Bay U.	27.2	42	42.5	33	459.0	25	69.8	37	64.3	47	123.0	37
183	Walvis Bay U.	2.1	98	8.4	100	96.1	85	17.9	104	8.7	101	12.3	101
184	Walvis Bay U.	14.8	59	36.3	52	1182.7	3	64.3	65	65.1	46	136.2	28
185	Walvis Bay U.	13.5	65	38.7	45	236.5	53	76.6	14	34.3	77	120.3	39
186	Walvis Bay U.	14.0	61	30.2	64	559.5	14	60.8	73	52.1	69	80.6	68
187	Walvis Bay U.	20.0	52	40.0	42	461.7	23	60.4	74	59.7	56	90.1	58
188	Walvis Bay U.	21.3	49	48.2	15	504.6	20	69.2	45	74.1	33	132.0	31
190	Walvis Bay U.	3.0	95	56.6	5	169.8	72	78.5	11	73.7	35	153.3	19
191	Walvis Bay U.	21.1	50	48.1	16	24.7	96	78.7	9	83.7	21	146.6	22
195	Walvis Bay U.	5.3	88	42.3	34	161.7	75	73.0	25	63.5	49	110.4	44
197	Walvis Bay U.	22.6	46	37.7	48	219.0	58	55.9	80	55.4	63	66.8	72
198	Walvis Bay U.	0.7	102	8.5	99	43.9	93	30.7	97	8.4	102	11.0	104
199	Walvis Bay U.	12.7	69	47.2	18	269.2	46	72.6	27	64.1	48	123.4	36

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