

# MEASURING MULTIPLE DEPRIVATION AT A SMALL AREA LEVEL IN SOUTH AFRICA: A springboard for tackling deprivation in the Eastern Cape

HUMAN AND SOCIAL DYNAMICS (HSD) RESEARCH SEMINAR SERIES

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# Introducing the South African Index of Multiple Deprivation 2011

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# Outline

- Concepts of deprivation, multiple deprivation and poverty
- The South African Indices of Multiple Deprivation 2001 - 2011.
- The SAIMD 2011 at provincial, local municipality and ward level.
- Multiple Deprivation at ward level compared to income poverty at ward level
- Using small area indices of deprivation to inform policy interventions
- Conclusion



# Concepts of deprivation, multiple deprivation and poverty



# Concepts and definitions of poverty

- Concepts – the theoretical framework
- Definitions – the line or threshold dividing the poor from non poor



# Concepts of Poverty

- A range of different concepts of poverty e.g. notions of survival, capabilities approach, livelihoods approach, quality of life approach, relative poverty debates
- All of these conceptualisations of poverty have their own aetiologies and academic discourses and traditions.
- Straddle a range of academic disciplines: Economics, Social Policy, Development Studies, Sociology



# Concepts of Relative Poverty: Participation in Society

*'Individuals, families and groups in the population can be said to be in poverty when they **lack the resources** to obtain the types of diet, **participate in the activities and have the living conditions** which are **customary, or at least widely encouraged or approved, in societies to which they belong.** Their resources are so seriously below those commanded by the average family or individual that they are in effect excluded from ordinary living patterns, customs and activities.'* (Townsend, 1979, p31).



# Poverty or Deprivation

“Deprivation may be defined as a state of observable and demonstrable disadvantage relative to the local community or the wider society or nation to which an individual, family or group belongs. The idea has come to be applied to **conditions** (that is, physical, environmental and social states or circumstances) rather than **resources** and to specific and not only general circumstances, and therefore can be distinguished from the concept of poverty.”

Townsend, P. (1987) ‘Deprivation’, *Journal of Social Policy*, Vol. 16, Part 2, p 125



# Multi-dimensional Deprivation

“People can be said to be deprived if they lack the types of diet, clothing, housing, household facilities and fuel and environmental, educational, working and social conditions, activities and facilities which are customary, or at least widely encouraged and approved, in the societies to which they belong ....

*People may not fall below the majority's standard of living but they may fall below what could be the majority's standard—given a better redistribution of resources or a reorganisation of institutions in that society”*

Townsend, P. (1987) ‘Deprivation’, *Journal of Social Policy*, Vol. 16, Part 2, p 126



# The South African Indices of Multiple Deprivation 2001 -2011

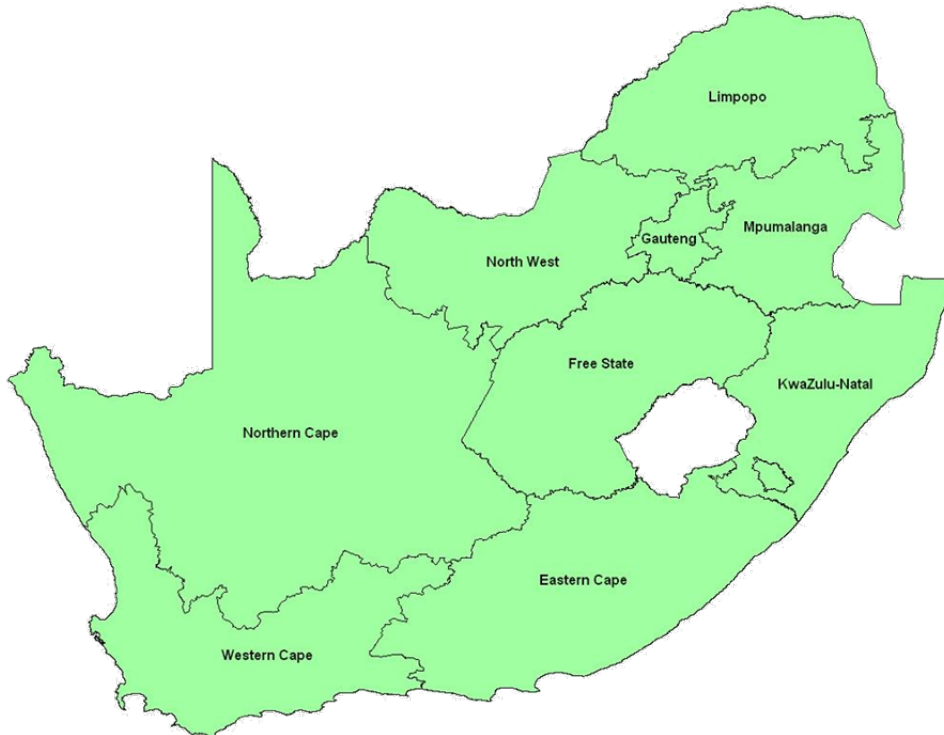


# A Small Area Index of Multiple Deprivation

- Long history dating back to 1971 in many developed countries e.g. Countries of UK, Australasia.
- A relative measure of multiple deprivation expressed at small area level and covering an entire country
- Primary purposes
  - target anti-poverty initiatives (Area Based Initiatives) to complement mainstream policies
  - Inform allocation of resources for poverty alleviation/regeneration



# South African Indices of Deprivation



**Provincial Index of Multiple Deprivation 2001 at ward level**

**South African Index of Multiple Deprivation 2001 at Datazone level**

**Municipality level Indices of Multiple Deprivation 2001 and 2007**

**Modelled South African Index of Multiple Deprivation 2007 at Datazone level**

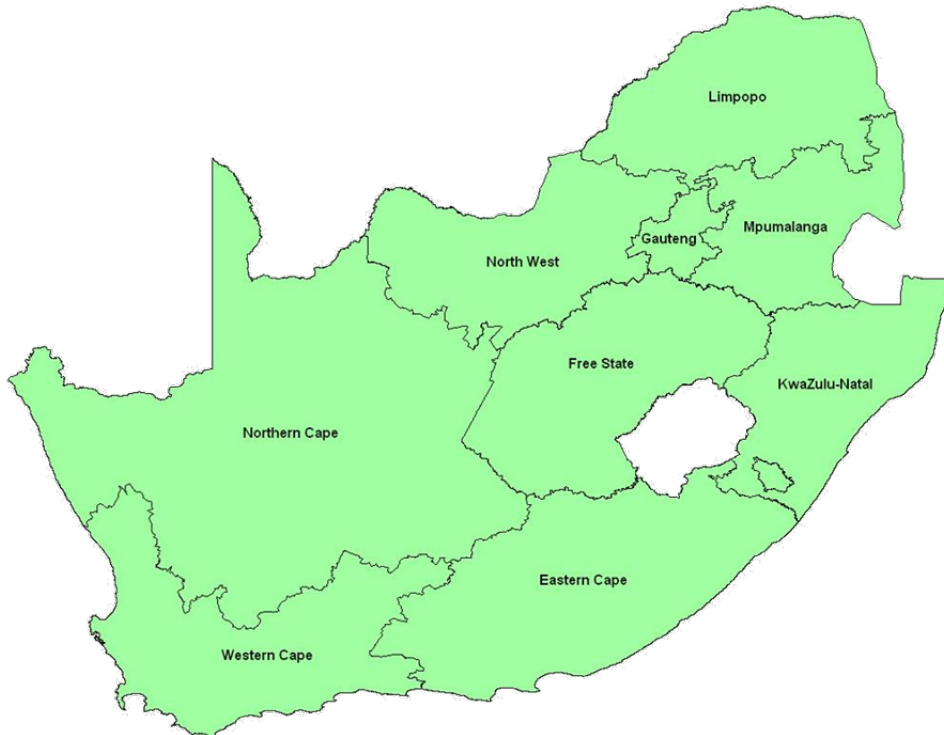
**Municipality level South African Index of Multiple Deprivation for Children 2001 and 2007**

**South African Index of Multiple Deprivation for Children 2001 at Datazone level**

**South African Index of Multiple Deprivation 2011 at Ward level**



# South African Indices of Deprivation



**Provincial Index of Multiple Deprivation 2001 at ward level**

**South African Index of Multiple Deprivation 2001 at Datazone level**

**Municipality level Indices of Multiple Deprivation 2001 and 2007**

**Modelled South African Index of Multiple Deprivation 2007 at Datazone level**

**Municipality level South African Index of Multiple Deprivation for Children 2001 and 2007**

**South African Index of Multiple Deprivation for Children 2001 at Datazone level**

**South African Index of Multiple Deprivation 2011 at Ward level**



# Establishing a clear theoretical framework

- Townsend's formulation of multiple deprivation (1987):
  - Relative concept
  - Deprivation is multidimensional
  - Experienced by individuals
- An Index of Multiple Deprivation conceptualises multiple deprivation as a composite of different dimensions or domains of deprivation experienced by individuals or households and expressed at area level using relative measures.
- E.g. It is possible to state that a % of the population of a particular area experiences a particular form of deprivation and a % experiences another form.



# Model of multiple deprivation at small area level

1. Dimensions of deprivation must be clearly identified.
2. Dimensions must be measured as accurately as possible with indicators that pass certain tests of fitness.
3. Problems of unacceptable standard error must be dealt with.
4. Indicators must be combined to form domains in such a way as to best measure the construct in question.
5. Domain scores must be capable of being ranked to generate a relative picture of that form of deprivation.
6. Domain ranks must be standardised and transformed in a way that allows their weighted combination into an overall index.
7. Appropriate domain weights should be selected.



# Data and Methodological issues

- Selecting domains
- Selecting variables
- Denominators
- The spatial scale
- Small numbers/unreliable data
- Combining variables into an index
  - Standardisation
  - Explicit and implicit weights
  - Cancellation effects



# The SAIMD 2011 at provincial, local municipality and ward level



# SAIMD 2011 Domains and Indicators

The SAIMD 2011 contains 4 domains which were each constructed at ward level:			
Material Deprivation Domain	Employment Deprivation Domain	Education Deprivation Domain	Living Environment Deprivation Domain
<p><b>% households with:</b></p> <ul style="list-style-type: none"> <li>no fridge; or</li> <li>no cell and no landline; or</li> <li>no TV and no radio</li> </ul>	<p><b>% working age people who are:</b></p> <ul style="list-style-type: none"> <li>unemployed (official definition); or</li> <li>unemployed (discouraged)</li> </ul>	<p><b>% 18-64 year olds who:</b></p> <ul style="list-style-type: none"> <li>have no schooling at secondary level or above</li> </ul>	<p><b>% total population who:</b></p> <ul style="list-style-type: none"> <li>have inadequate water supply; or</li> <li>have inadequate sanitation; or</li> <li>do not use electricity as main source for lighting; or</li> <li>live in a shack</li> </ul>
Each domain score was standardised and transformed to a common distribution and then combined with equal weights (i.e. 25% per domain)			
<b>South African Index of Multiple Deprivation 2011 at ward level</b>			

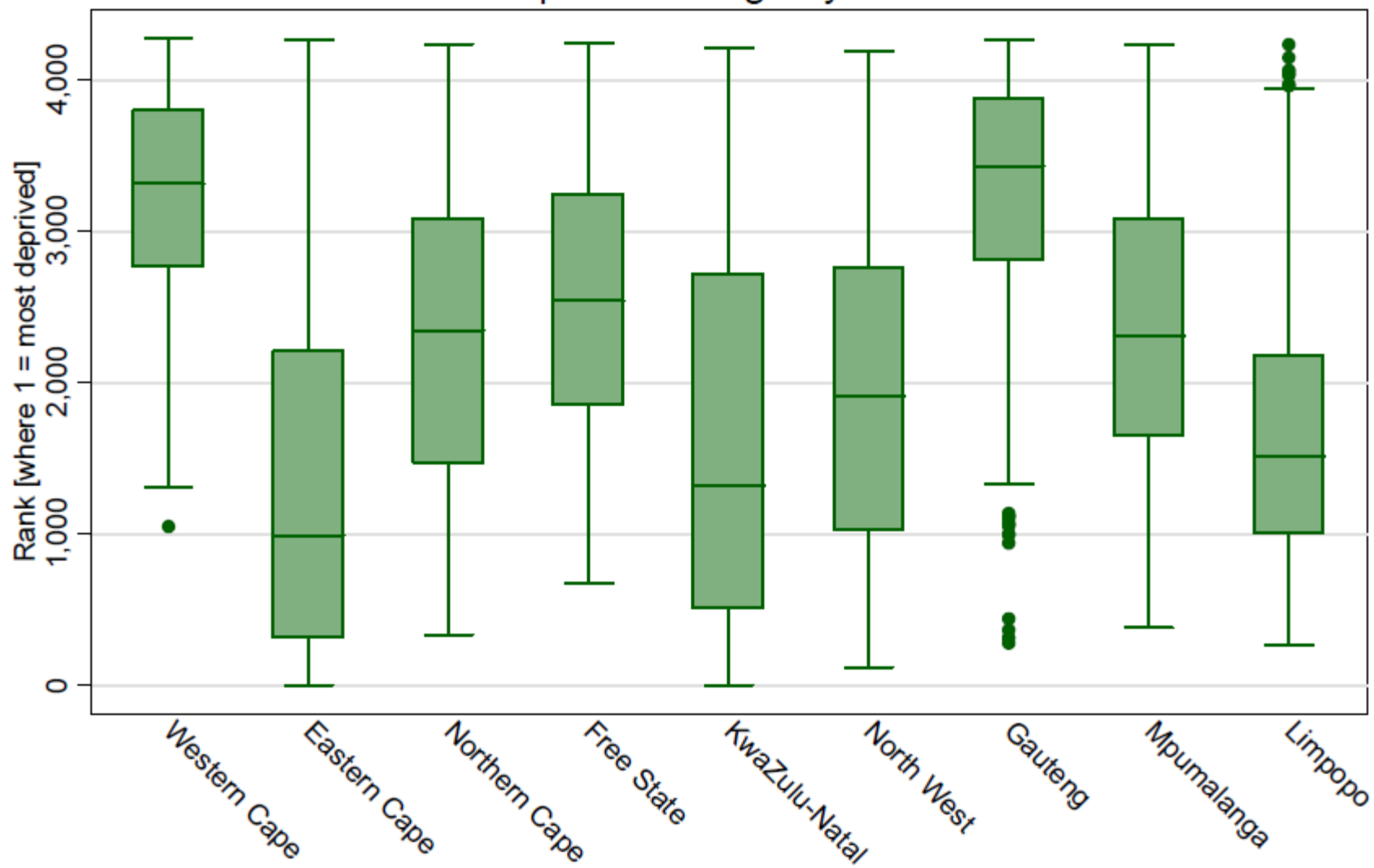
For more details about the SAIMD 2011's components and construction see Noble *et al.* (2013).

**Table 2: Provincial rates of deprivation for the four domains of the SAIMD 2011**

	Material Deprivation %	Employment Deprivation %	Education Deprivation %	Living Environment Deprivation %
Western Cape	24.8	25.1	16.8	19.1
Eastern Cape	52.0	47.3	28.5	59.6
Northern Cape	39.5	34.1	30.0	32.1
Free State	33.3	38.9	23.4	32.9
KwaZulu-Natal	43.0	42.3	23.4	55.3
North West	41.7	37.9	28.7	55.4
Gauteng	30.8	29.8	12.6	21.5
Mpumalanga	34.9	38.2	24.4	54.5
Limpopo	40.2	46.4	24.3	71.9
South Africa	37.1	36.0	20.9	43.8

Figure 1

### Ward-level SAIMD 2011 Interquartile Range by Province





# Ward Level SAIMD 2011 presented at Province level

**Table 1: Population weighted average ward rank of the SAIMD 2011 for each province in South Africa**

Province Code	Province Name	Population weighted Average Rank	Rank Order where 1=most deprived
2	Eastern Cape	1572	1
9	Limpopo	1772	2
6	North West	2016	3
5	KwaZulu-Natal	2020	4
3	Northern Cape	2312	5
8	Mpumalanga	2318	6
4	Free State	2611	7
7	Gauteng	3275	8
1	Western Cape	3339	9



# Local Municipalities – 10 Most Deprived

**Table 3: Population weighted average ward rank of the SAIMD 2011 for the most deprived 10 local municipalities in South Africa**

Province	District	Local Municipality	Population weighted average rank of wards in the local municipality (where 1=most deprived)	National rank (where 1=most deprived)
KwaZulu-Natal	Umzinyathi	Msinga	176	1
Eastern Cape	Alfred Nzo	Ntabankulu	280	2
Eastern Cape	O.R.Tambo	Port St Johns	304	3
KwaZulu-Natal	Ugu	Vulamehlo	383	4
KwaZulu-Natal	iLembe	Maphumulo	388	5
Eastern Cape	Alfred Nzo	Mbizana	395	6
Eastern Cape	O.R.Tambo	Ngquza Hill	399	7
KwaZulu-Natal	Umkhanyakude	Umhlabuyalingana	400	8
Eastern Cape	Chris Hani	Engcobo	449	9
KwaZulu-Natal	Uthungulu	Nkandla	453	10



# Local Municipalities – Least Deprived

**Table 4: Population weighted average ward rank of the SAIMD 2011 for the least deprived 10 local municipalities in South Africa**

Province	District	Local Municipality	Population weighted average rank of wards in the local municipality (where 1=most deprived)	National rank (where 1=most deprived)
Northern Cape	Namakwa	Richtersveld	3285	225
Western Cape	Overberg	Overstrand	3297	226
Mpumalanga	Nkangala	Steve Tshwete	3306	227
Gauteng	City of Tshwane	City of Tshwane	3319	228
Western Cape	Eden	Mossel Bay	3350	229
Western Cape	Cape Winelands	Stellenbosch	3362	230
Western Cape	Cape Winelands	Drakenstein	3385	231
Western Cape	West Coast	Saldanha Bay	3406.7	232
Gauteng	City of Johannesburg	City of Johannesburg	3407.4	233
Western Cape	City of Cape Town	City of Cape Town	3482	234



# 20 Most Deprived Wards in South Africa

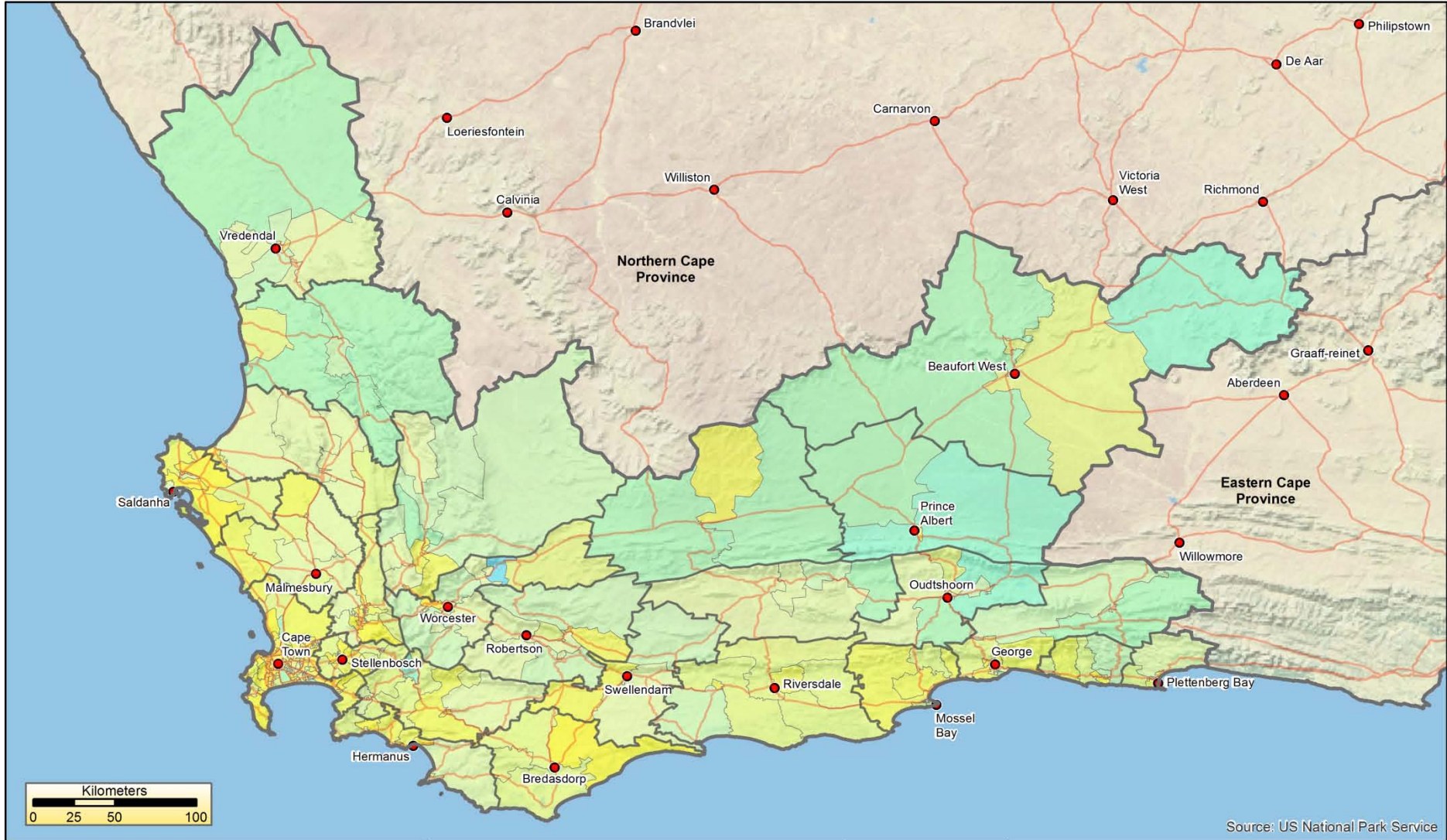
	Province	District Municipality	Local Municipality	Ward Number
1	Eastern Cape	O.R.Tambo	Port St Johns	11
2	KwaZulu-Natal	Umzinyathi	Msinga	16
3	KwaZulu-Natal	Umzinyathi	Msinga	18
4	Eastern Cape	Chris Hani	Engcobo	5
5	Eastern Cape	Amathole	Mbhashe	17
6	Eastern Cape	O.R.Tambo	King Sabata Dalindyebo	25
7	Eastern Cape	Alfred Nzo	Ntabankulu	3
8	Eastern Cape	O.R.Tambo	King Sabata Dalindyebo	27
9	Eastern Cape	Alfred Nzo	Mbizana	12
10	Eastern Cape	O.R.Tambo	Ngquza Hill	24
11	Eastern Cape	O.R.Tambo	Port St Johns	18
12	KwaZulu-Natal	Umzinyathi	Msinga	2
13	Eastern Cape	Chris Hani	Engcobo	20
14	Eastern Cape	Alfred Nzo	Mbizana	28
15	Eastern Cape	O.R.Tambo	Port St Johns	17
16	Eastern Cape	Alfred Nzo	Ntabankulu	18
17	Eastern Cape	Alfred Nzo	Ntabankulu	17
18	Eastern Cape	O.R.Tambo	Nyandeni	26
19	Eastern Cape	Amathole	Mbhashe	11
20	Eastern Cape	Alfred Nzo	Mbizana	15



## % wards in most deprived decile and most deprived quintile

	N wards	N in 10% most deprived	N in 20% most deprived	% in 10% most deprived	% in 20% most deprived
Western Cape	387	0	0	0	0
Eastern Cape	715	222	336	31.1	47.0
Northern Cape	194	3	18	1.5	9.3
Free State	317	0	3	0	0.9
KwaZulu-Natal	828	173	313	20.9	37.8
North West Province	383	20	74	5.2	19.3
Gauteng	508	3	4	0.6	0.8
Mpumalanga	402	2	19	0.5	4.7
Limpopo	543	4	88	0.7	16.2

# Ward-level SAIMD 2011 Western Cape Province



Source: US National Park Service

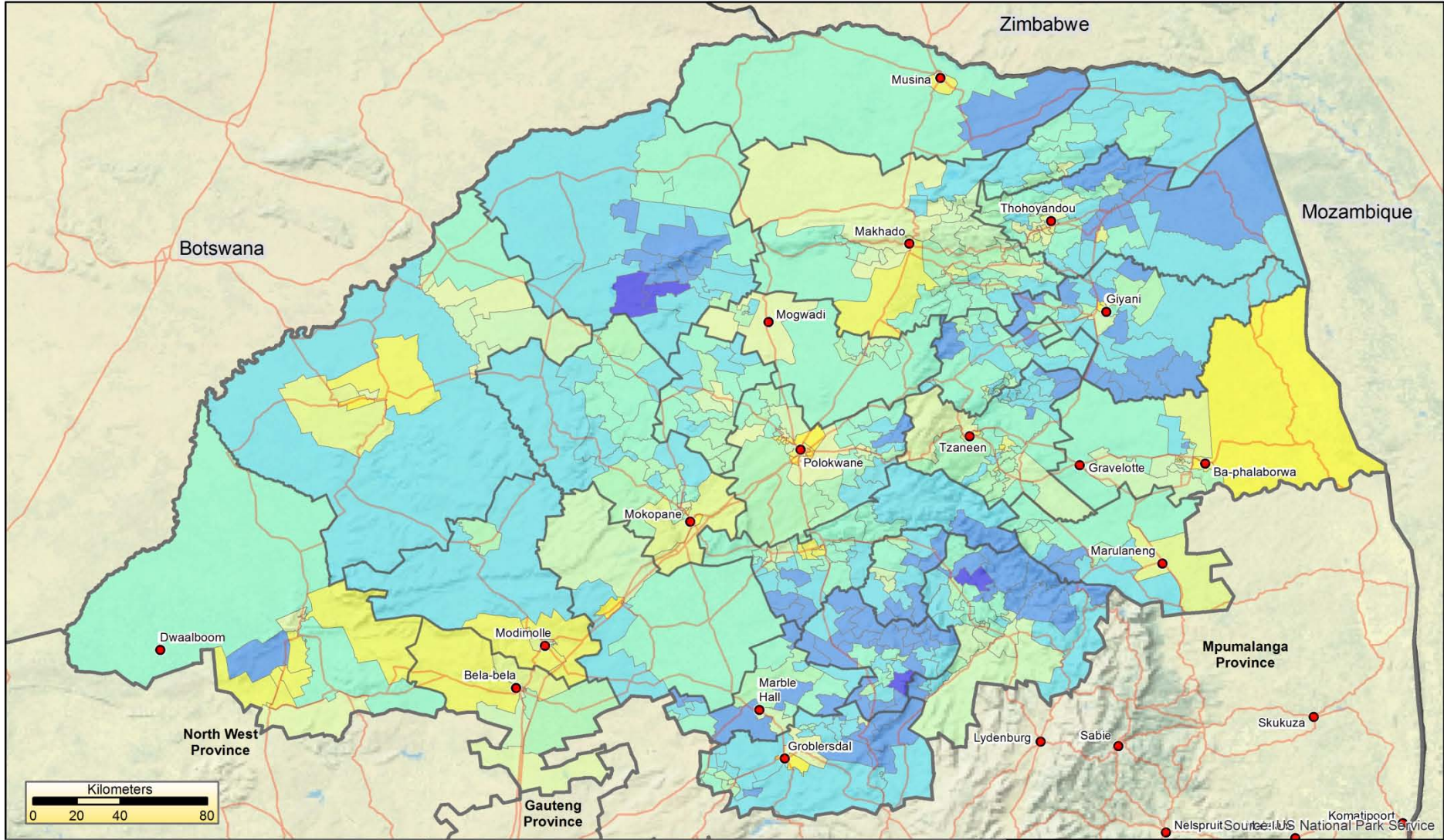
## National deciles



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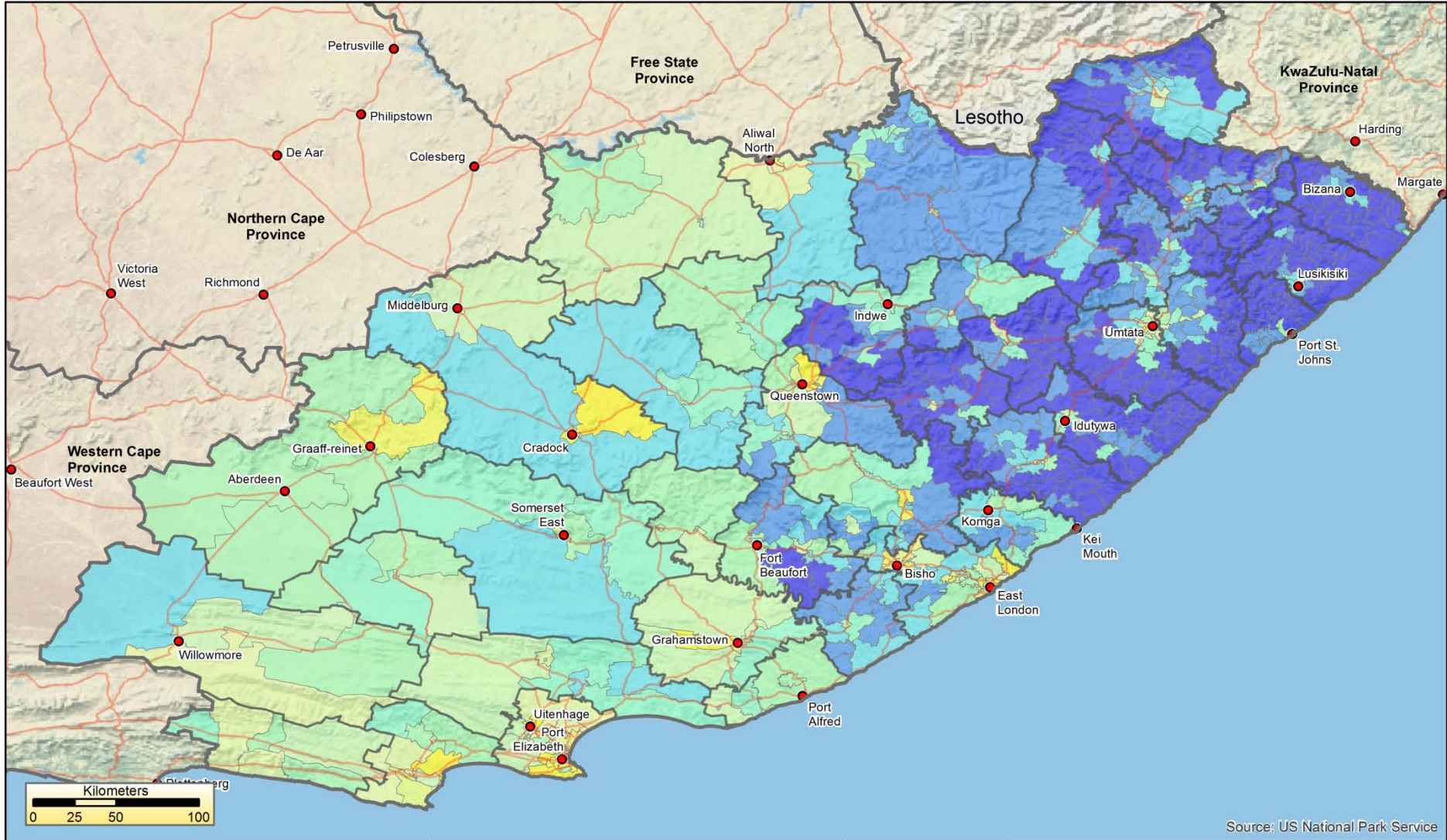
**Ward-level SAIMD 2011  
Limpopo Province**



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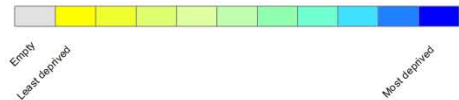


# Ward-level SAIMD 2011 Eastern Cape Province



Source: US National Park Service

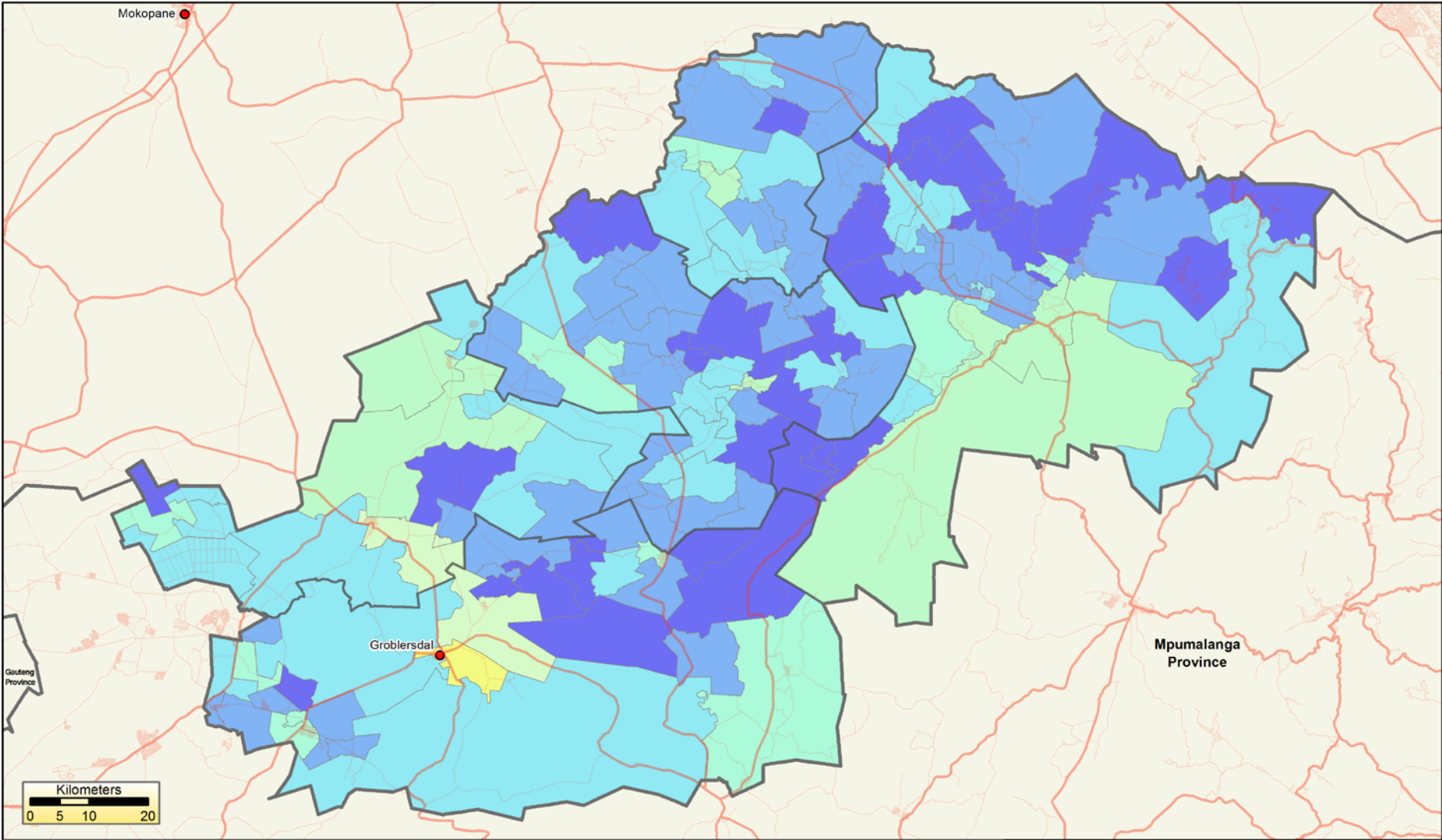
### National deciles



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# Ward-level SAIMD 2011: Living Environment Deprivation Limpopo Province, Greater Sekhukhune District (National Deciles)



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# Income poverty at ward level



# For Comparison – Income Poverty at Ward level

- Hoogeveen and Özler (2006).
- “lower bound” poverty line = R604 and an “upper bound” poverty line = R1113 pcpm in 2011
- Uses published (Superstar) ward level tables using household income and household size



# Methodology

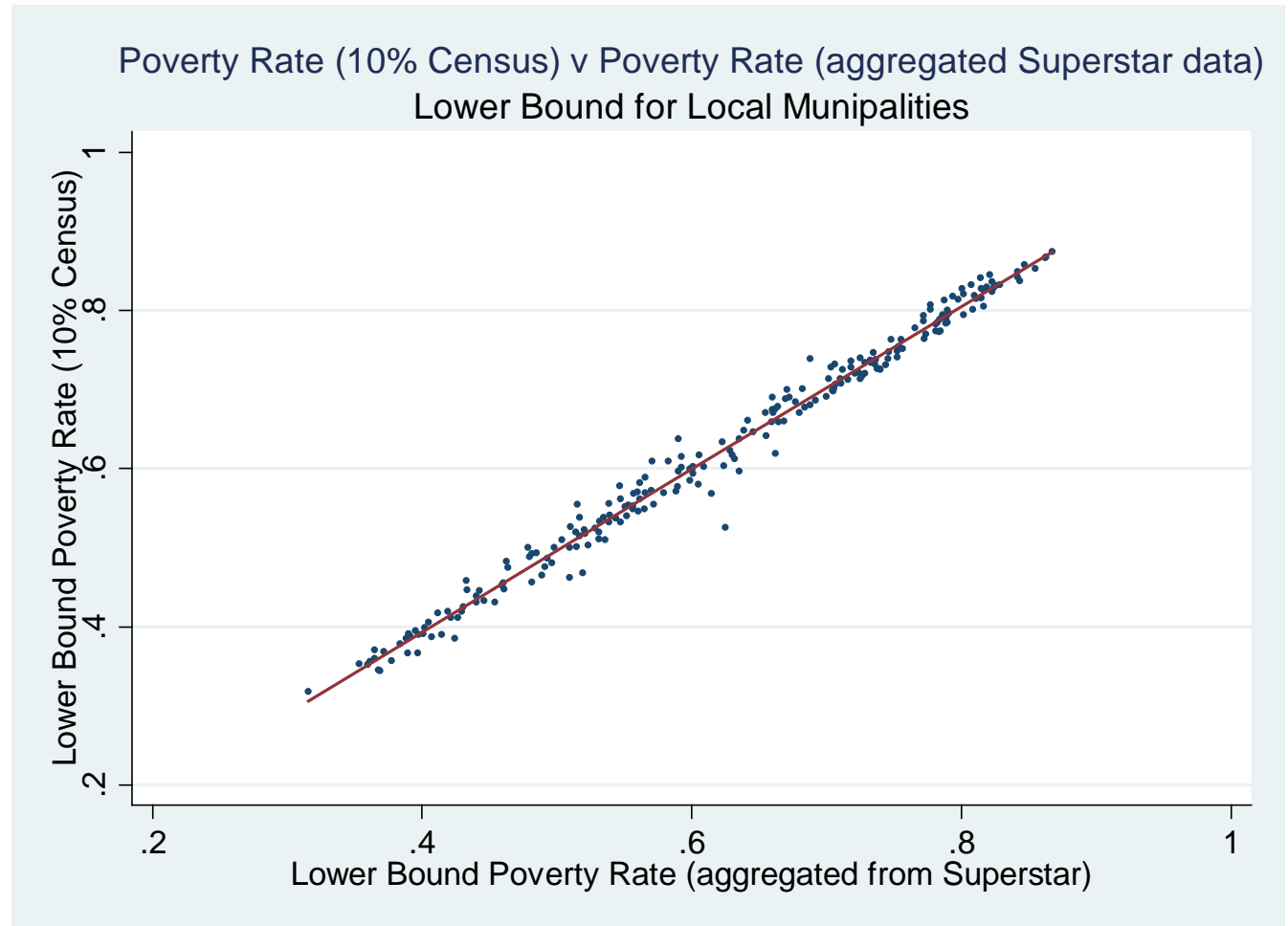
- Banded household income translated into point income using log mean of the band
- per capita income created using hhsiz.
- proportions of individuals falling below the lines for each ward computed.
- Necessarily there is some loss of information when the banded income is translated into point income.
- Particularly 'noisy', as Stats SA derived banded household income from banded individual income!



# But despite methodological imprecision ...

Provincial income poverty rates using lower bound H&O poverty line

Province	Lower Bound Poverty Rate (10% Census) %	Lower Bound Poverty Rate (Aggregated from Superstar) %
Western Cape	40.1	40.1
Eastern Cape	69.3	69.0
Northern Cape	55.0	54.7
Free State	58.1	58.9
KwaZulu-Natal	63.9	62.7
North West	58.8	58.7
Gauteng	40.0	40.7
Mpumalanga	59.2	60.2
Limpopo	69.4	70.3



Spearman's rho = 0.9930

Test of Ho: tot\_pop\_pov\_rate\_L and low\_pov\_rate are independent

Prob > |t| = 0.0000



# 20 Poorest Local Municipalities

Province	Local Municipality Code	Local Municipality Name	% of population below Lower Bound Poverty Line	Rank (Where 1=area with highest lower bound poverty rates and 226 = area with lowest lower bound poverty rates)
Eastern Cape	291	Port St Johns	86.7	1
Eastern Cape	298	Ntabankulu	86.3	2
KwaZulu-Natal	569	Indaka	86.2	3
KwaZulu-Natal	576	Msinga	85.5	4
KwaZulu-Natal	575	Nqutu	84.7	5
Eastern Cape	290	Ngquza Hill	84.3	6
Eastern Cape	297	Mbizana	84.2	7
Eastern Cape	292	Nyandeni	84.2	8
KwaZulu-Natal	582	Umhlabuyalingana	82.9	9
North West	665	Ratlou	82.6	10
KwaZulu-Natal	580	Nongoma	82.4	11
KwaZulu-Natal	583	Jozini	82.3	12
Eastern Cape	284	Engcobo	82.3	13
KwaZulu-Natal	546	Maphumulo	82.1	14
KwaZulu-Natal	588	Ntambanana	81.9	15
KwaZulu-Natal	598	Umzimkhulu	81.7	16
Eastern Cape	293	Mhlontlo	81.7	17
Eastern Cape	270	Mbhashe	81.5	18
Limpopo	985	Makhuduthamaga	81.5	19
KwaZulu-Natal	542	Nkandla	81.4	20



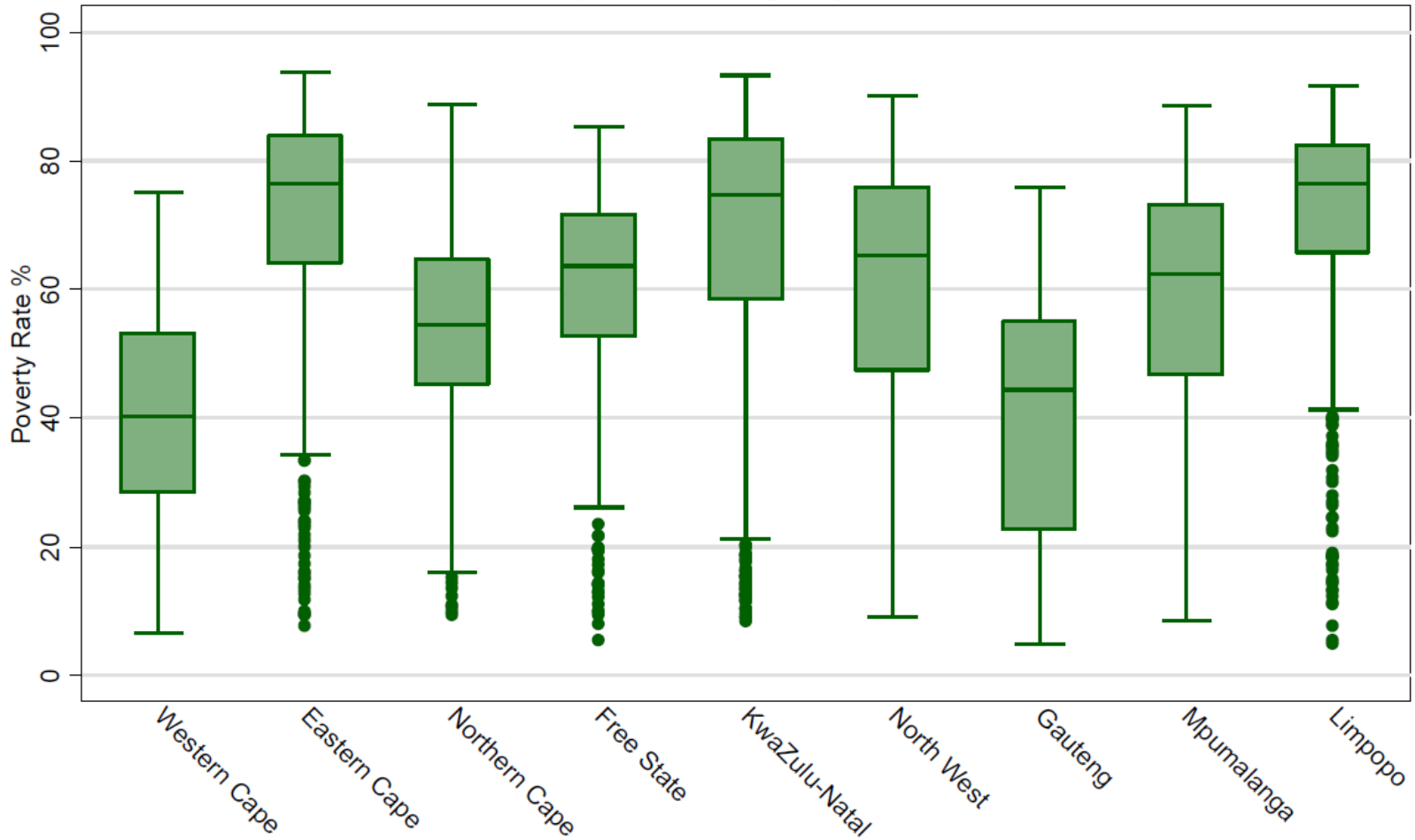
# % Wards per decile – lower bound poverty line

	Deciles										N
	1	2	3	4	5	6	7	8	9	10	
	%	%	%	%	%	%	%	%	%	%	
<b>Western Cape</b>	20.2	31.8	20.4	8.8	11.9	5.4	1.6	0.0	0.0	0.0	387
<b>Eastern Cape</b>	3.4	2.9	4.8	6.7	8.0	10.9	11.8	15.0	15.1	21.5	715
<b>Northern Cape</b>	8.3	10.3	20.6	23.2	12.4	10.3	6.7	2.1	3.6	2.6	194
<b>Free State</b>	8.2	7.3	6.3	12.9	20.5	16.4	13.6	9.8	4.7	0.3	317
<b>KwaZulu-Natal</b>	6.8	6.5	5.6	6.0	8.7	8.0	11.0	11.4	16.9	19.2	828
<b>North West</b>	6.3	12.0	9.1	9.1	12.0	14.6	12.0	12.0	8.6	4.2	383
<b>Gauteng</b>	28.6	16.0	19.7	18.7	8.7	5.7	2.6	0.0	0.0	0.0	507
<b>Mpumalanga</b>	9.0	10.0	10.5	13.4	11.9	13.2	12.2	9.7	7.0	3.2	402
<b>Limpopo</b>	4.2	3.7	5.7	4.8	4.6	9.8	15.3	19.5	17.9	14.6	543

Note: Decile 1 = the 10% of wards with the lowest poverty headcount (using lower bound poverty line)

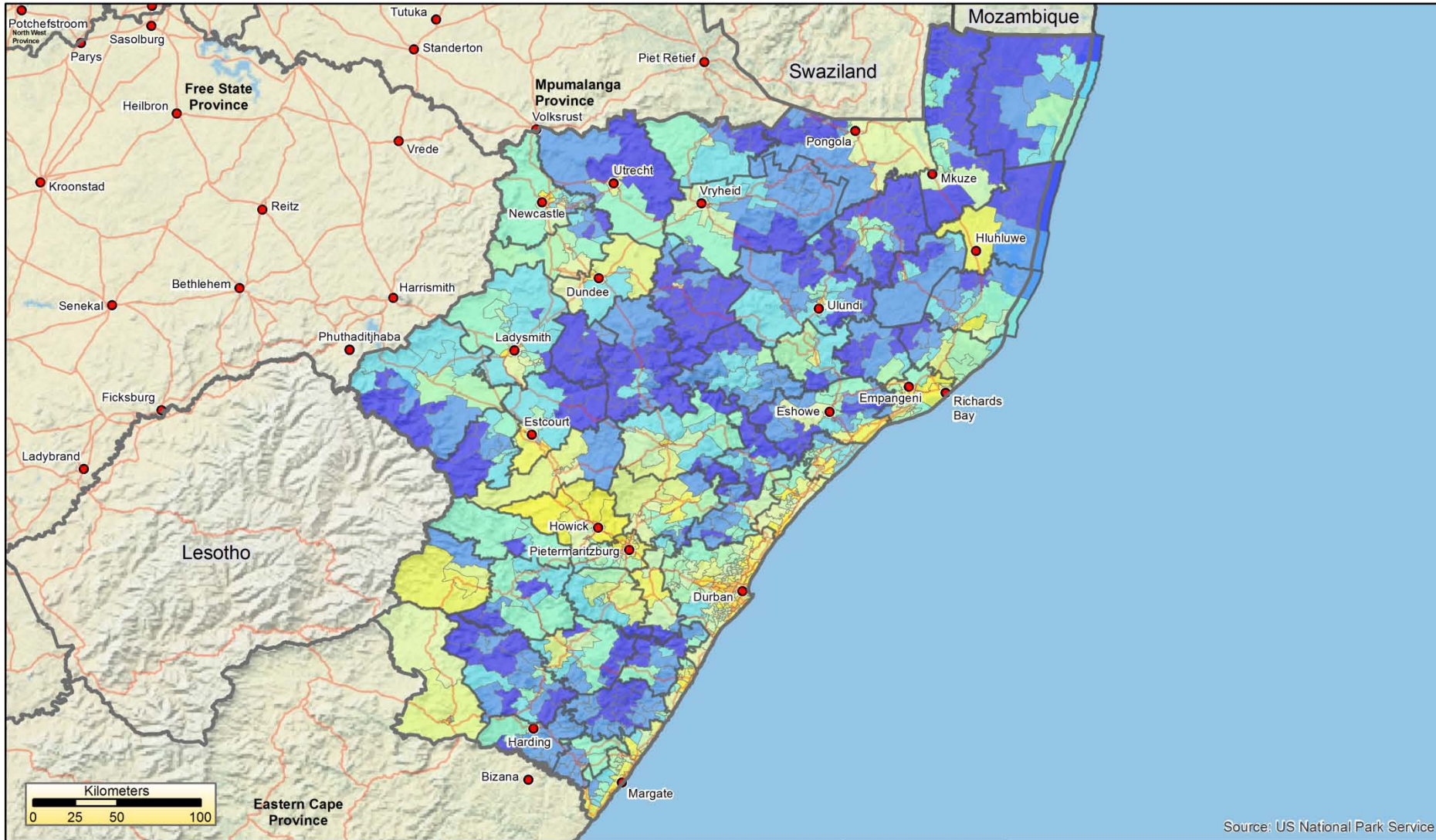
# Ward-level Per Capita Income Poverty 2011

Lower bound poverty line (R604 per month in 2011)  
Interquartile Range by Province



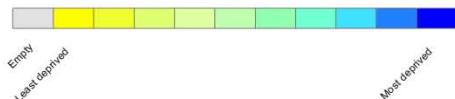
Poverty Line: Hoozeven and Ozler (2006) lower bound line updated to 2011 using CPI

# Ward level income poverty rates 2011 (poverty line R604 per capita pcm) KwaZulu-Natal Province



Source: US National Park Service

### National deciles



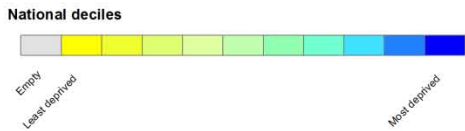
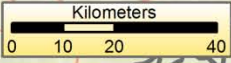
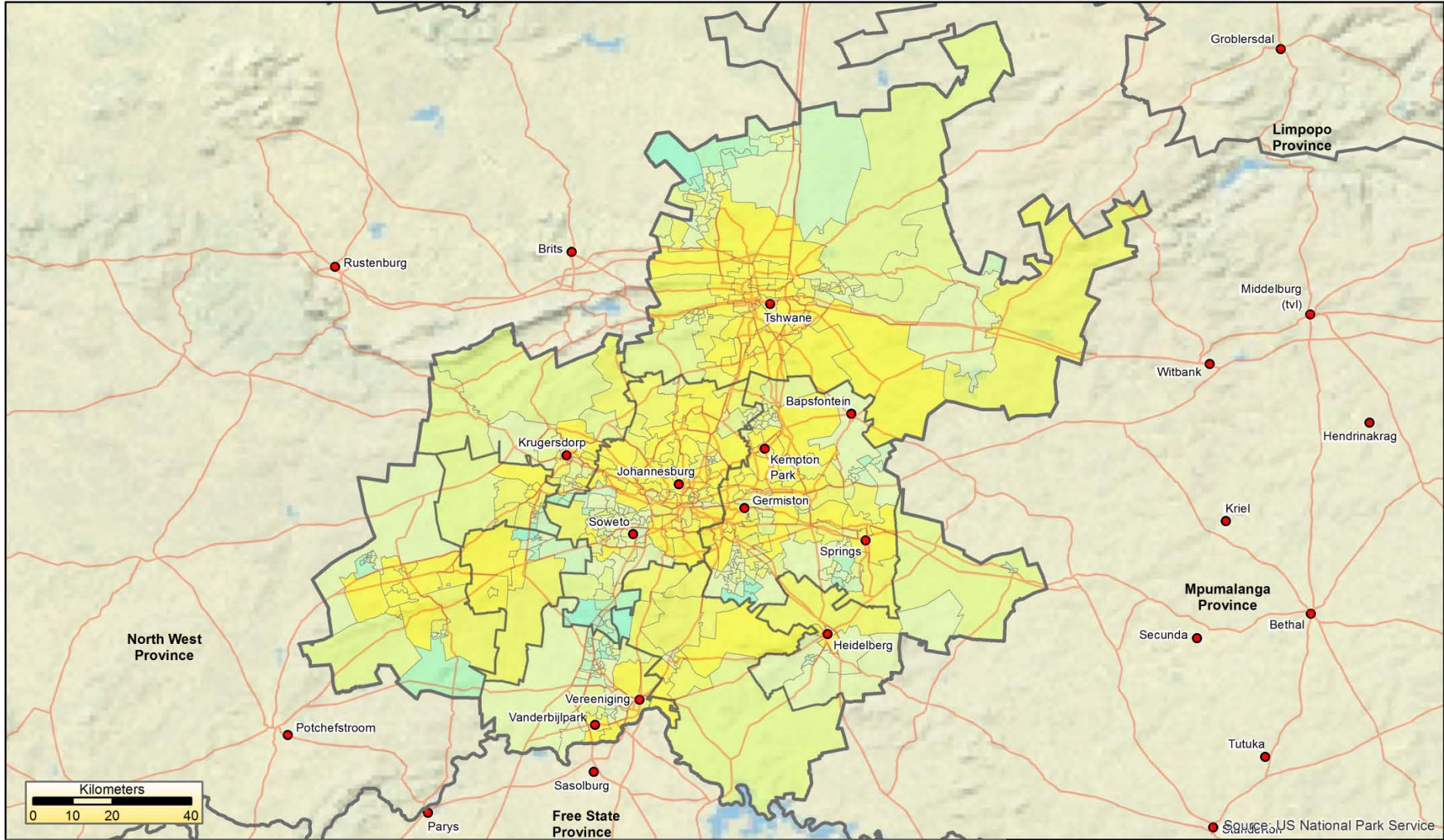
Empty  
Least deprived

Most deprived

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**Ward level income poverty rates 2011 (poverty line R604 per capita pcm)  
Gauteng Province**



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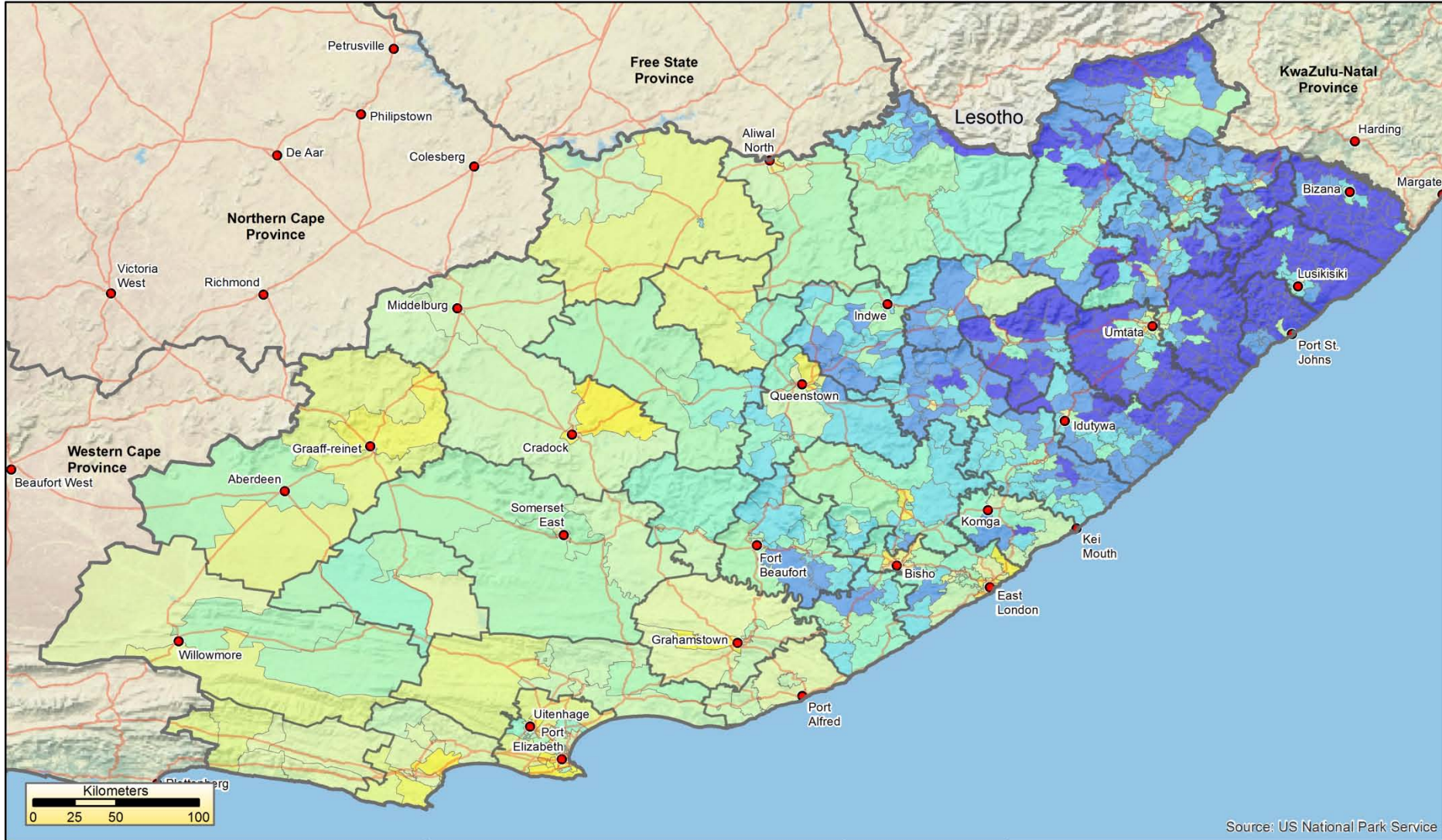


Source: US National Park Service



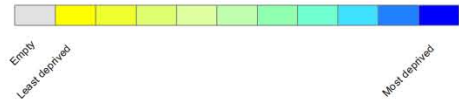
# Comparing Multiple Deprivation and Income Poverty at Ward Level

# Ward level income poverty rates 2011 (poverty line R604 per capita pcm) Eastern Cape Province



Source: US National Park Service

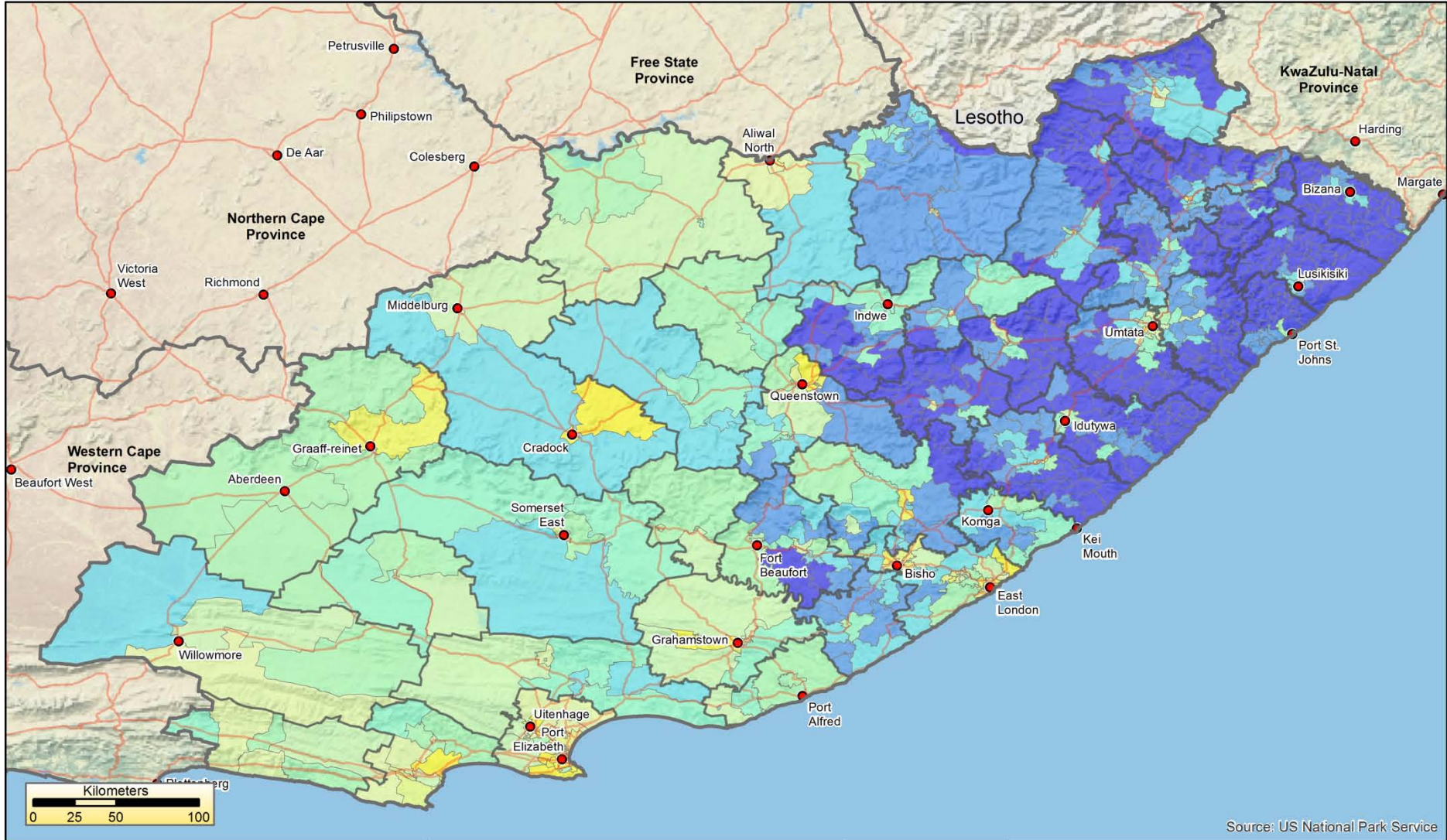
National deciles



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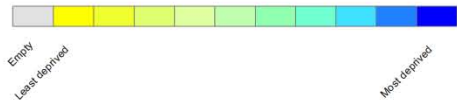


# Ward-level SAIMD 2011 Eastern Cape Province



Source: US National Park Service

### National deciles



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**Table 10 Spearman Rank Correlation at Ward Level between SAIMD and Poverty Rates**

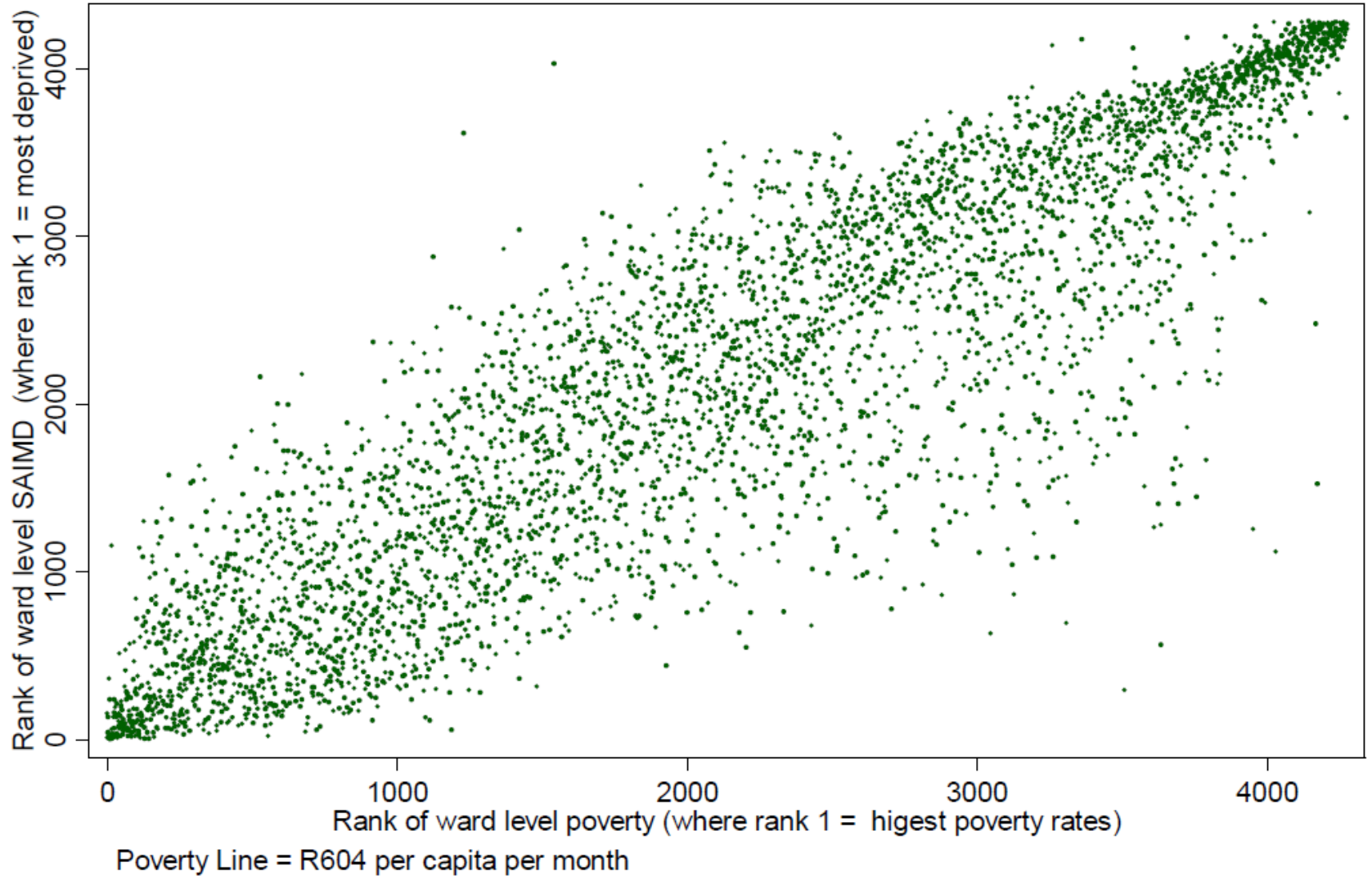
	SAIMD	Lower Bound Poverty	Upper Bound Poverty
SAIMD 2011	1		
Lower Bound Poverty	0.8944*	1	
Upper Bound Poverty	0.8873*	0.9921*	1

(p<.001)

**Figure 3**

### Scatter of Income Poverty and Multiple Deprivation

All South Africa at Ward Level (Ward Ranks)





Change between 2001 and 2011



# Change 2001 to 2011

National and Provincial Deprivation rates 2001 to 2011

	Employment Deprivation 2001 %	Employment Deprivation 2011 %	Education Deprivation 2001 %	Education Deprivation 2011 %	Living Environment Deprivation 2001 %	Living Environment Deprivation 2011 %
Western Cape	27.7	25.1	27.2	16.8	41.2	19.1
Eastern Cape	56.3	47.3	45.2	28.5	81.2	59.6
Northern Cape	37.7	34.1	44.2	30.0	53.7	32.1
Free State	44.7	38.9	41.5	23.4	67.1	32.9
KwaZulu-Natal	50.7	42.3	40.0	23.4	74.4	55.3
North west	46.1	37.9	42.3	28.7	75.3	55.4
Gauteng	37.3	29.8	23.0	12.6	43.9	21.5
Mpumalanga	43.9	38.2	44.0	24.4	74.9	54.5
Limpopo	52.9	46.4	45.7	24.3	89.3	71.9
All SA	43.5	36.0	36.4	20.9	67.2	43.8

NB Domains similar but not identical



# Uses of the SAIMD

- Direct Uses – national and international examples
  - Diagnostic Evaluation
  - Targeting Resources
  - Academic uses
- Springboard for further research – moving from ‘what’ and ‘where’ to ‘why’ and ‘how’
- Tracking change over time




# Conclusion

- The spatial patterns of deprivation are not markedly different in 2011 than in 2001
- There has been an improvement in absolute terms between 2001 and 2011. Though not shared equally across all areas
- However, in absolute and relative terms the rural former homeland areas still bear the brunt of multiple deprivation (and income poverty)
- The SAIMD 2011 provides a useful tool to identify areas for policy prioritisation



# Thank You

A screenshot of the SASPRI website homepage. At the top right, there are social media icons for Facebook, LinkedIn, and Twitter. The main header features a large tree image on the left and the 'saspri' logo in purple text on the right. Below the logo, the full name 'Southern African Social Policy Research Institute' and 'Southern African Social Policy Research Insights' are listed in purple. A dark navigation bar contains the following links: Welcome, Objectives, The team, Research, Teaching, Collaborations, and Contact us. The main content area has a green heading 'SASPRI' followed by a paragraph describing the organization. Below that is another green heading 'A Definition of Social Policy for Southern Africa' followed by a quote. At the bottom, there is a citation for a 2006 draft document.

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## saspri

Southern African Social Policy Research Institute  
Southern African Social Policy Research Insights

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### SASPRI

comprises two not-for-profit organisations, Southern African Social Policy Research Institute (registered in South Africa) and Southern African Social Policy Research Insights (registered in the UK) committed to promoting social policy as an area of study in academia in Southern Africa. SASPRI is also committed to a rights-based approach to social policy as a route for development in the region. SASPRI organises and runs training events and conferences as well as undertaking research to develop the evidence base for social policy interventions.

### A Definition of Social Policy for Southern Africa

“social policies at the national level are collective state-lead measures, implemented by the central and local governments and other stakeholders such as organized employers and workers, the broader private sector and civil society, as well as international development partners. Social policies are interventions which are about promoting the well being of all citizens and which address structural inequalities in wealth, ensure greater equity and equality for all, correct market shortcomings, reduce poverty and promote social inclusion.”

*Towards An African Regional Social Policy – Johannesburg Draft, SADC Ministerial Meeting, Johannesburg, South Africa 24 November 2006*