Datazone level Namibian Index of Multiple Deprivation 2001

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Otjozondjupa Region

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ISBN: 978-99945-73-60-8

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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of the NIMD required very detailed and reliable data and information, it was agreed that the 2001 census data, though 'outdated', be used as the source of information for preparing the NIMD.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 Otjozondjupa 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 Otjozondjupa 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 Otjozondjupa 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 Otjozondjupa 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 Otjozondjupa 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 Otjozondjupa 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.

TABLE OF CONTENTS

SECTION 1: INTRODUCTION

This report presents the datazone level Namibian Index of Multiple Deprivation 2001 (NIMD 2001) for the Otjozondjupa 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 Otjozondjupa 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 Otjozondjupa 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 Region, 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 Otjozondjupa region. In constructing the NIMD at datazone level

> "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)"

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 Otjozondjupa region based on the existing EA geography which nest within the seven 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 137 datazones were created for the Otjozondjupa 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.

> "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 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 137 datazones and seven constituencies in Otjozondjupa region.

The NIMD contains five domains of deprivation:

- Material Deprivation[1]
- 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[2].

> "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

[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.

(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 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.

> "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"

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

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'* (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 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

> "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"

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).

"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"

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

> "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)"

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

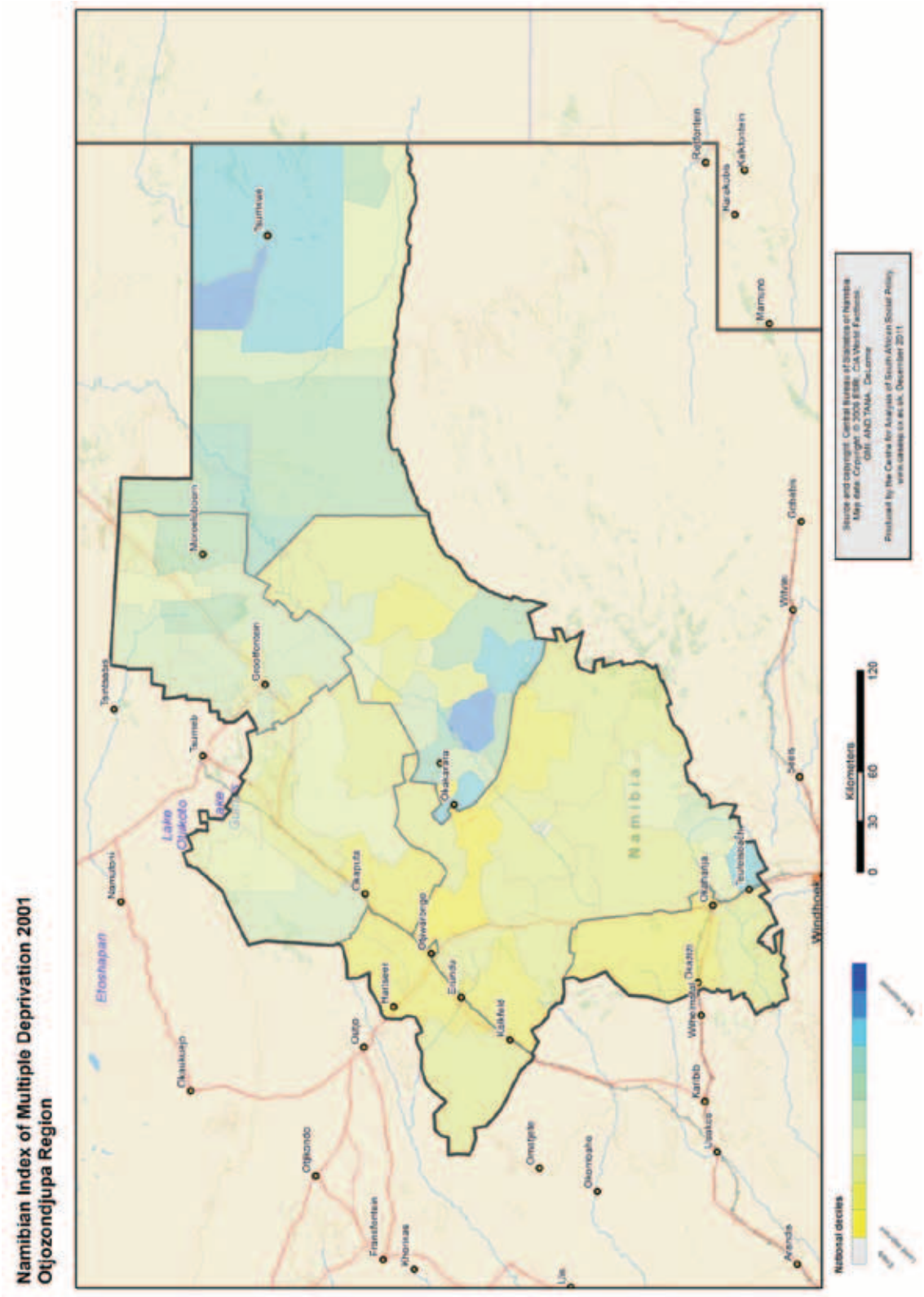
Domains are conceived as independent dimensions of multiple deprivation, each with their own additive impact on multiple deprivation. The strength of this impact, though, may vary between domains depending on their relative importance. As a starting point, equal weights for the domains were recommended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

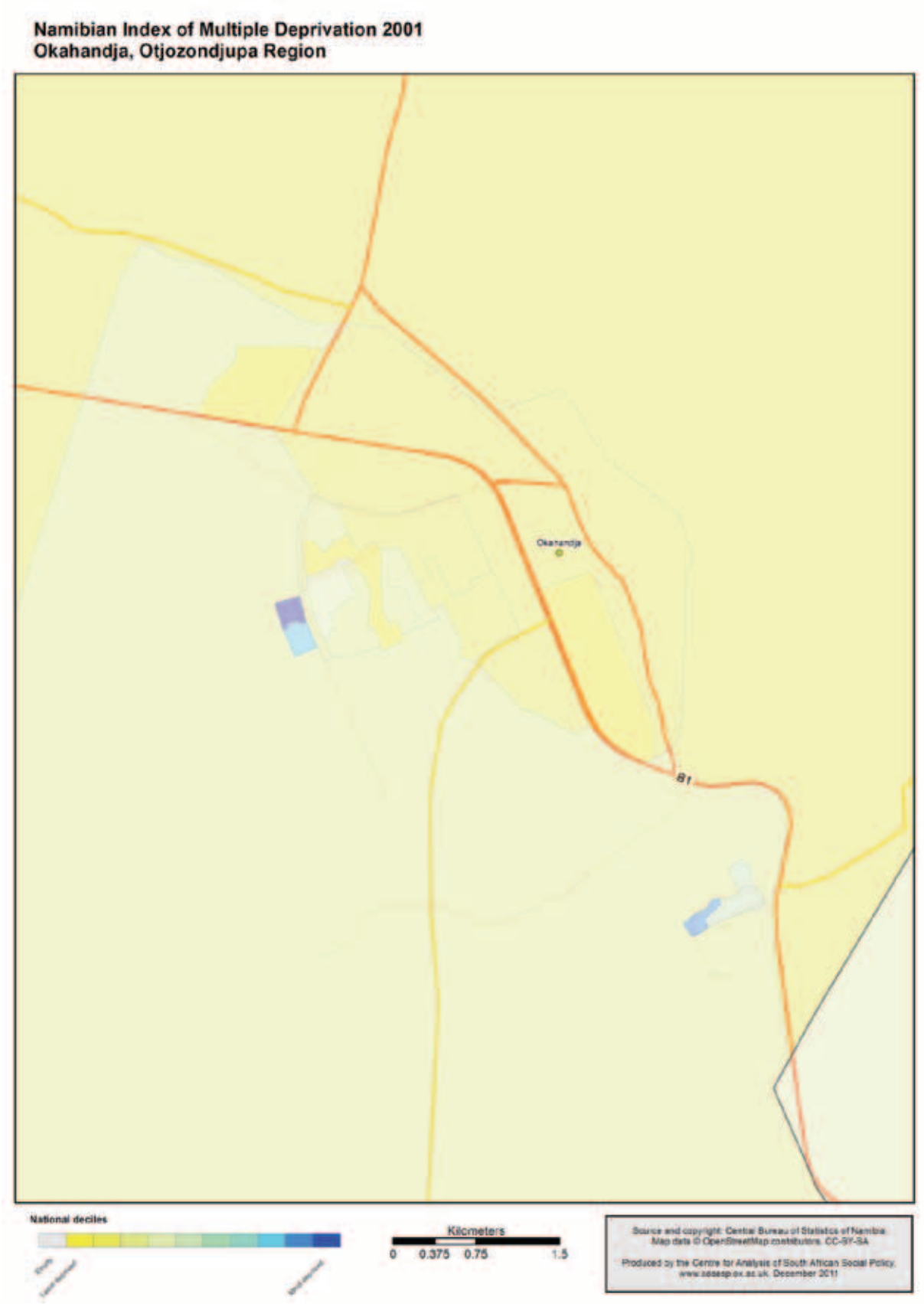
4.1 Multiple Deprivation

In this section a profile of multiple deprivation in Otjozondjupa region, at both constituency and datazone levels, is presented. Using the data from the NIMD it is possible to compare the 137 datazones and seven constituencies within Otjozondjupa region. Map 1 shows the datazones in Otjozondjupa 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. Maps 2 and Map 3 are zoom-ins of Map 1, showing the datazones within the Okahandja and Otjiwarongo 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 Otjozondjupa Region.

Map 1


Namibian Index of Multiple Deprivation 2001
Otjozondjupa Region
Namibia
Kilometers
0
30
60
120
National deciles

Map 2


Namibian Index of Multiple Deprivation 2001
Okahandja, Otjozondjupa Region
Okahandja
B1
National deciles
Kilometers
0 0.375 0.75 1.5
Source and copyright: Central Bureau of Statistics of Namibia
Map data © OpenStreetMap contributors, CC-SY-SA
Produced by the Centre for Analysis of South African Social Policy
www.sasspo.ox.ac.uk December 2011

Map 3

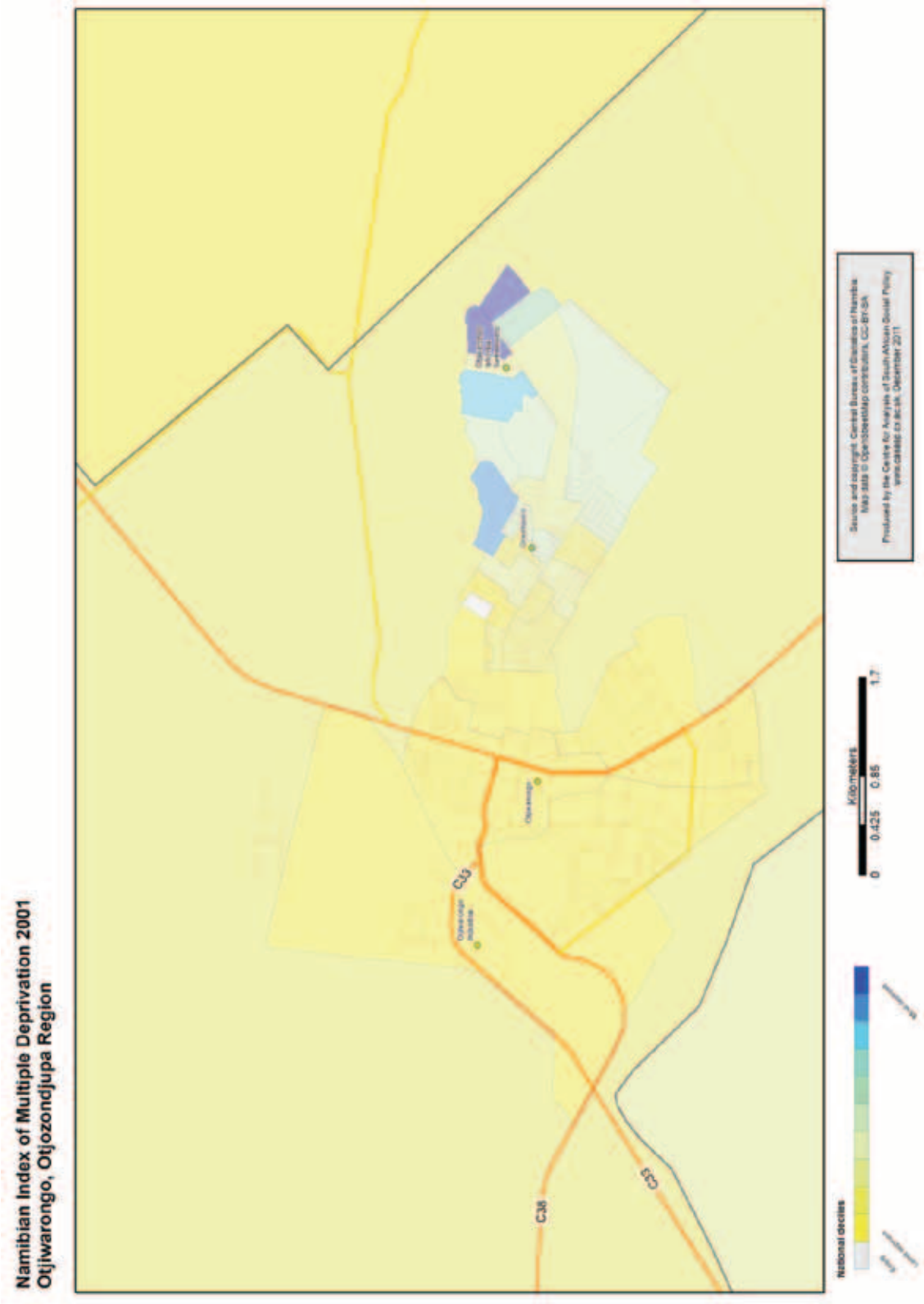

Namibian Index of Multiple Deprivation 2001
Otjiwarongo, Otjozondjupa Region
C33
C38
C33
Kilometers
0
0.425
0.85
1.7
National deciles

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 Otjozondjupa rank (where 1=most deprived and 252=least deprived) for the 20 most deprived datazones in Otjozondjupa are shown. Appendix 2 provides this information for all of the datazones in Otjozondjupa.

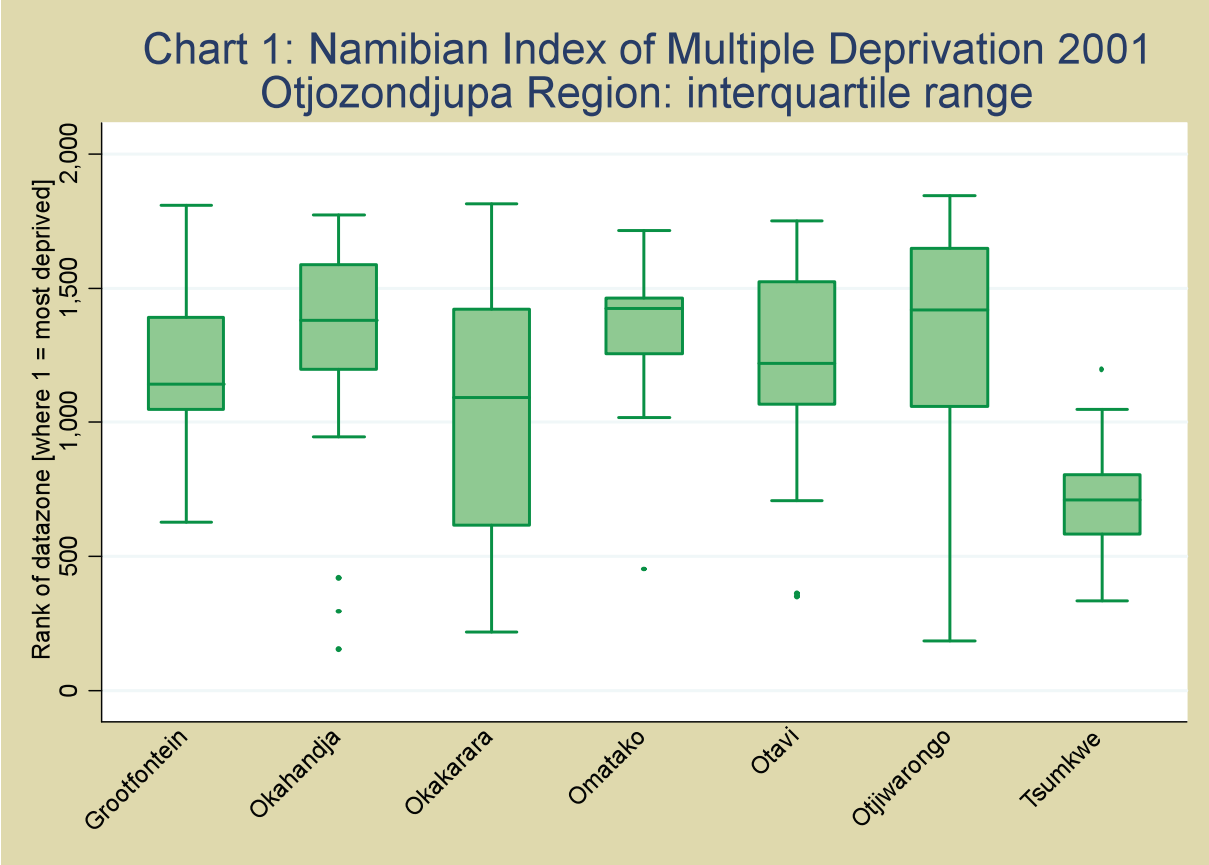
The most deprived datazone in Otjozondjupa is in Okahandja constituency, and is therefore given a rank of 1 among the datazones in Otjozondjupa. If ranked alongside all datazones in Namibia however, it ranks at 155. Two of the datazones in Otjozondjupa are in the most deprived 10 percent of datazones nationally in terms of multiple deprivation (the cut-off for the 10 percent most deprived is a rank of 187). The least deprived datazone in Otjozondjupa is located in Otjiwarongo and is ranked at 1,845 in Namibia as a whole.

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

Datazone	Constituency	NIMD score	NIMD rank – national	NIMD rank – within Otjozondjupa
1785	Okahandja	270.9	155	1
1879	Otjiwarongo	265.3	184	2
1813	Okakarara	258.5	216	3
1873	Otjiwarongo	253.2	247	4
1777	Okahandja	246.6	291	5
1890	Tsumkwe	240.5	333	6
1851	Otavi	237.9	349	7
1855	Otavi	236.4	361	8
1889	Tsumkwe	233.4	389	9
1794	Okakarara	232.4	396	10
1786	Okahandja	229.1	420	11
1798	Okakarara	225.6	446	12
1831	Omatako	224.9	451	13
1817	Okakarara	222.6	479	14
1796	Okakarara	219.5	496	15
1877	Otjiwarongo	218.5	504	16
1819	Okakarara	217.3	512	17
1820	Okakarara	215.9	523	18
1884	Tsumkwe	209.7	583	19
1888	Tsumkwe	208.3	595	20

The ten constituencies in Otjozondjupa 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).

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 Okahandja and Omatako, appear at either end of the line). Datazones in Okakarara and Otjiwarongo have a wide range of deprivation, while datazones in Tsumkwe has a narrow range of deprivation.

The green box for each constituency shows the range of the NIMD ranks of the middle 50 percent 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 Tsumkwe is lower (more deprived) than in the other constituencies. 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). The middle 50 percent of datazones in Okakarara constituency have a wider range of ranks than the other consitituencies. Conversely Tsumkwe and Omatako constituencies have a comparatively

narrow range for the middle 50 percent. 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 the datazones in the constituency are concentrated in the least deprived part of the national distribution. In most of the constituencies the datazones are concentrated in the middle of the distribution. However, datazones in Tsumkwe are situated more towards the more deprived part of the national distribution.

Further analysis shows that the datazones in the most deprived 10 percent of datazones *within Otjozondjupa* on the overall NIMD are located in all but one (Grootfontein) of the constituencies. The number of datazones that are in the most deprived 10 percent of datazones within Otjozondjupa are as follows: Okahandja (3 of 17), Okakarara (3 of 29), Omatako (1 of 17), Otavi (2 of 15), Otjiwarongo (2 of 24) and Tsumkwe (2 of 10).

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 Otjozondjupa, 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, 53.2 percent of the population in Grootfontein constituency experienced material deprivation in 2001. The within Otjozondjupa ranks are shown as well as the domain scores, for each constituency in Otjozondjupa (where 1=most deprived).

In terms of material deprivation, the most deprived constituency in Otjozondjupa is Tsumkwe (with a very high 95 percent of the population experiencing material deprivation). In Okakarara over 70 percent of the population is materially deprived.

In relation to employment deprivation, the most deprived constituency is Okakarara where almost half of the relevant population is employment deprived. The other constituencies have much lower rates of employment deprivation, the next highest being Okahandja at 37 percent. The most deprived constituency in terms of education deprivation is Tsumkwe (with 79 percent of the relevant population being education deprived). Over 70 percent of the relevant population in Grootfontein, Omatako and Otavi also experience education deprivation.

Tsumkwe is again the most deprived constituency in terms of living environment deprivation (with 97 percent of the total population experiencing living environment deprivation), followed by Okakarara (92 percent). Although Tsumkwe is the most deprived constituency in terms of material, education and living environment deprivation, it is the least deprived constituency in terms of employment deprivation.

The domain scores and ranks for each of the datazones in Otjozondjupa 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 Otjozondjupa Region

Constituency	Material deprivation rate (%)	Material deprivation rank (within Otjozondjupa)	Employment deprivation rate (%)	Employment deprivation rank (within Otjozondjupa)	Education deprivation rate (%)	Education deprivation rank (within Otjozondjupa)	Living environment deprivation rate (%)	Living environment deprivation rank (within Otjozondjupa)
Grootfontein	53.2	3	29.5	4	70.8	4	63.5	6
Okahandja	48.7	5	36.7	2	64.3	5	63.7	5
Okakarara	71.5	2	48.6	1	62.9	7	92.4	2
Omatako	48.7	6	24.2	6	72.2	3	80.6	3
Otavi	49.2	4	25.0	5	75.9	2	77.9	4
Otjiwarongo	46.4	7	30.8	3	64.0	6	60.8	7
Tsumkwe	95.4	1	21.0	7	79.1	1	97.3	1

Table 3 below 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 Otjozondjupa feature amongst the most deprived 10 percent of datazones in Namibia on at least one domain. However, none of the constituencies feature in the most deprived 10 percent of datazones in terms of material deprivation. All constituencies except from Okakara have some datazones in the most deprived 10 percent of datazones nationally in terms of education. 60 percent of the datazones in Tsumkwe and over 40 percent of the datazones in Grootfontein and Otavi are in the most deprived 10 percent in terms of education deprivation. Over one quarter (27 percent) of the datazones in Okakarara are in the most deprived 10 percent nationally for employment 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
Grootfontein	25	0.0	0.0	0.0	44.0	0.0
Okahandja	17	0.0	0.0	0.0	5.9	11.8
Okakarara	29	0.0	27.6	0.0	0.0	3.4
Omatako	17	0.0	5.9	0.0	11.8	0.0
Otavi	15	0.0	0.0	0.0	40.0	0.0
Otjiwarongo	24	0.0	0.0	4.2	16.7	0.0
Tsumkwe	10	0.0	0.0	0.0	60.0	0.0

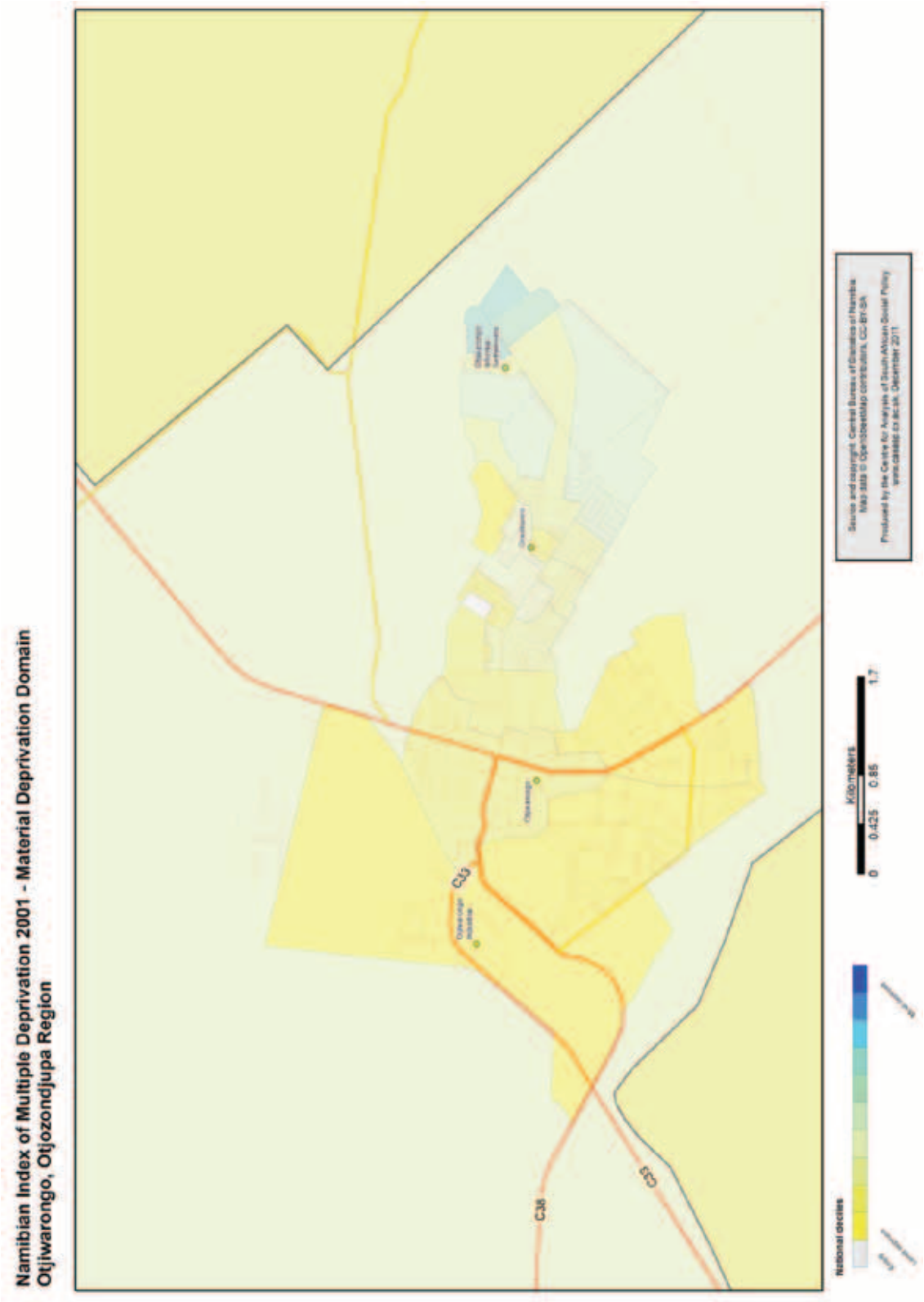
Table 4 shows the percentage of each constituency's datazones that are in the most deprived 10 percent of datazones *within Otjozondjupa* for each domain. Otavi is the only constituency that has at least one datazone in the most deprived 10 percent of datazones for each domain. Nine of Tsumkwe's ten datazones (90 percent) are in the most deprived 10 percent in terms of material deprivation. The proportions for the other domains are much lower. Over one third of Okakarara's datazones (40 percent) are in the most deprived 10 percent of datazones in terms of employment deprivation. One quarter of the datazones in Otjiwarongo are in the most deprived 10 percent in terms of health.

Table 4: Percentage of datazones in most deprived 10% of datazones in the Otjozondjupa Region

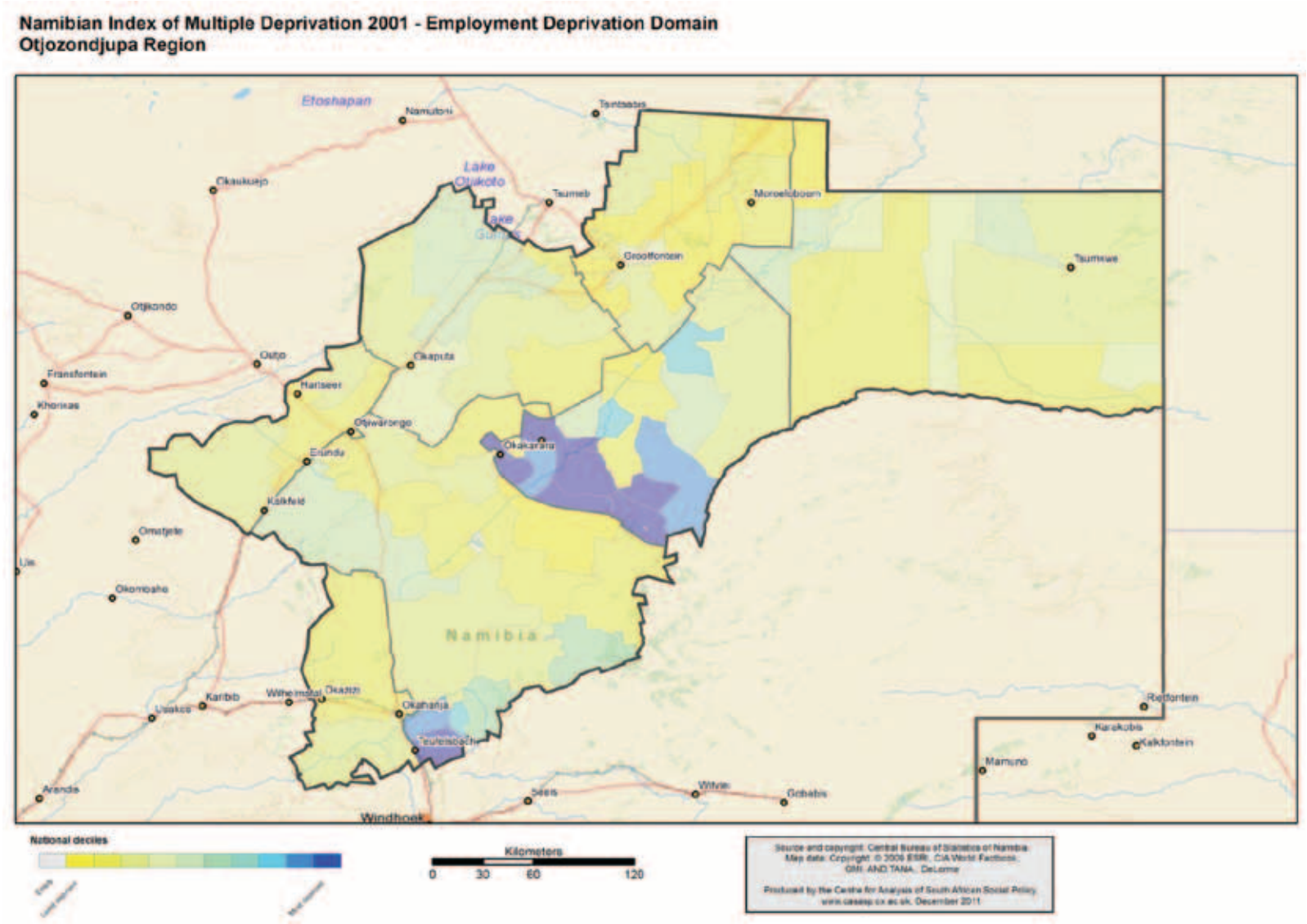
Constituency	Number of datazones	Material deprivation	Employment deprivation	Health deprivation	Education deprivation	Living env. deprivation
Grootfontein	25	0.0	4.0	0.0	28.0	4.0
Okahandja	17	5.9	0.0	11.8	0.0	17.6
Okakarara	29	6.9	34.5	10.3	0.0	13.8
Omatako	17	0.0	5.9	0.0	0.0	5.9
Otavi	15	6.7	6.7	13.3	6.7	6.7
Otjiwarongo	24	0.0	0.0	25.0	4.2	4.2
Tsumkwe	10	90.0	0.0	0.0	40.0	20.0

The following maps present each of the five domains at datazone level for Otjozondjupa and for the Otjiwarongo and Okahandja areas. As with Maps 1, 2 and 3, 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 Otjozondjupa Region.

Map 6


Namibian Index of Multiple Deprivation 2001 - Material Deprivation Domain
Otjiwarongo, Otjozondjupa Region
C33
C38
C33
Kilometers
0
0.425
0.85
1.7
National deciles

Map 7


Namibian Index of Multiple Deprivation 2001 - Employment Deprivation Domain
Otjozondjupa Region
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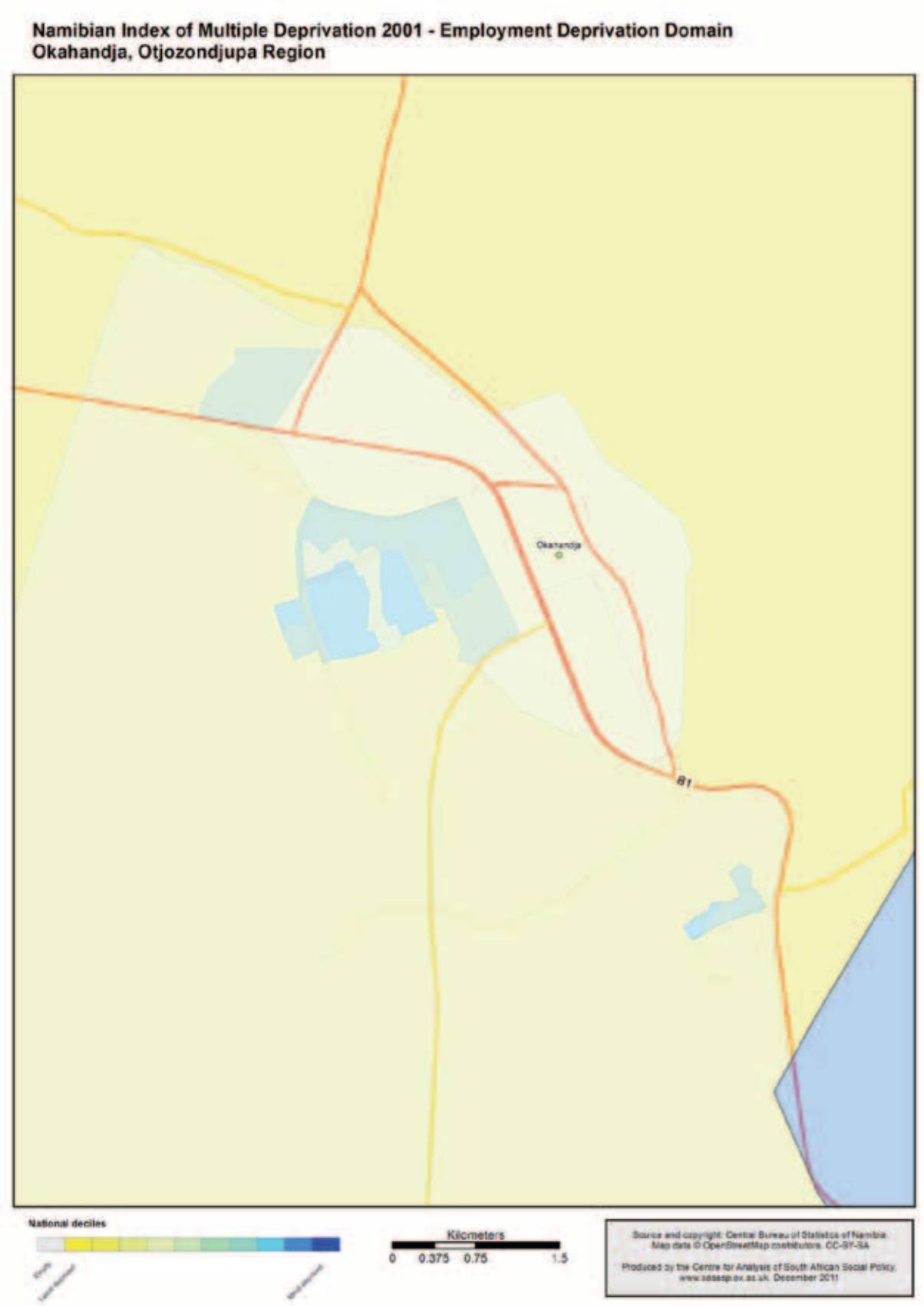
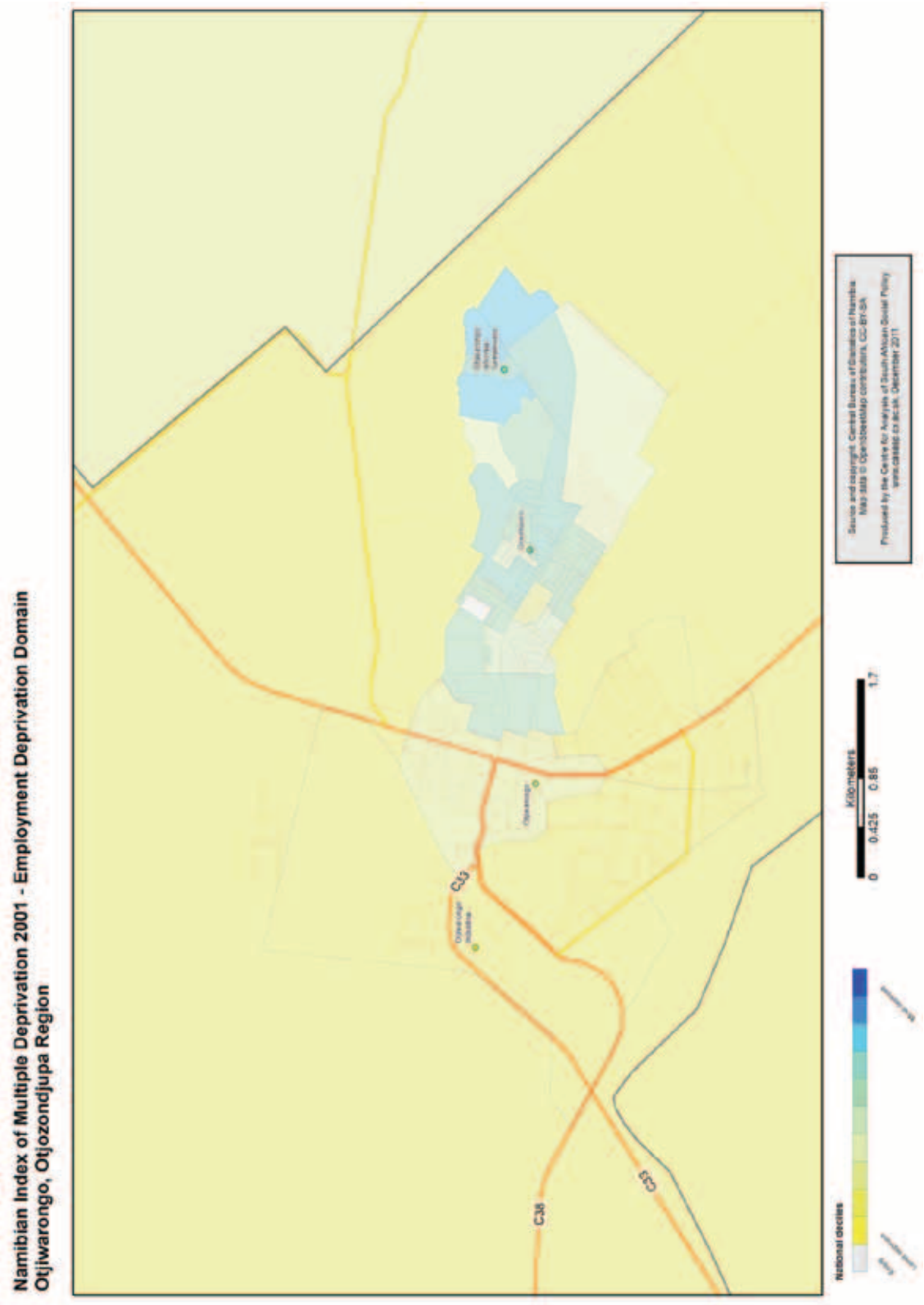
Tsintsabis
Okaukuejo
Lake Otjikoto
Tsumeb
Lake Guinas
Grootfontein
Moroelubaai
Tsumkwe
Otjikondo
Outjo
Okaputa
Fransfontein
Khorixas
Otjiwarongo
Okakarara
Erindi
Kalkfeld
Omaruru
Uis
Okombahe
Namibia
Karibib
Usakos
Okahandja
Okatjiri
Aranos
Windhoek
Rehoboth
Karakobis
Kalkfontein
Mariental
Witvlei
Gobabis
National deciles
Kilometers
0 30 60 120
Source and copyright: Central Bureau of Statistics of Namibia.
Map data: Copyright © 2006 ESRI, CIA World Factbook, GNI, AND TANA, DeLorme
Produced by the Centre for Analysis of South African Social Policy
www.casasp.ox.ac.uk, December 2011

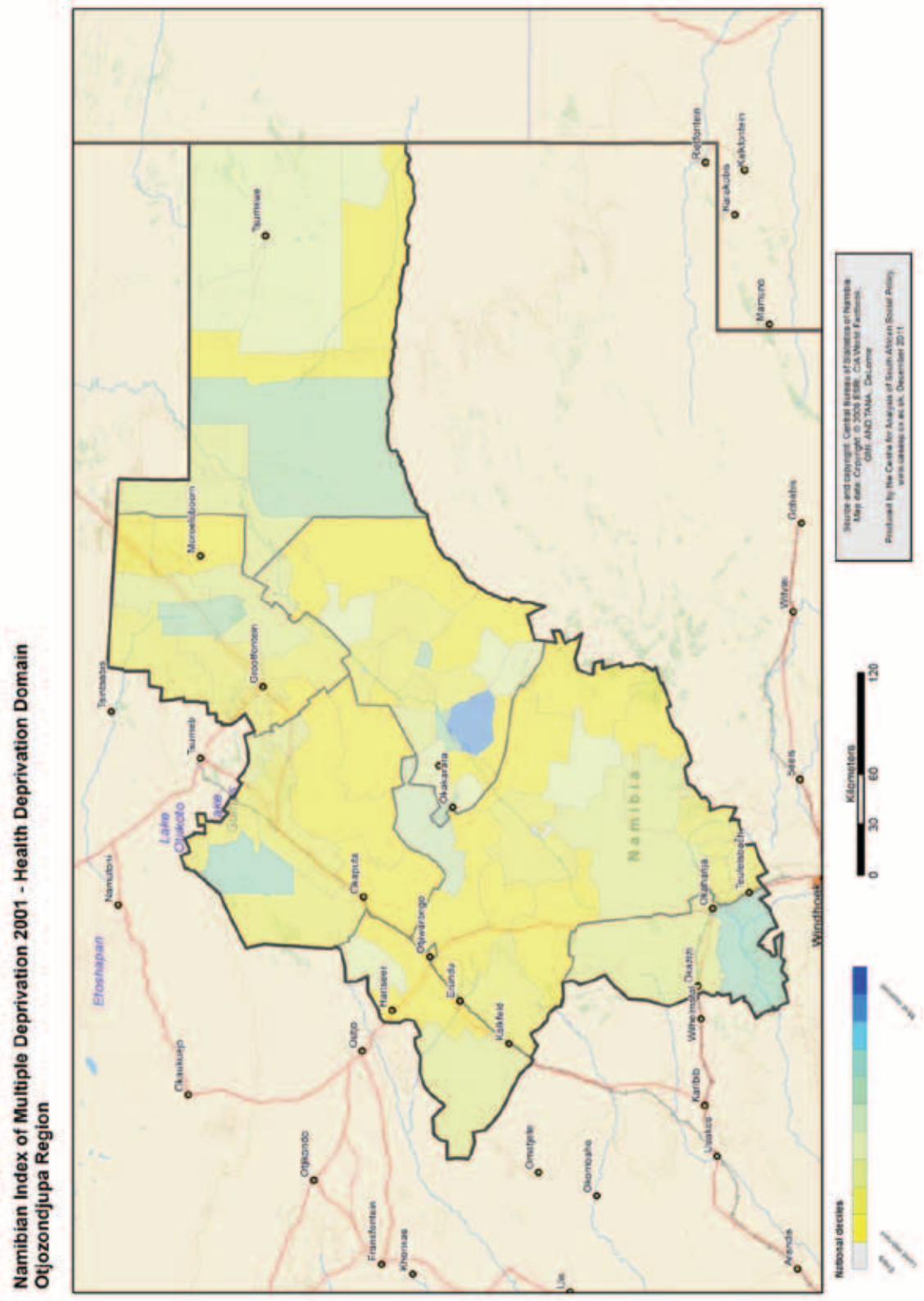
Map 8


Namibian Index of Multiple Deprivation 2001 - Employment Deprivation Domain
Okahandja, Otjozondjupa Region
Okahandja
B1
National deciles
Kilometers
0 0.375 0.75 1.5
Produced by the Centre for Analysis of South African Social Policy
December 2011

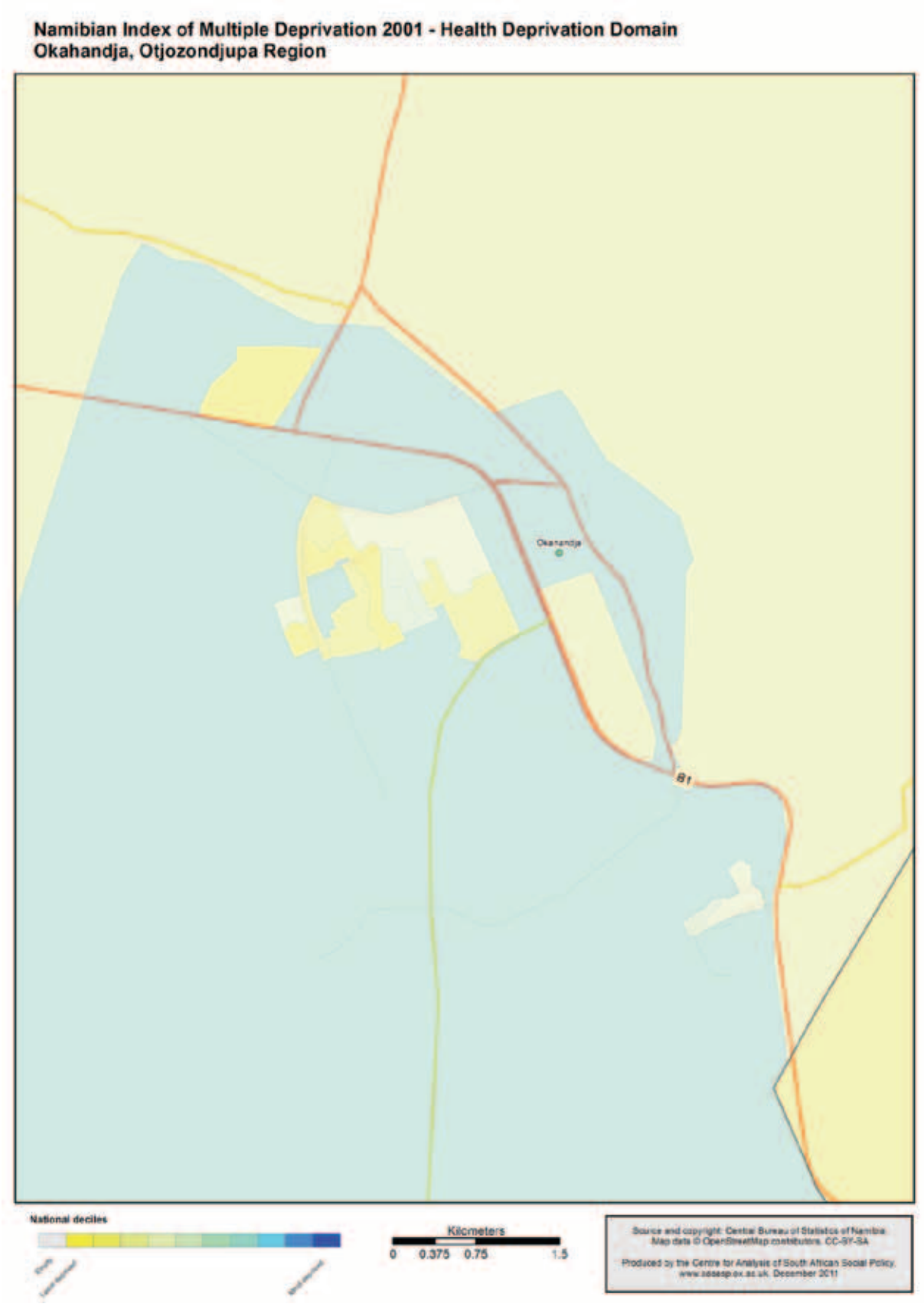
Map 9


Namibian Index of Multiple Deprivation 2001 - Employment Deprivation Domain
Otjiwarongo, Otjozondjupa Region
C33
C38
C53
Kilometers
0
0.425
0.85
1.7
National deciles

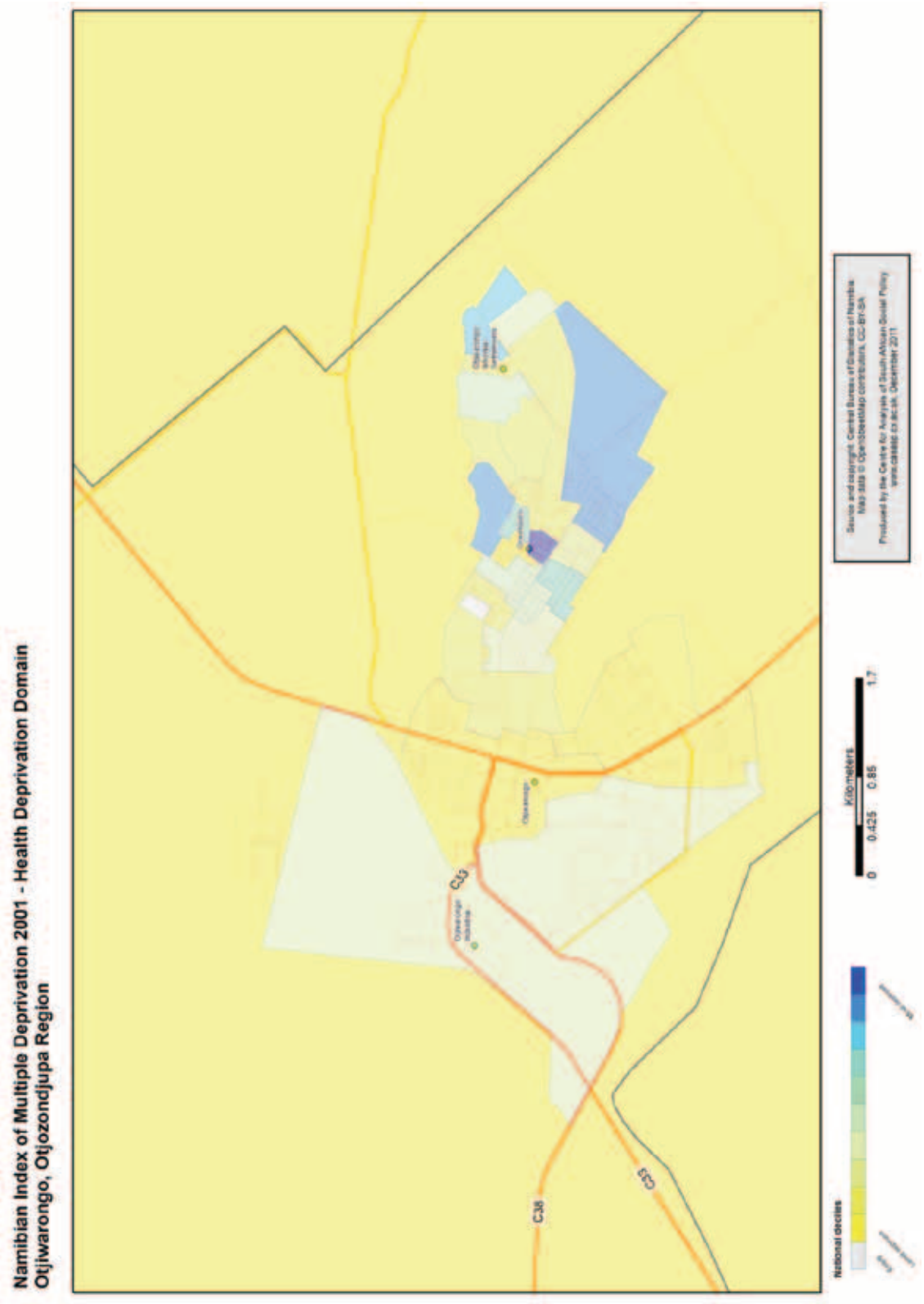
Map 10


Namibian Index of Multiple Deprivation 2001 - Health Deprivation Domain
Otjozondjupa Region
Namibia
Windhoek
Lake Otjikoto
Etosha pan
Kilometers
0
30
60
120
National deciles

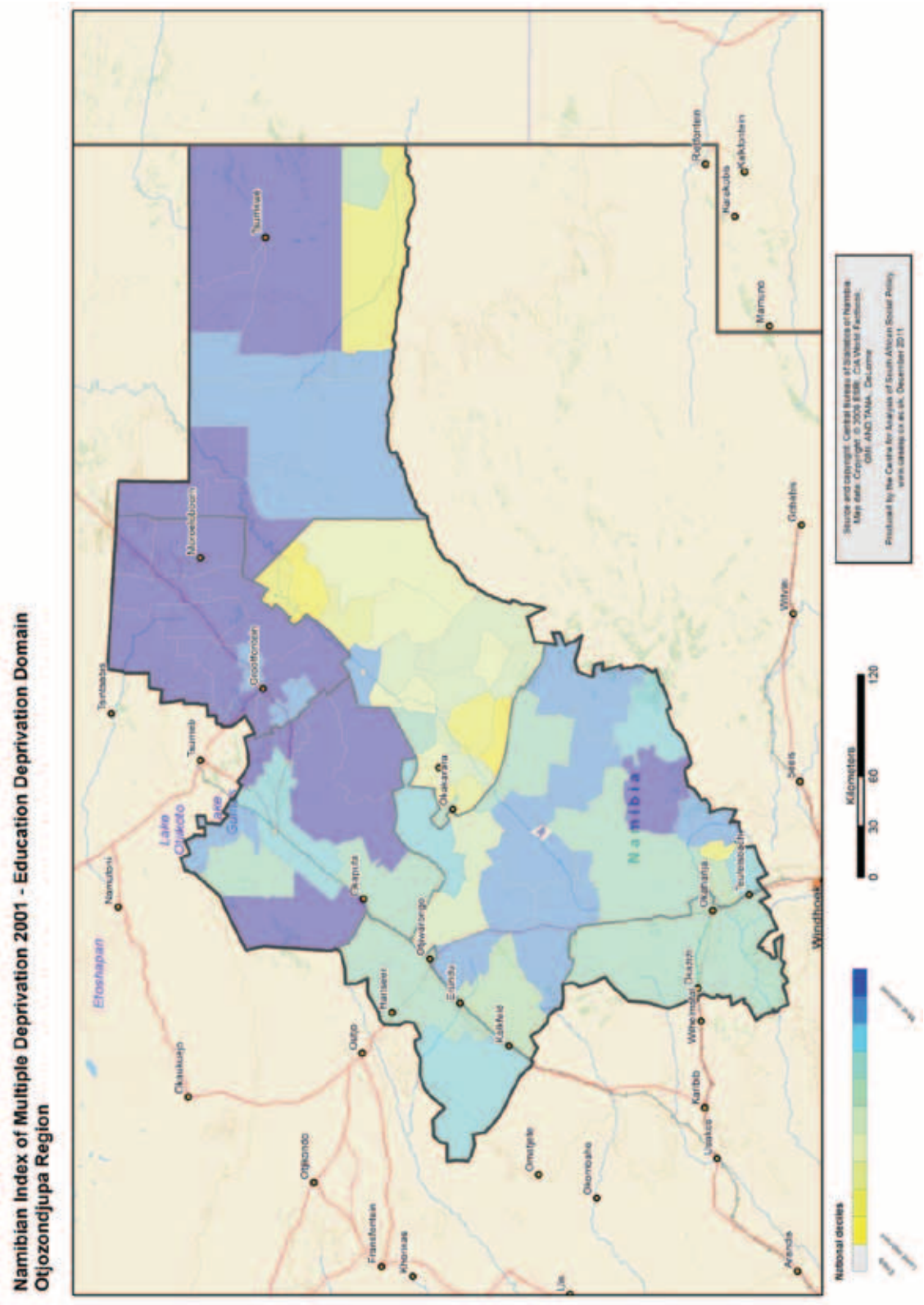
Map 11


Namibian Index of Multiple Deprivation 2001 - Health Deprivation Domain
Okahandja, Otjozondjupa Region
Okahandja
B1
National deciles
Kilometers
0 0.375 0.75 1.5
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.sasspo.ox.ac.uk December 2011

Map 12


Namibian Index of Multiple Deprivation 2001 - Health Deprivation Domain
Otjiwarongo, Otjozondjupa Region
C33
C38
C53
Kilometers
0
0.425
0.85
1.7
National deciles

Map 13


Namibian Index of Multiple Deprivation 2001 - Education Deprivation Domain
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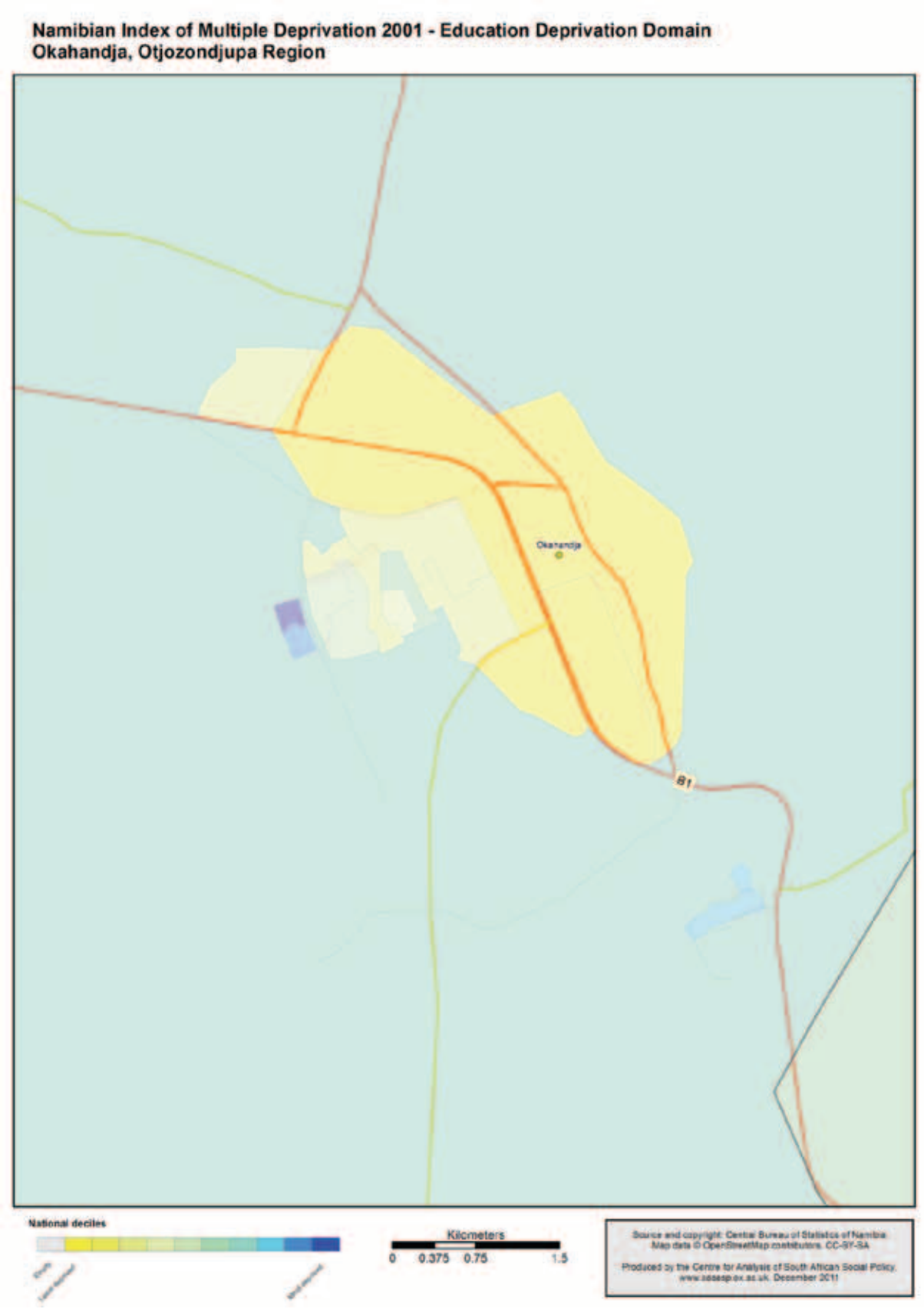
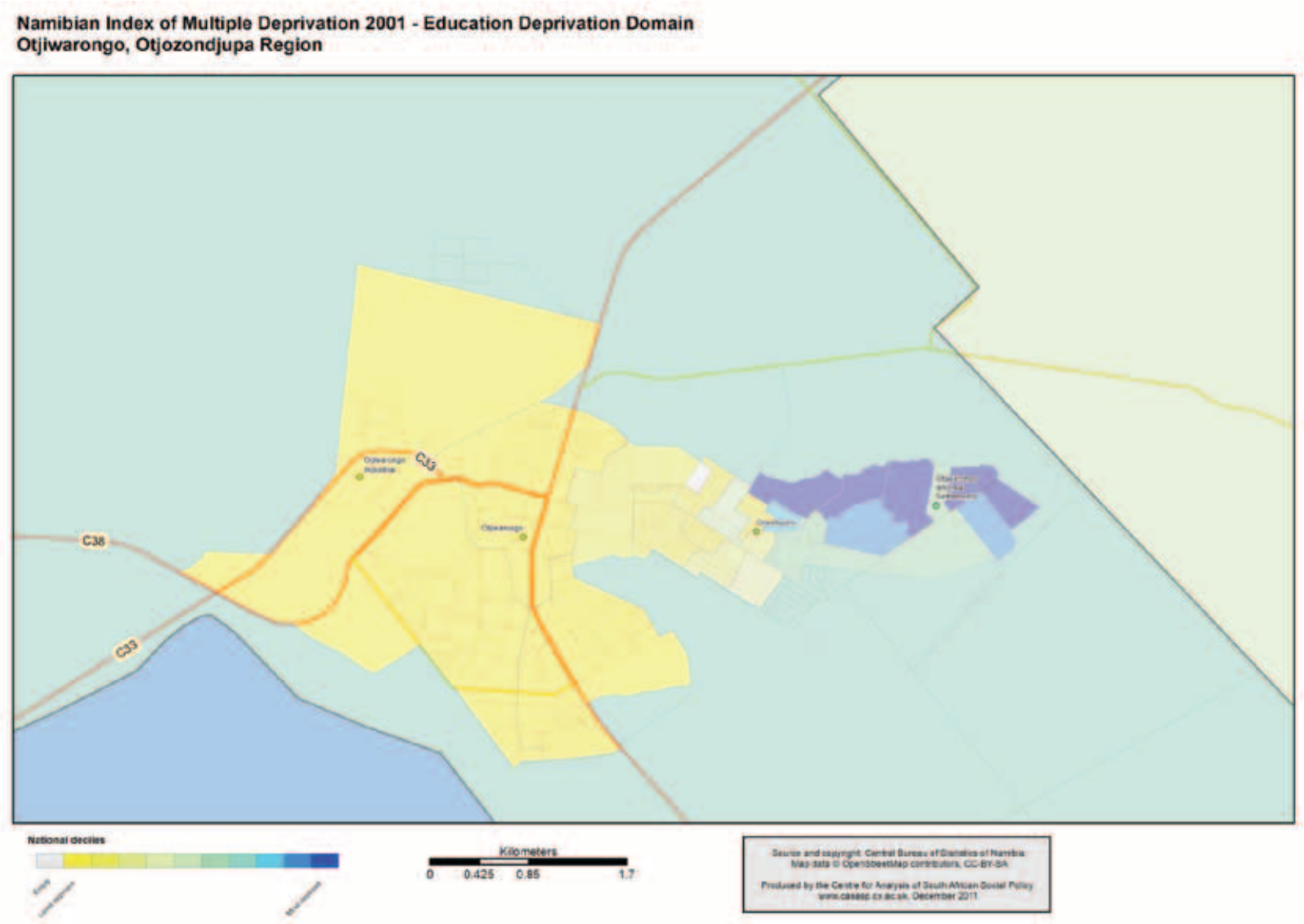
Namibia
Windhoek
Kilometers
0
30
60
120
National deciles

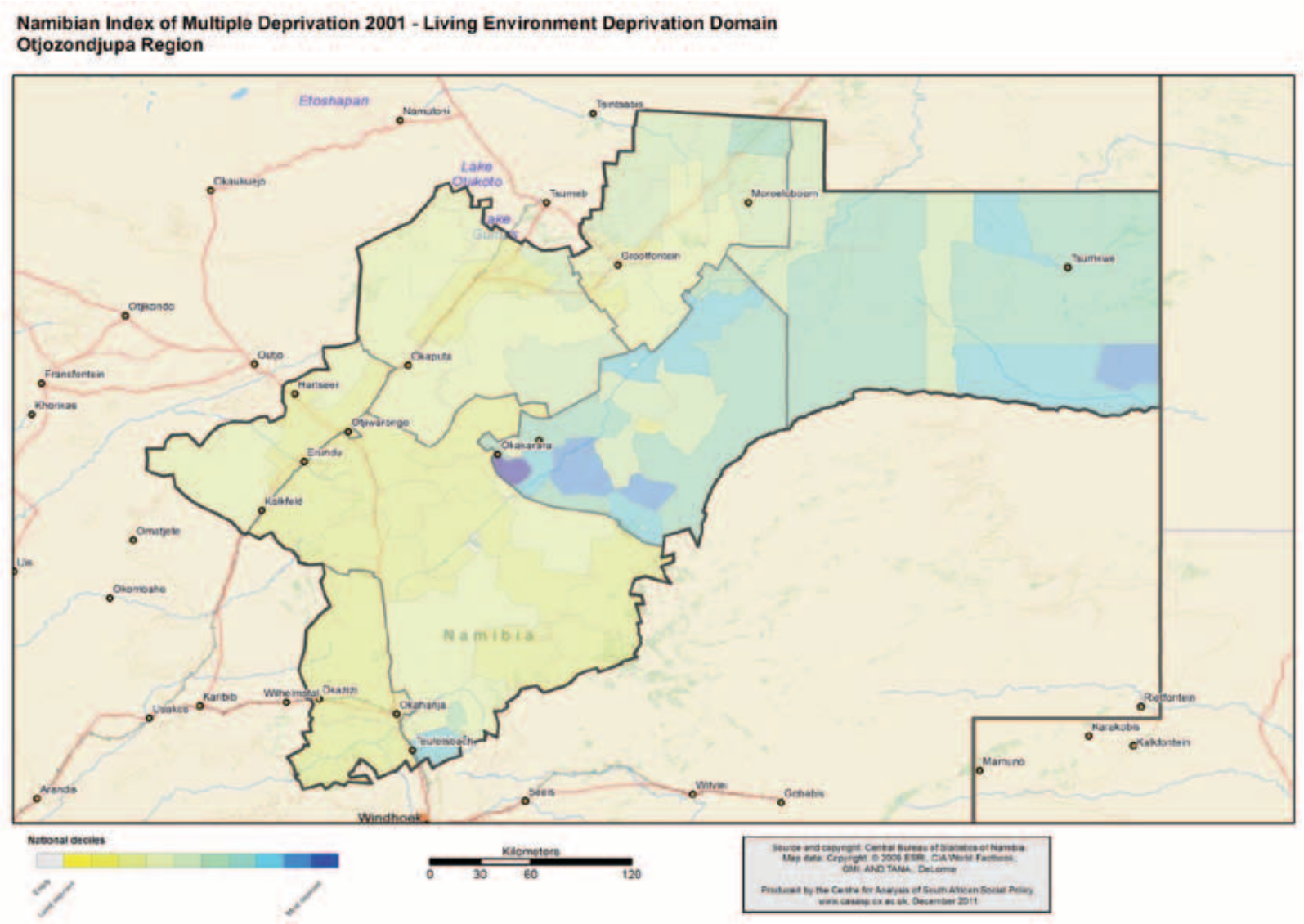
Map 14


Namibian Index of Multiple Deprivation 2001 - Education Deprivation Domain
Okahandja, Otjozondjupa Region
Okahandja
B1
National deciles
Kilometers
0 0.375 0.75 1.5
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.sasspo.ox.ac.uk, December 2011

Map 15


Namibian Index of Multiple Deprivation 2001 - Education Deprivation Domain
Otjiwarongo, Otjozondjupa Region
C33
C38
C33
National deciles
Kilometers
0
0.425
0.85
1.7
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.caseasp.ox.ac.uk, December 2011

Map 16


Namibian Index of Multiple Deprivation 2001 - Living Environment Deprivation Domain
Otjozondjupa Region
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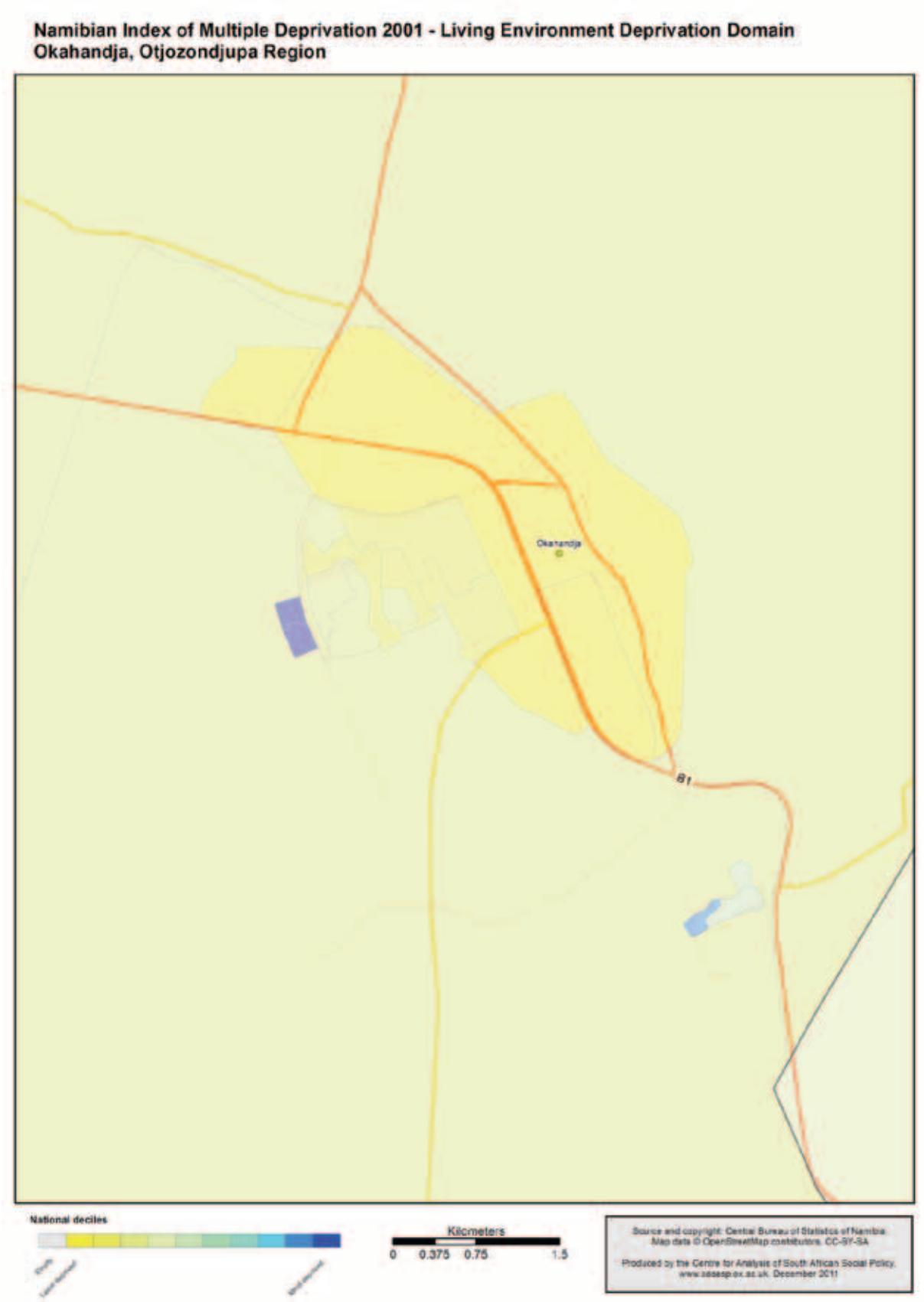
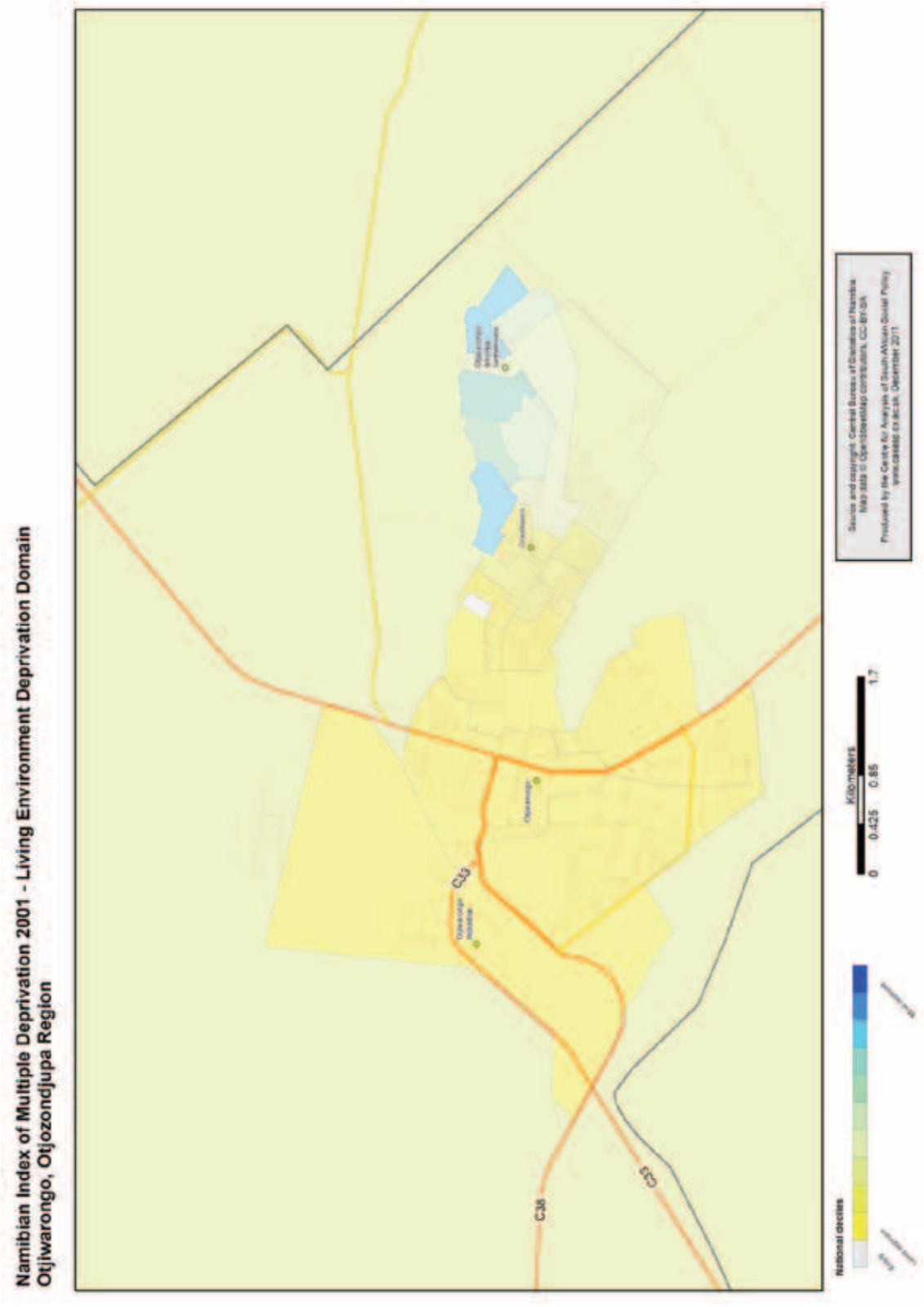
Namutoni
Tantalos
Lake Otjikoto
Okaukuejo
Tsumeb
Moroelubaai
Geoffontein
Tsumkwe
Otjikondo
Outjo
Okaputa
Fransfontein
Harlseer
Khorixas
Otjiwarongo
Okakarara
Erindu
Kalkfeld
Omaruru
Uis
Okombahe
Namibia
Karibib
Wilhelmstal
Okahandja
Usakos
Rehoboth
Karakubis
Kalkfontein
Mariental
Arandis
Swakopmund
Walvis Bay
Gobabis
Windhoek
National deciles
Kilometers
0 30 60 120
Source and copyright: Central Bureau of Statistics of Namibia.
Map data: Copyright © 2006 ESRI, CIA World Factbook, GRI, AND TANA, DeLorme
Produced by the Centre for Analysis of South African Social Policy
www.casasp.ox.ac.uk, December 2011

Map 17


Namibian Index of Multiple Deprivation 2001 - Living Environment Deprivation Domain
Okahandja, Otjozondjupa Region
Okahandja
B1
National deciles
Kilometers
0 0.375 0.75 1.5

Map 18


Namibian Index of Multiple Deprivation 2001 - Living Environment Deprivation Domain
Otjiwarongo, Otjozondjupa Region
C33
C38
C53
Kilometers
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0.425
0.85
1.7
National deciles

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 Otjozondjupa 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 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.

> "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"

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 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 Otjozondjupa region and even the least deprived areas, such as Omatako and Okahandja constituencies, contain pockets of deprivation. They are simply less deprived than other areas with higher levels of deprivation such as Tsumkwe 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 Otjozondjupa 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 Otjozondjupa for the five domains and the overall NIMD. For all domains except health the score is calculated as a rate. So for example, 62.5% of the population in datazone 1751 in Grootfontein 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 Otjozondjupa ranks are shown for each datazone (where 1=most deprived).

Datazone	Constituency	Material score	Material rank	Employment score	Employment rank	Health score	Health rank	Education score	Education rank	Living environment score	Living environment rank	NIMD score	NIMD rank
1751	Grootfontein	62.5	60	17.9	89	159.9	79	74.8	48	70.3	95	111.3	82
1752	Grootfontein	74.3	43	11.6	110	156.9	80	79.5	27	89.3	65	140.0	63
1753	Grootfontein	86.1	28	3.2	135	31.4	120	75.3	45	67.6	97	111.1	85
1754	Grootfontein	90.2	22	4.9	132	118.9	94	80.4	25	87.9	67	150.7	49
1755	Grootfontein	68.6	52	17.0	93	160.7	77	84.3	13	89.8	60	157.5	40
1756	Grootfontein	67.1	56	3.3	134	232.1	59	82.6	18	89.8	61	145.6	56
1757	Grootfontein	73.5	44	2.9	136	586.0	15	90.3	2	89.5	63	183.1	29
1758	Grootfontein	13.9	129	5.3	130	0.0	127	92.6	1	97.7	33	143.3	59
1759	Grootfontein	92.2	16	6.8	126	49.4	118	88.6	4	90.0	59	171.4	35
1760	Grootfontein	74.6	42	15.6	99	145.1	82	87.9	6	92.9	52	166.8	36
1761	Grootfontein	20.8	124	18.8	87	0.0	127	34.3	134	19.0	132	25.0	135
1762	Grootfontein	66.0	57	48.4	29	567.9	16	70.1	67	59.4	103	154.4	41
1763	Grootfontein	82.2	35	48.7	28	110.6	96	74.4	51	33.6	124	149.0	52
1764	Grootfontein	73.0	47	60.7	10	403.9	29	74.6	49	54.7	106	180.5	32
1765	Grootfontein	57.3	70	50.7	25	0.0	127	68.1	78	52.3	109	110.1	88
1766	Grootfontein	52.0	74	51.5	24	199.1	67	62.0	105	46.9	113	100.3	97
1767	Grootfontein	39.4	98	56.8	18	142.4	83	70.0	68	55.9	105	124.3	74
1768	Grootfontein	28.7	112	51.8	22	177.2	72	59.9	112	39.4	117	86.2	107
1769	Grootfontein	41.6	93	49.6	27	350.6	38	66.4	86	46.0	114	113.9	79
1770	Grootfontein	12.3	132	44.4	39	164.3	76	85.0	11	99.7	10	203.4	22
1771	Grootfontein	17.1	127	16.3	97	82.7	107	34.9	133	17.3	134	25.0	134
1772	Grootfontein	51.5	76	19.8	84	458.3	24	52.3	124	30.9	125	66.9	118
1773	Grootfontein	33.6	107	29.6	64	507.1	18	58.1	117	26.4	129	74.9	115
1774	Grootfontein	40.0	96	7.5	125	197.3	68	83.6	15	94.6	43	142.7	62
1775	Grootfontein	50.5	78	4.5	133	124.2	91	88.6	5	93.4	49	146.3	54

1776	Okahandja	83.2	32	41.8	42	305.1	46	72.9	57	94.4	44	166.0	37
1777	Okahandja	96.8	6	50.5	26	404.7	28	73.8	53	99.8	5	246.6	5
1778	Okahandja	40.7	95	46.9	32	438.0	27	63.4	100	73.8	91	113.2	80
1779	Okahandja	68.0	54	46.4	34	98.5	101	65.7	90	63.5	102	108.1	89
1780	Okahandja	46.4	88	52.1	21	611.5	14	65.8	89	65.3	100	137.3	66
1781	Okahandja	23.0	117	31.0	62	82.9	105	59.8	113	43.1	116	51.8	128
1782	Okahandja	49.4	81	41.0	46	139.7	84	69.9	71	74.7	89	111.2	83
1783	Okahandja	20.0	125	21.7	76	615.2	13	46.4	128	30.7	126	66.3	119
1784	Okahandja	38.8	100	31.8	61	0.0	127	60.7	110	20.8	130	53.1	127
1785	Okahandja	87.7	24	51.6	23	316.0	45	80.8	23	99.9	2	270.9	1
1786	Okahandja	82.6	34	42.9	41	77.4	111	77.9	34	99.9	1	229.1	11
1787	Okahandja	3.6	136	21.6	77	211.5	65	28.0	136	26.6	128	33.4	131
1788	Okahandja	64.4	58	33.1	58	90.0	103	61.1	107	56.4	104	76.6	112
1789	Okahandja	20.9	123	41.3	44	286.6	47	60.8	109	49.4	110	79.8	111
1790	Okahandja	32.8	109	44.9	36	399.2	30	67.0	83	52.6	108	111.7	81
1791	Okahandja	35.8	105	10.3	112	231.7	60	70.7	63	73.9	90	82.9	110
1792	Okahandja	60.0	65	13.3	106	634.2	11	69.4	75	78.7	79	117.6	77
1793	Okakarara	85.8	30	44.5	38	109.1	97	64.7	97	98.6	22	148.7	53
1794	Okakarara	97.7	3	69.4	9	321.0	44	62.4	102	99.8	6	232.4	10
1795	Okakarara	49.2	83	41.6	43	338.3	41	67.3	81	93.2	51	125.5	73
1796	Okakarara	92.8	14	71.9	8	280.4	49	66.6	85	99.5	14	219.5	15
1797	Okakarara	94.5	9	56.8	17	79.6	109	66.1	88	98.1	29	177.4	33
1798	Okakarara	73.3	45	83.8	5	272.0	51	61.8	106	99.9	3	225.6	12
1799	Okakarara	57.7	69	54.4	20	463.3	22	66.7	84	63.9	101	138.8	64
1800	Okakarara	87.5	25	10.3	113	152.2	81	65.3	93	93.3	50	98.4	101
1801	Okakarara	23.4	116	26.5	69	460.7	23	65.4	92	90.6	57	97.8	102
1802	Okakarara	62.8	59	5.2	131	139.4	85	76.6	37	99.0	20	142.7	61
1803	Okakarara	59.6	66	25.1	72	129.9	87	62.2	103	95.1	41	88.2	105
1804	Okakarara	39.0	99	7.6	124	206.9	66	57.4	120	89.5	62	54.6	125
1805	Okakarara	78.8	38	48.3	30	351.1	37	59.9	111	99.1	18	158.0	38
1806	Okakarara	85.8	29	15.2	101	64.8	113	62.1	104	98.5	24	106.7	90

1807	Okakarara	92.5	15	16.1	98	5.4	124	43.4	129	99.5	15	114.7	78
1808	Okakarara	91.7	19	16.7	94	212.4	64	55.1	122	96.3	38	104.9	91
1809	Okakarara	81.1	36	92.0	1	335.3	42	63.8	98	97.5	34	202.2	23
1810	Okakarara	77.8	39	37.3	51	746.1	7	73.9	52	94.2	45	187.0	27
1811	Okakarara	49.7	80	59.9	11	0.0	127	65.0	95	98.9	21	146.0	55
1812	Okakarara	90.7	21	84.4	4	1.4	126	36.5	131	98.5	23	181.6	31
1813	Okakarara	88.4	23	88.1	2	972.6	5	51.2	125	99.8	8	258.5	3
1814	Okakarara	37.4	103	76.5	7	502.5	19	64.9	96	99.8	4	204.9	21
1815	Okakarara	87.3	26	28.2	67	192.6	69	70.8	62	98.4	26	153.7	44
1816	Okakarara	25.8	114	19.1	86	0.0	127	28.0	137	6.2	137	24.4	136
1817	Okakarara	75.3	40	59.0	13	538.7	17	72.7	59	99.5	16	222.6	14
1818	Okakarara	41.3	94	20.3	83	261.9	53	59.4	115	44.3	115	56.7	124
1819	Okakarara	85.8	31	58.7	15	667.2	10	69.9	69	98.4	27	217.3	17
1820	Okakarara	49.3	82	87.7	3	489.2	21	69.7	72	98.1	28	215.9	18
1821	Okakarara	68.5	53	6.5	127	13.8	123	62.8	101	92.8	53	68.9	116
1824	Omatako	73.2	46	8.0	123	127.8	89	75.7	43	71.8	92	111.0	87
1825	Omatako	21.2	122	12.4	107	34.3	119	65.0	94	71.3	93	48.9	129
1826	Omatako	60.3	64	2.8	137	87.7	104	70.7	64	85.3	71	84.8	109
1827	Omatako	56.3	71	10.3	114	363.1	33	71.8	60	76.2	85	104.2	92
1828	Omatako	33.0	108	9.3	119	361.5	34	76.3	40	76.3	83	111.2	84
1829	Omatako	62.3	61	15.0	102	227.9	61	70.6	65	81.0	75	100.2	98
1830	Omatako	52.6	73	55.8	19	160.7	78	68.9	76	80.6	76	132.3	70
1831	Omatako	67.7	55	80.6	6	175.2	73	72.8	58	99.6	13	224.9	13
1832	Omatako	83.0	33	48.0	31	107.1	99	57.8	118	96.6	37	127.8	72
1833	Omatako	92.1	17	33.2	57	136.4	86	75.2	46	86.1	70	157.6	39
1834	Omatako	42.6	91	17.7	90	252.4	55	79.5	28	76.5	82	128.9	71
1835	Omatako	30.3	111	32.3	60	0.0	127	73.5	56	66.7	99	99.0	100
1836	Omatako	21.6	120	10.1	115	58.8	115	78.4	31	76.3	84	100.5	96
1837	Omatako	22.2	118	11.6	109	72.2	112	78.0	33	77.5	81	101.6	94
1838	Omatako	8.8	134	24.6	75	126.6	90	67.0	82	75.6	87	68.8	117
1839	Omatako	14.2	128	27.7	68	0.0	127	75.6	44	75.7	86	99.4	99

1841	Omatako	4.1	135	34.8	53	0.0	127	81.3	21	97.3	35	150.7	48
1843	Otavi	45.8	89	9.7	117	79.1	110	78.7	30	90.1	58	118.5	76
1844	Otavi	51.4	77	15.4	100	0.0	127	83.5	16	88.3	66	137.6	65
1845	Otavi	12.5	131	16.4	95	5.2	125	75.9	41	67.3	98	88.2	106
1846	Otavi	36.6	104	8.5	121	179.5	70	68.5	77	35.1	123	62.0	121
1847	Otavi	32.4	110	6.2	128	256.1	54	85.4	9	92.1	55	143.0	60
1848	Otavi	39.4	97	24.9	73	113.7	95	73.7	54	79.0	78	103.6	93
1849	Otavi	48.9	84	25.7	70	120.4	93	78.4	32	89.4	64	133.4	69
1850	Otavi	70.0	48	25.4	71	695.5	8	69.7	73	87.9	68	143.7	58
1851	Otavi	95.1	8	59.3	12	107.5	98	76.4	39	99.6	12	237.9	7
1852	Otavi	21.9	119	19.4	85	62.5	114	59.8	114	38.8	120	38.6	130
1853	Otavi	48.6	86	38.5	49	105.3	100	77.2	36	70.6	94	134.0	68
1854	Otavi	59.3	67	56.8	16	273.1	50	79.4	29	93.5	48	194.5	25
1855	Otavi	91.9	18	9.7	118	1095.8	4	82.8	17	96.2	39	236.4	8
1856	Otavi	62.0	62	17.5	92	165.2	75	84.1	14	86.6	69	151.8	47
1857	Otavi	48.6	85	18.3	88	0.0	127	70.4	66	82.3	72	85.4	108
1858	Otjiwarongo	69.5	51	13.7	104	246.0	56	74.4	50	82.3	73	119.6	75
1859	Otjiwarongo	47.6	87	11.8	108	27.1	121	69.9	70	74.9	88	75.0	114
1860	Otjiwarongo	28.0	113	34.8	54	129.3	88	50.4	126	27.2	127	53.2	126
1861	Otjiwarongo	37.9	101	29.0	65	349.9	39	48.6	127	18.6	133	60.3	122
1862	Otjiwarongo	50.1	79	43.2	40	438.4	26	65.5	91	38.8	118	111.1	86
1863	Otjiwarongo	58.0	68	16.4	96	382.0	32	52.4	123	47.1	112	64.5	120
1864	Otjiwarongo	41.8	92	33.5	55	631.2	12	59.0	116	53.2	107	95.8	103
1865	Otjiwarongo	45.2	90	33.1	59	222.6	62	63.5	99	38.8	119	75.2	113
1866	Otjiwarongo	18.1	126	39.0	48	1734.7	1	61.1	108	37.2	122	149.3	51
1867	Otjiwarongo	51.9	75	29.7	63	82.7	106	56.7	121	37.8	121	57.2	123
1868	Otjiwarongo	53.9	72	37.1	52	668.0	9	73.6	55	49.0	111	150.1	50
1869	Otjiwarongo	25.7	115	14.1	103	50.8	117	39.9	130	19.5	131	25.3	133
1870	Otjiwarongo	37.4	102	41.2	45	122.9	92	67.7	80	80.6	77	100.6	95
1871	Otjiwarongo	61.0	63	20.6	82	1162.8	3	69.5	74	69.1	96	153.9	43
1873	Otjiwarongo	3.1	137	37.7	50	1172.2	2	84.9	12	99.7	11	253.2	4

1874	Otjiwarongo	34.0	106	20.7	81	98.4	102	80.9	22	96.7	36	144.7	57
1875	Otjiwarongo	69.8	49	33.3	56	178.4	71	77.3	35	92.1	54	152.8	45
1876	Otjiwarongo	13.9	130	9.0	120	357.2	36	34.2	135	13.7	135	33.2	132
1877	Otjiwarongo	69.6	50	46.7	33	438.5	25	80.2	26	98.4	25	218.5	16
1878	Otjiwarongo	79.0	37	45.7	35	269.3	52	75.9	42	93.7	47	176.1	34
1879	Otjiwarongo	87.0	27	44.9	37	823.9	6	80.5	24	99.3	17	265.3	2
1880	Otjiwarongo	11.7	133	9.9	116	53.8	116	36.2	132	10.6	136	16.1	137
1881	Otjiwarongo	21.3	121	13.6	105	358.4	35	70.9	61	81.1	74	92.6	104
1882	Otjiwarongo	74.7	41	59.0	14	399.0	31	66.3	87	77.8	80	152.5	46
1883	Tsumkwe	90.9	20	28.8	66	238.4	57	85.8	8	94.9	42	200.6	24
1884	Tsumkwe	93.3	13	20.9	80	215.2	63	86.2	7	98.1	30	209.7	19
1885	Tsumkwe	93.9	11	5.5	129	237.5	58	85.2	10	94.0	46	183.9	28
1886	Tsumkwe	96.8	5	21.4	78	340.2	40	67.9	79	99.8	7	182.4	30
1887	Tsumkwe	97.4	4	10.7	111	20.8	122	57.6	119	99.8	9	137.2	67
1888	Tsumkwe	94.1	10	39.1	47	168.9	74	81.5	20	95.7	40	208.3	20
1889	Tsumkwe	98.1	1	17.5	91	281.9	48	88.9	3	97.8	32	233.4	9
1890	Tsumkwe	98.0	2	24.7	74	332.1	43	82.4	19	99.1	19	240.5	6
1891	Tsumkwe	93.5	12	21.4	79	82.0	108	76.5	38	90.6	56	153.9	42
1892	Tsumkwe	96.2	7	8.3	122	496.5	20	75.2	47	98.0	31	187.1	26

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