National Trends on Town and Settlement Growth: a Spatial Analysis

Presented by: Gerbrand Mans

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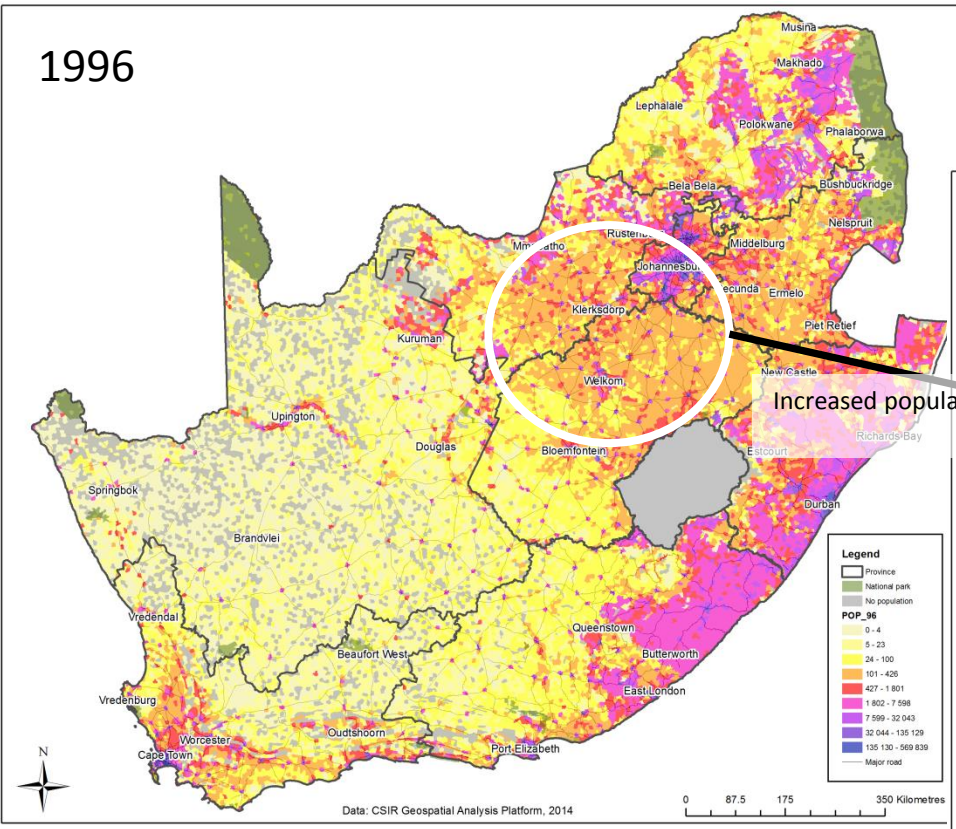
Team contributions: Elsona van Huyssteen, Johan Maritz, Alize le Roux, Mawande Ngidi, Dave McKelly, Cheri Green

Content

- Introduction
- Spatial and temporally aligned data
- Settlement typology
- Town growth discussion
  - General trends
  - Differentiated growth
- Economic networks
- Implications
- Further collaboration/investigation needed
  - Underlying drivers
  - Simulating scenario based outcomes

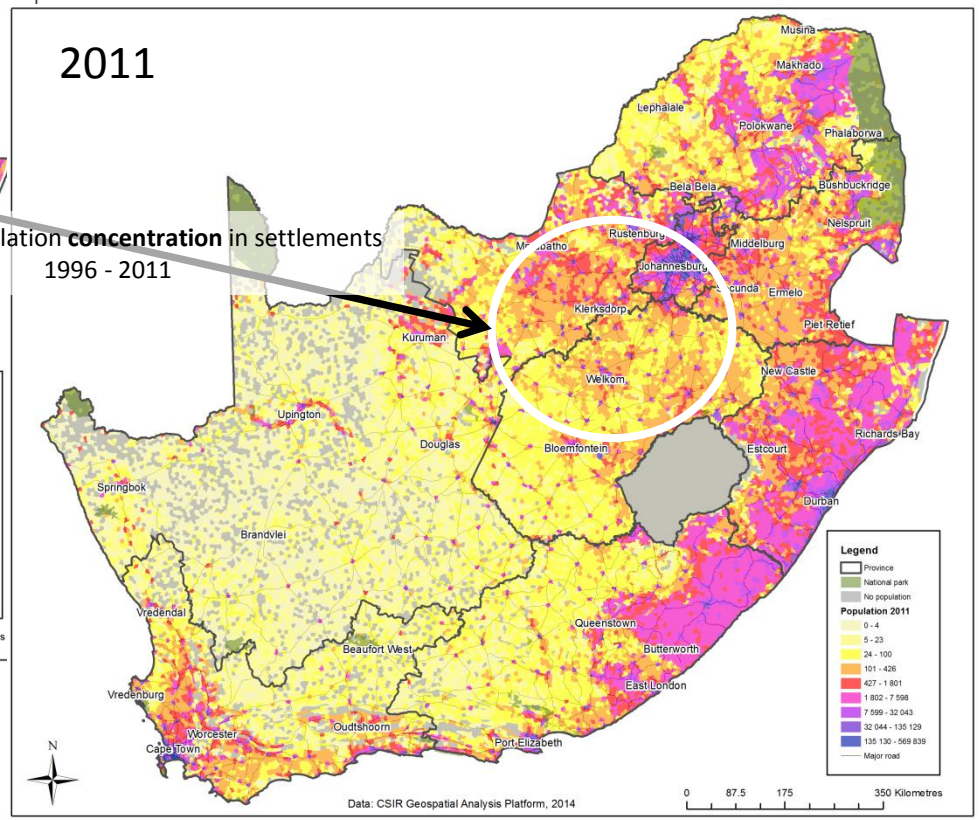
Introduction (1)

Introduction (2)

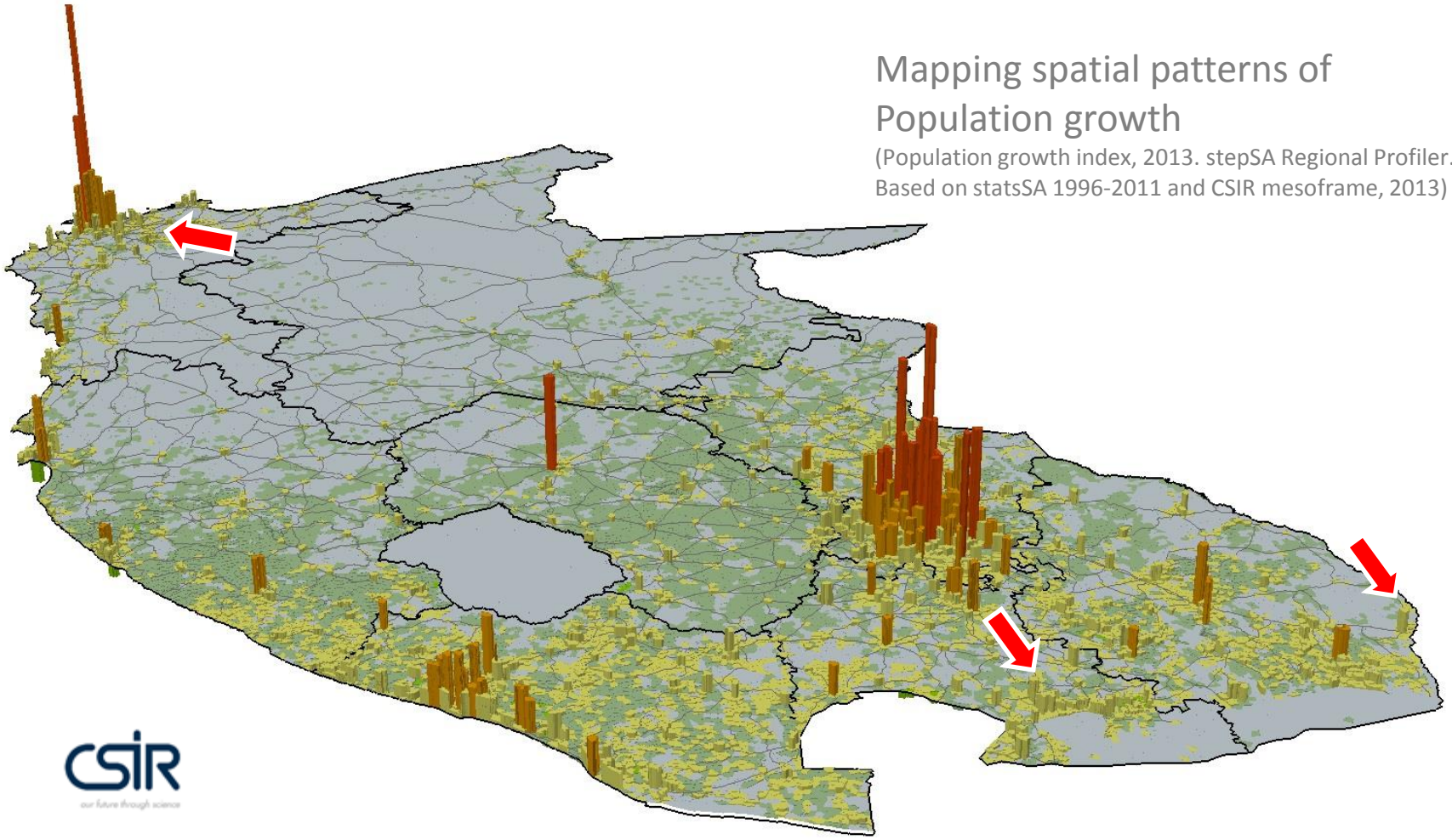


Spatial and temporally aligned data

Increased population **concentration** in settlements
1996 - 2011



Introduction (3)



Mapping spatial patterns of Population growth

(Population growth index, 2013. stepSA Regional Profiler. Based on statsSA 1996-2011 and CSIR mesoframe, 2013)

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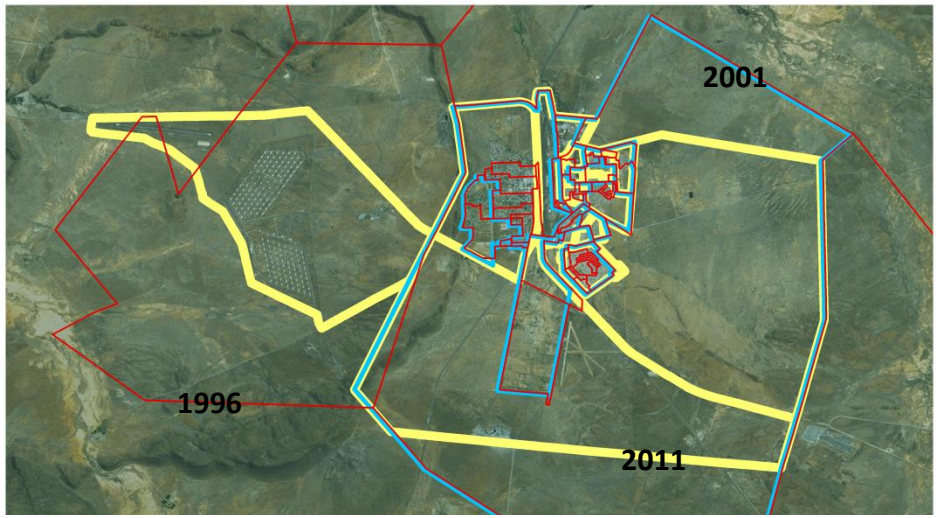
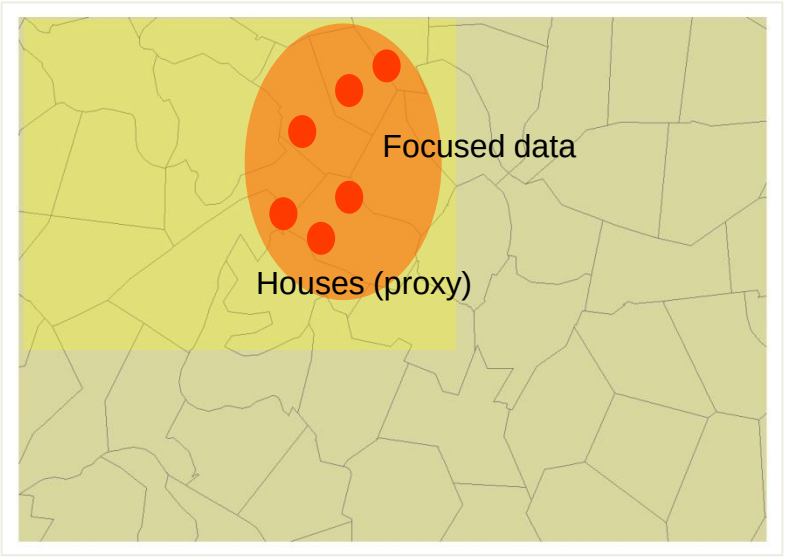
Spatial and temporal aligned data

- Data not spatially aligned
- Algorithm developed to align data
  - Dasymetric mapping principles
  - Ancillary data to do re-allocation
  - Packaged in any demarcation





Input

$m =$ number of wards.
$m' =$ number of mesozones.
$n =$ number of points (houses).
Let $T = \{t_i, \dots, t_m\}$ be the set of population totals per ward.

Let $P = \{p_i, \dots, p_n\}$ be the potential household size of each point.

Process step 1

Let $\Lambda = \{W_i\}_{i=1}^{m}$: $\cup_{i=1}^{m} W_i = P$ be a partition of P into m wards. Let w_{ij} refer to the j^{th} point of ward i.

$S = \{s_i : s_i = \sum w_{ij} \; \forall \, w_{ij} \in W_i\}_{i=1}^{m}$.

$\Lambda' = \{W'_i\}_{i=1}^{m}$ with $W'_i = \{w'_{ij} : w'_{ij} = w_{ij}/s_i \; \forall \, w_{ij} \in W_i\}$.

$\hat{P} = \{\hat{p}_k : \hat{p}_k = w'_{ij} \times t_j \; \forall \, w'_{ij} \in W'_i\}_{i=1}^{m}$.

Process step 2

Let $\Theta = \{M_i\}_{i=1}^{m'}$: $\cup_{i=1}^{m'} M_i = \hat{P}$ be a partition of $\hat{P}$ into m' mesozones. Let m_{ij} refer to the j^{th} point of mesozone i.

$\hat{S} = \{\hat{s}_i : \hat{s}_i = \sum m_{ij} \; \forall \, m_{ij} \in M_i\}_{i=1}^{m'}$.

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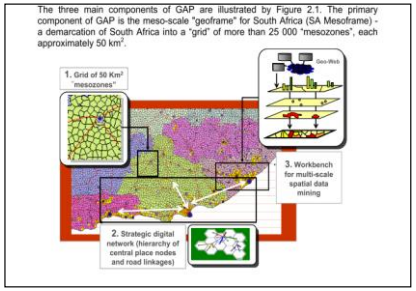
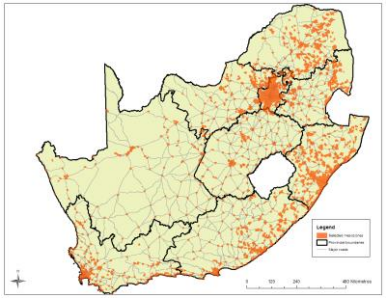
Settlement typology (1)

Functional classification of SA settlements

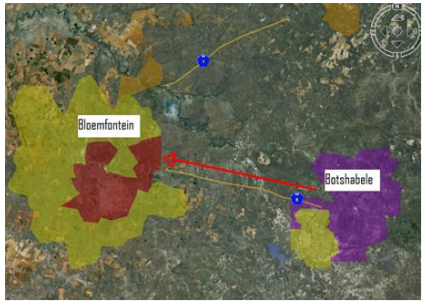
A: Base layer (prepared as described on previous slide)



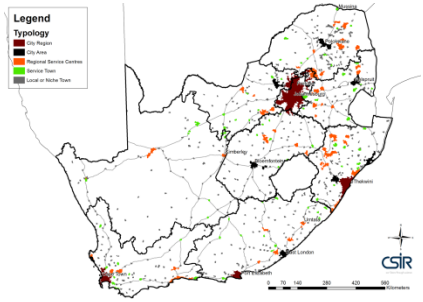
B: Detailed settlement description



C: Demarcation of functional settlement areas



D: Settlement typology

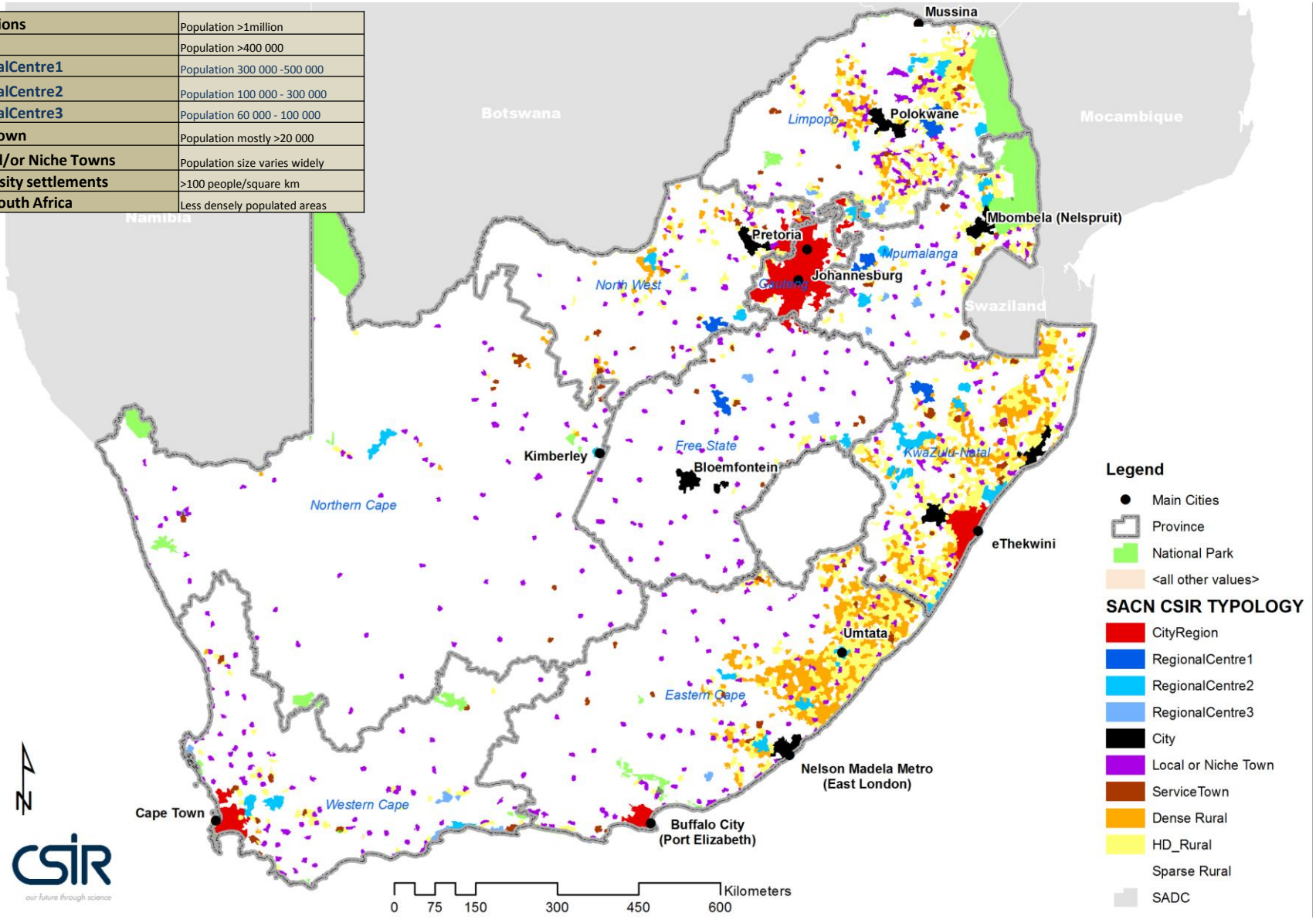


Technical ⟷ Expert inputs

Validation / Iteration

Settlement typology (2)

City Regions	Population >1million
Cities	Population >400 000
RegionalCentre1	Population 300 000 -500 000
RegionalCentre2	Population 100 000 - 300 000
RegionalCentre3	Population 60 000 - 100 000
Service town	Population mostly >20 000
Local and/or Niche Towns	Population size varies widely
High density settlements	>100 people/square km
Rest of South Africa	Less densely populated areas



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Town growth: general trends

Functional Settlement Type (CSIR/SACN 2013v2)	Area_Km	% of National Area	Population 2011	% of National Population	Service Economy (Service Sector GVA (xR1000))	Economic Activity (*Total GVA (xR1000))	Contribu-tion to Formal Nat Econ Activity
CityRegions	20 575	1.65%	21 856 192	42.22%	758 652	1 185 948	56.77%
Cities	8 225	0.66%	3 876 064	7.49%	102 574	178 276	8.53%
TOTAL CITIES	**28 800**	**2.30%**	**25 732 256**	**49.70%**	**861 226**	**1 364 224**	**65.30%**
Regional Centres	18 079	1.45%	7 313 730	14.13%	141 580	229 697	10.99%
ServiceTowns	7 232	0.58%	2 720 372	5.25%	47 847	87 232	4.18%
Total	**25 311**	**2.02%**	**10 034 102**	**19.38%**	**189 427**	**316 929**	**15.17%**
Local or Niche Towns	29 756	2.38%	4 327 891	8.36%	69 102	121 169	5.80%
Rural Nodes in High density areas	928	0.07%	191 123	0.37%	2 537	4 850	0.23%
Total	**30 684**	**2.45%**	**4 519 014**	**8.73%**	**71 639**	**126 019**	**6.03%**
High Density Settlements	59 276	4.74%	6 081 912	11.75%	40 074	73 587	3.52%
Sparse Rural Areas	1 070 931	85.66%	3 036 010	5.86%	51 830	184 994	8.86%
Dense Rural Areas	35 258	2.82%	2 366 803	4.57%	13 921	23 351	1.12%
TOTAL REST OF SA	**1 165 465**	**93.22%**	**11 484 725**	**22.18%**	**105 826**	**281 932**	**13.50%**
NATIONAL TOTALS	**1250260**	100.00%	**51770097**	100%	**1228117**	**2089104**	100%

89.56%

2011 Population in cities,towns & Settlements

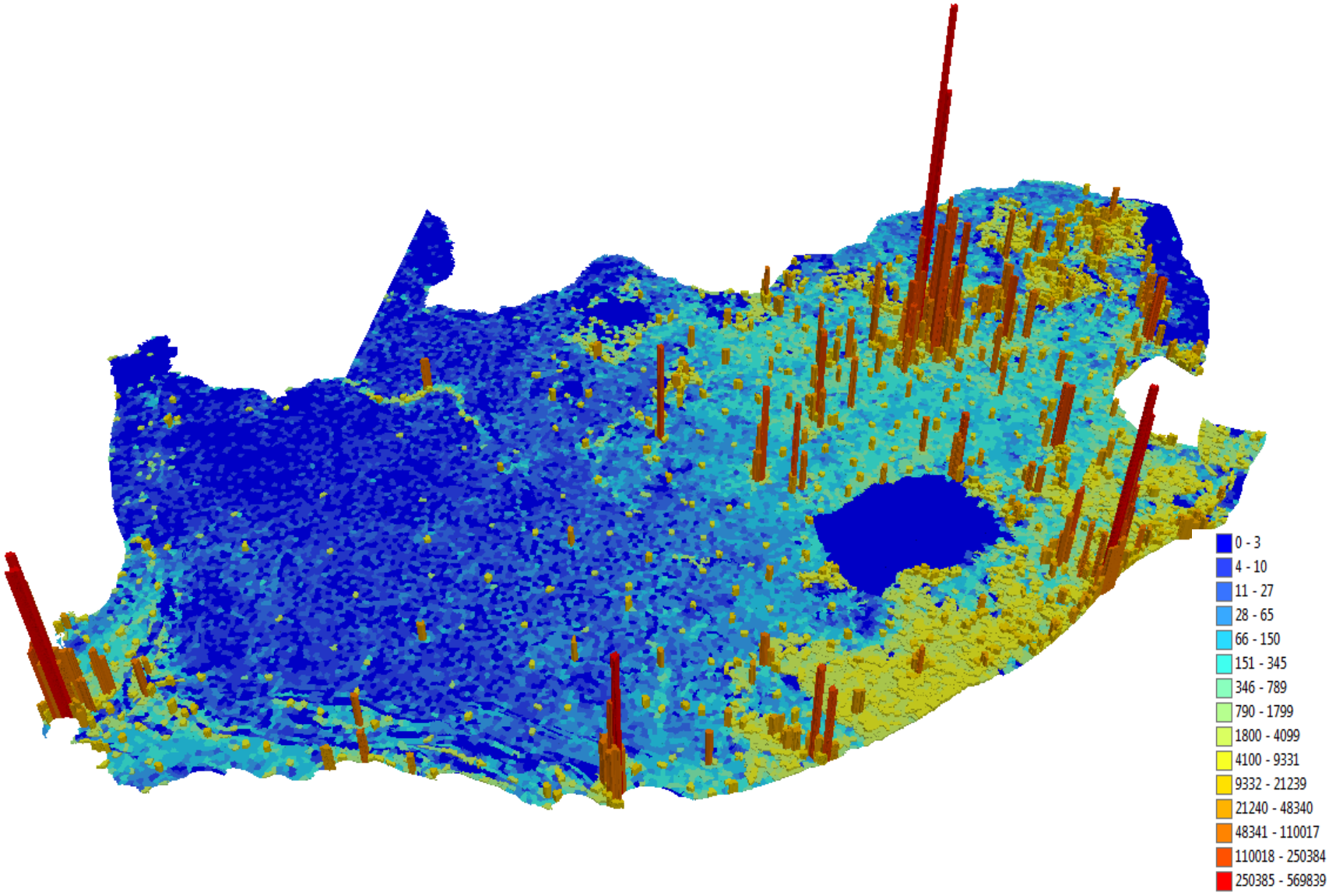
77.82%

2011 Population in cities & towns

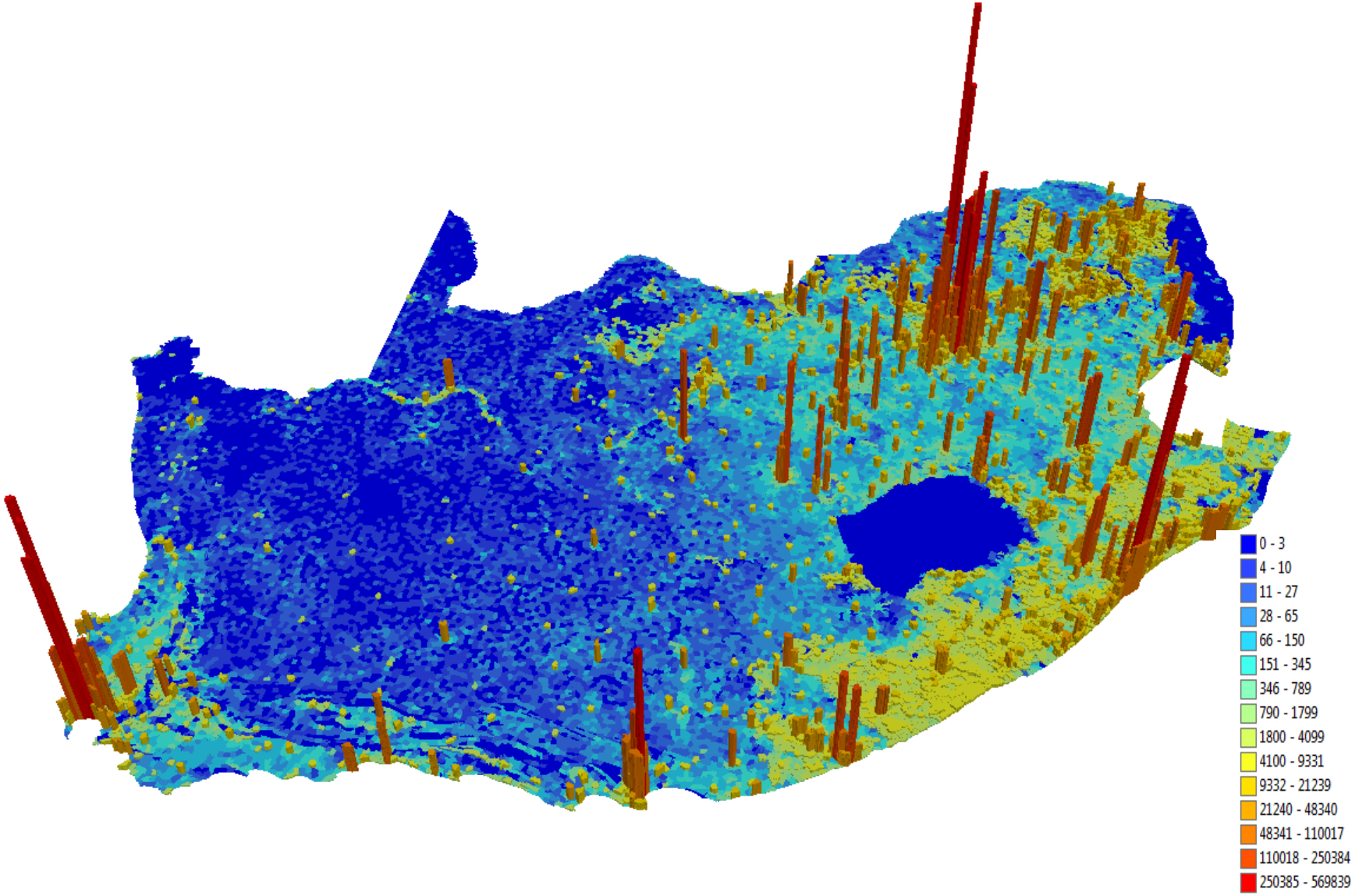
** GVA Total excludes Construction sector*

SOURCE: CSIR GAP 2013 based on StatsSA Census 1996,2001,2011; SACN/CSIR Settlement Typology 2013v2, CSIR TAT (Temporal Analyses Tool) 2013

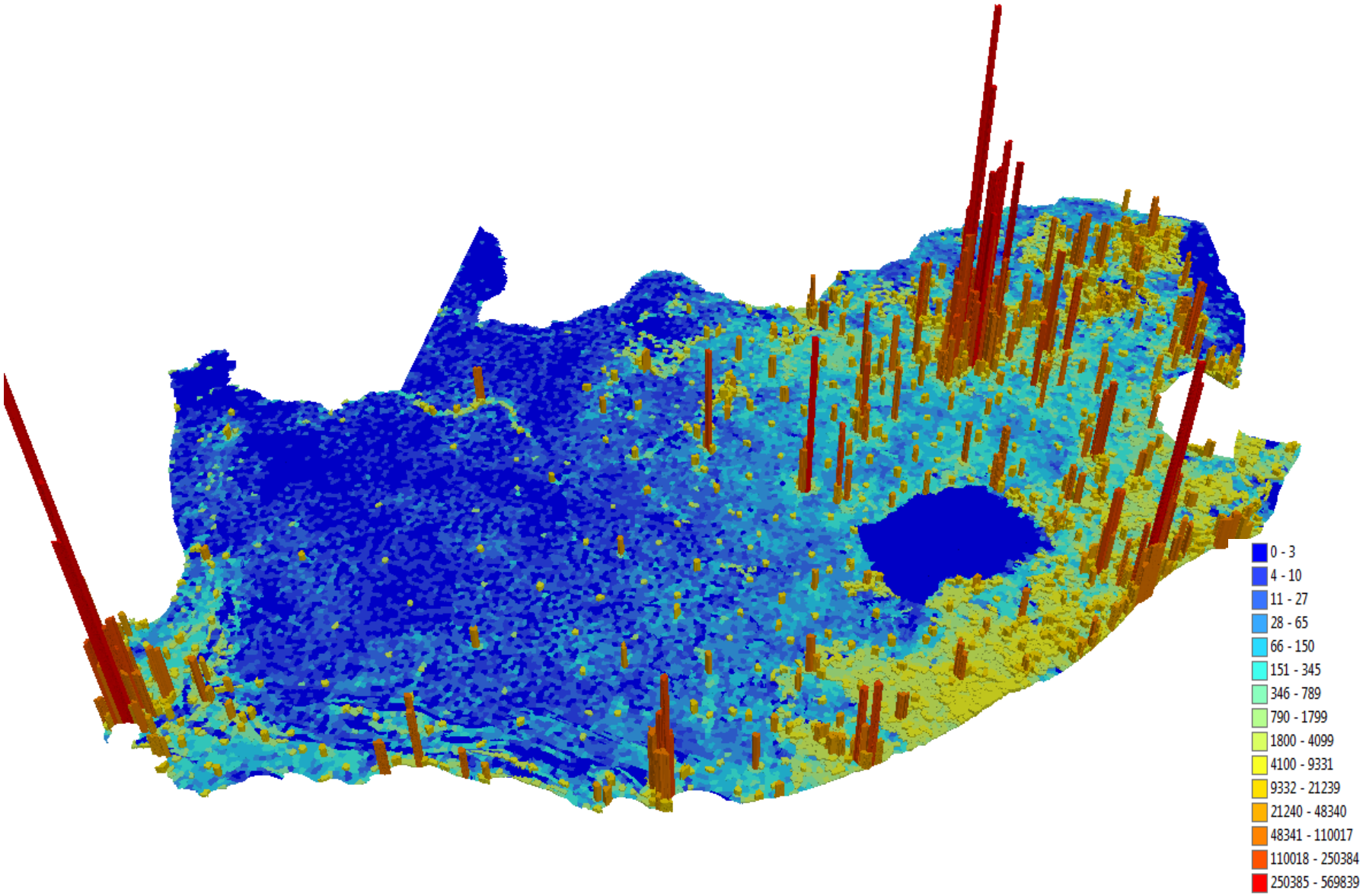
1996 population distribution



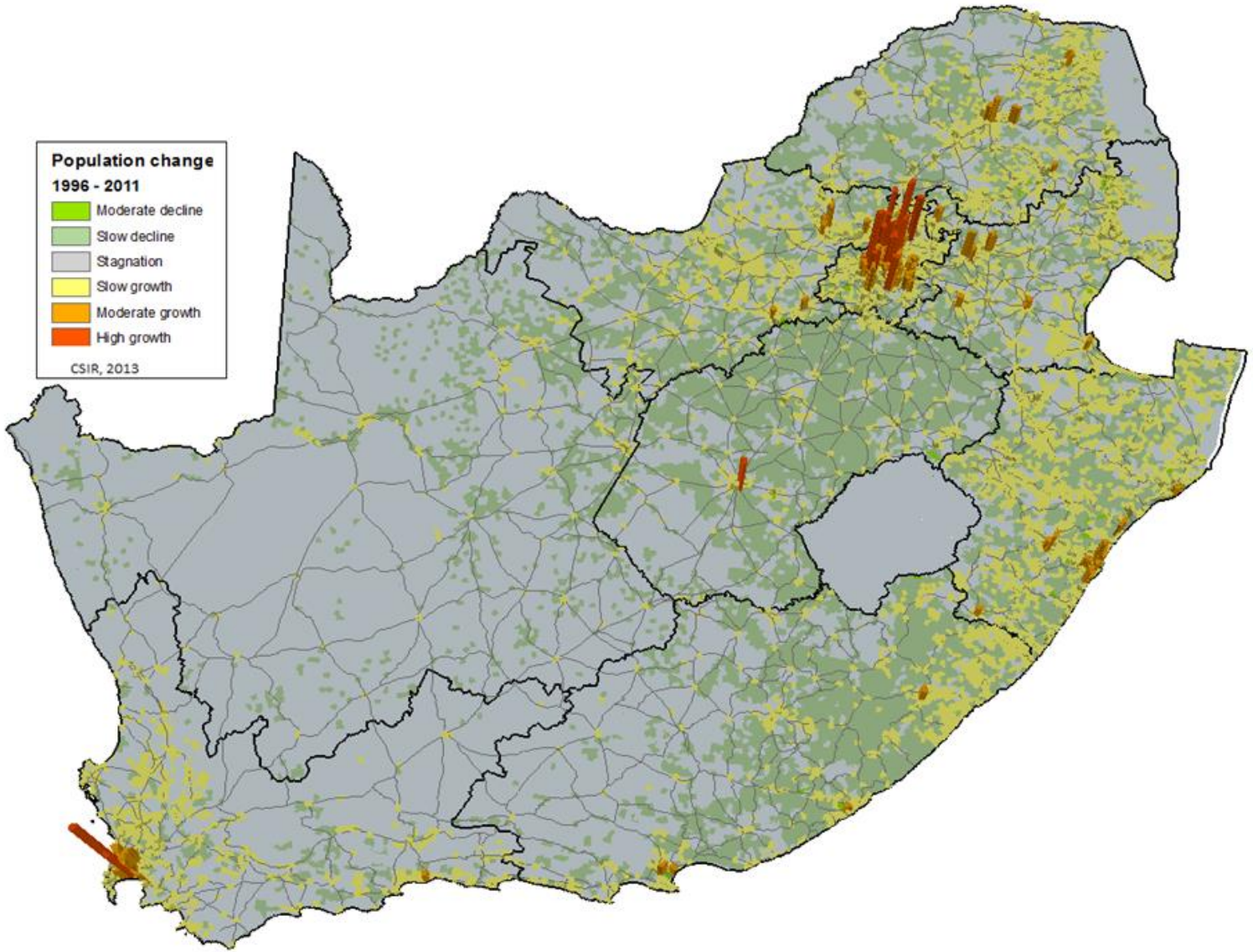
2001 population distribution



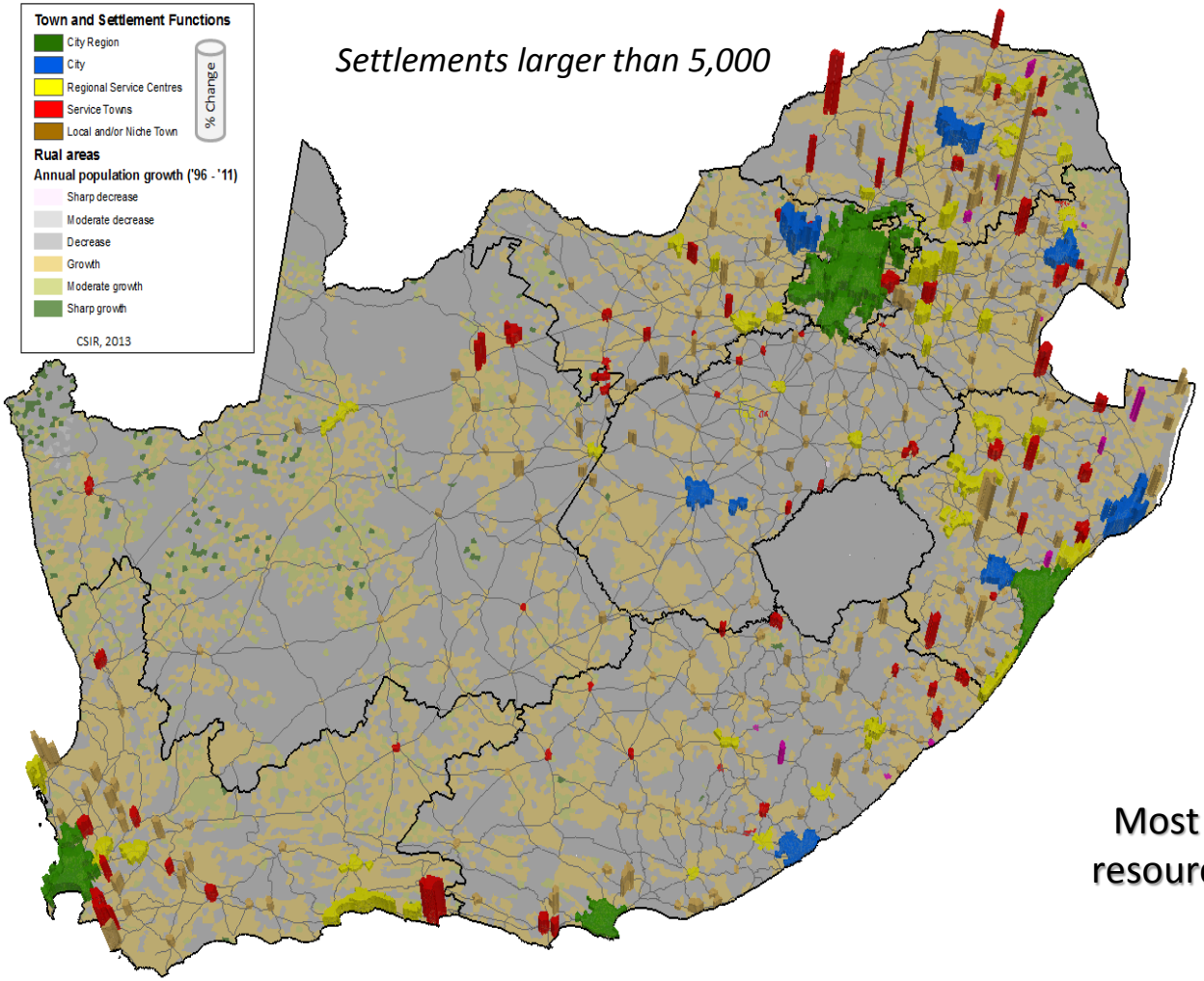
2011 population distribution



Town growth: general trends

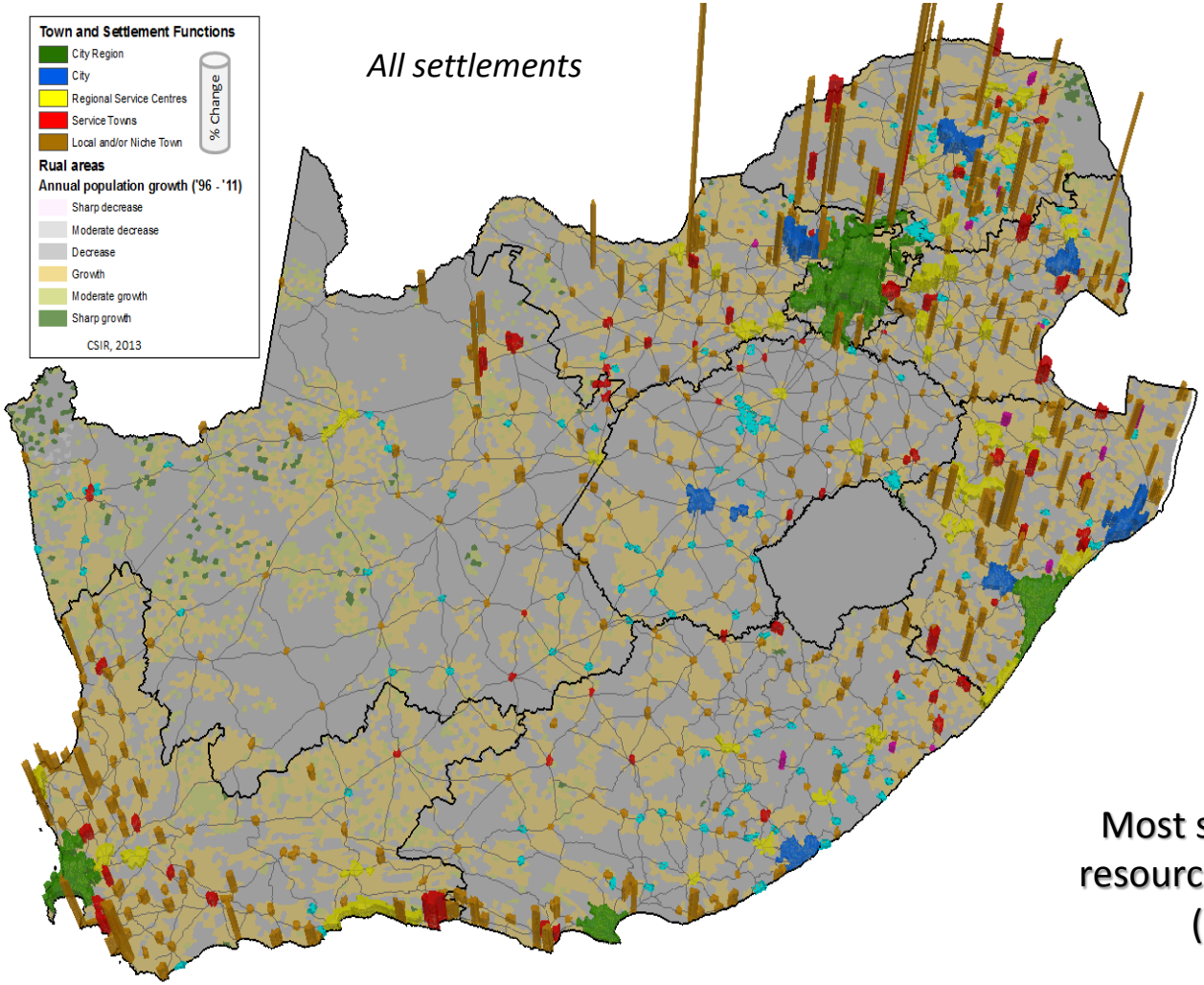


Town growth: differentiated growth (1)



Most significant growth in resource, border and coastal (service) towns

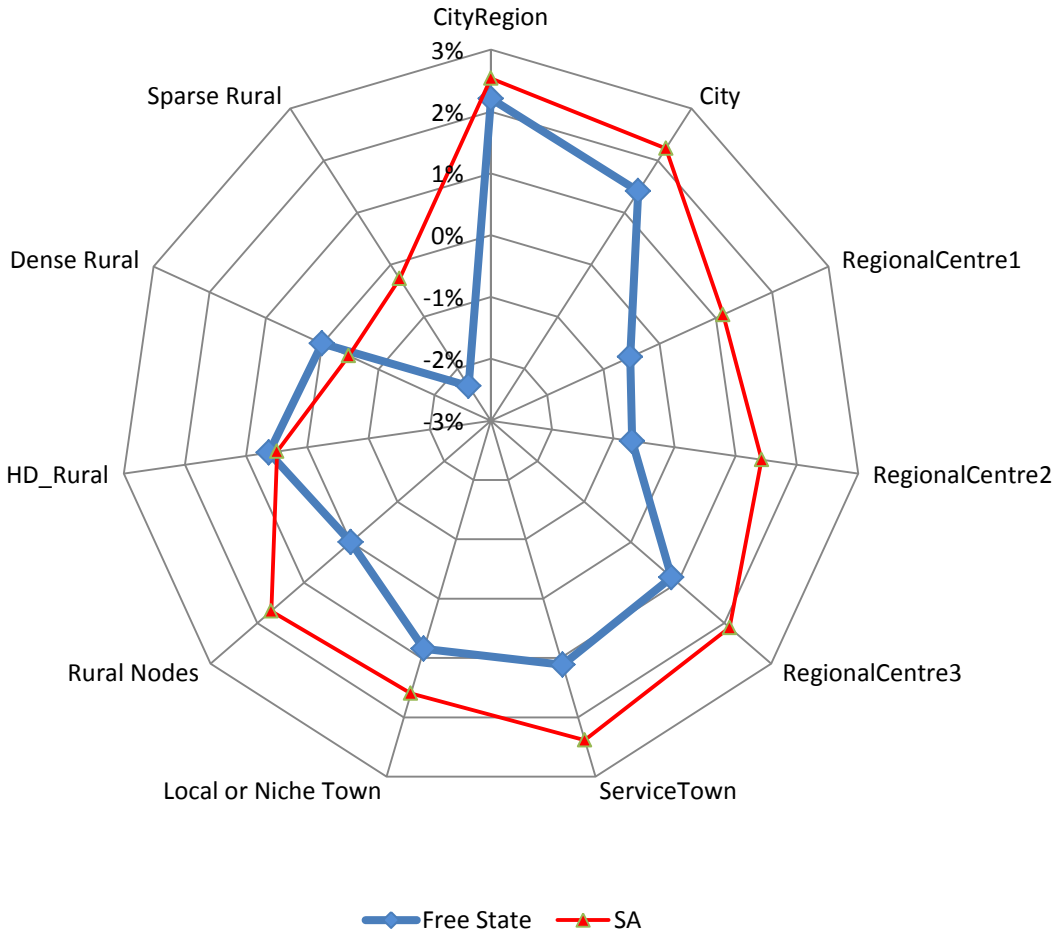
Town growth: differentiated growth (2)



Most significant growth in resource, border and coastal (service) towns

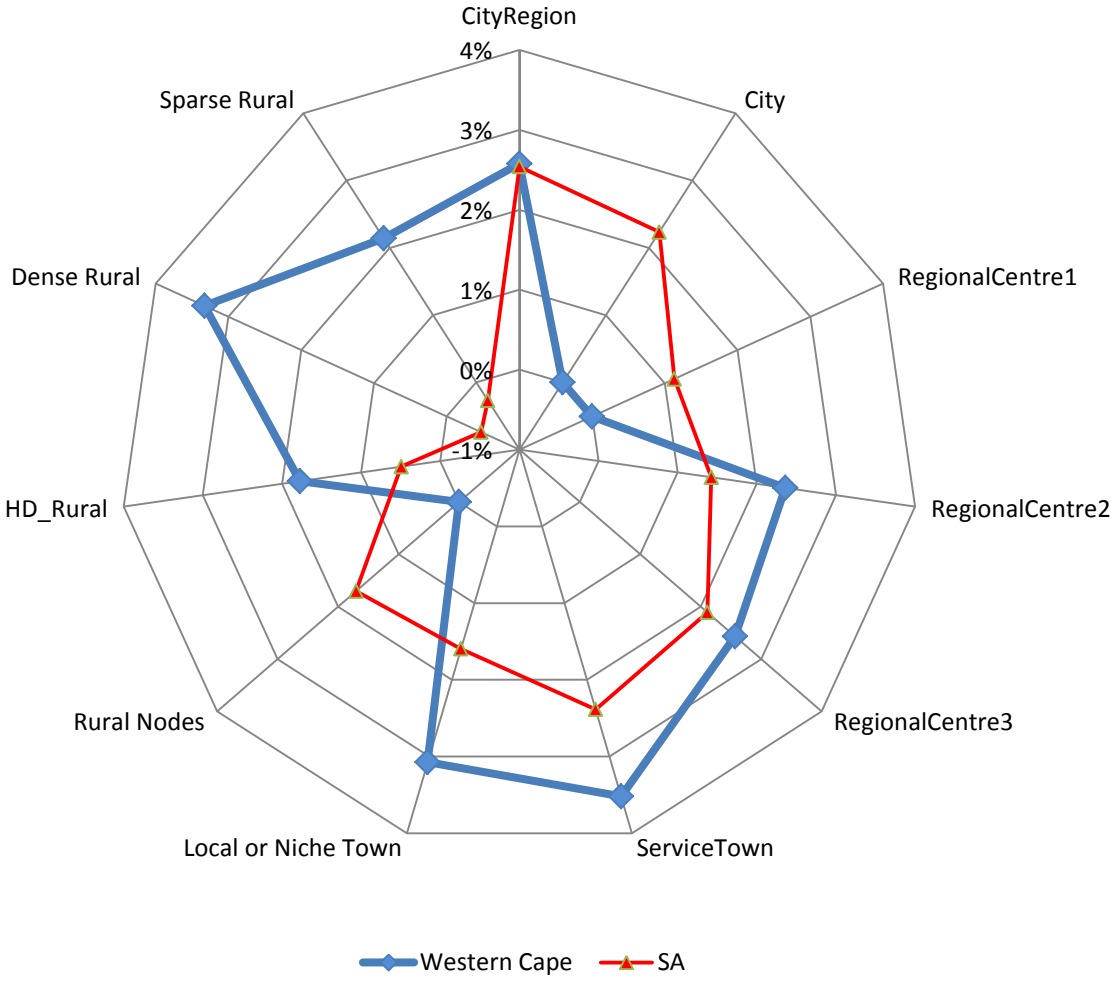
Town growth: differentiated growth (3)

Free State



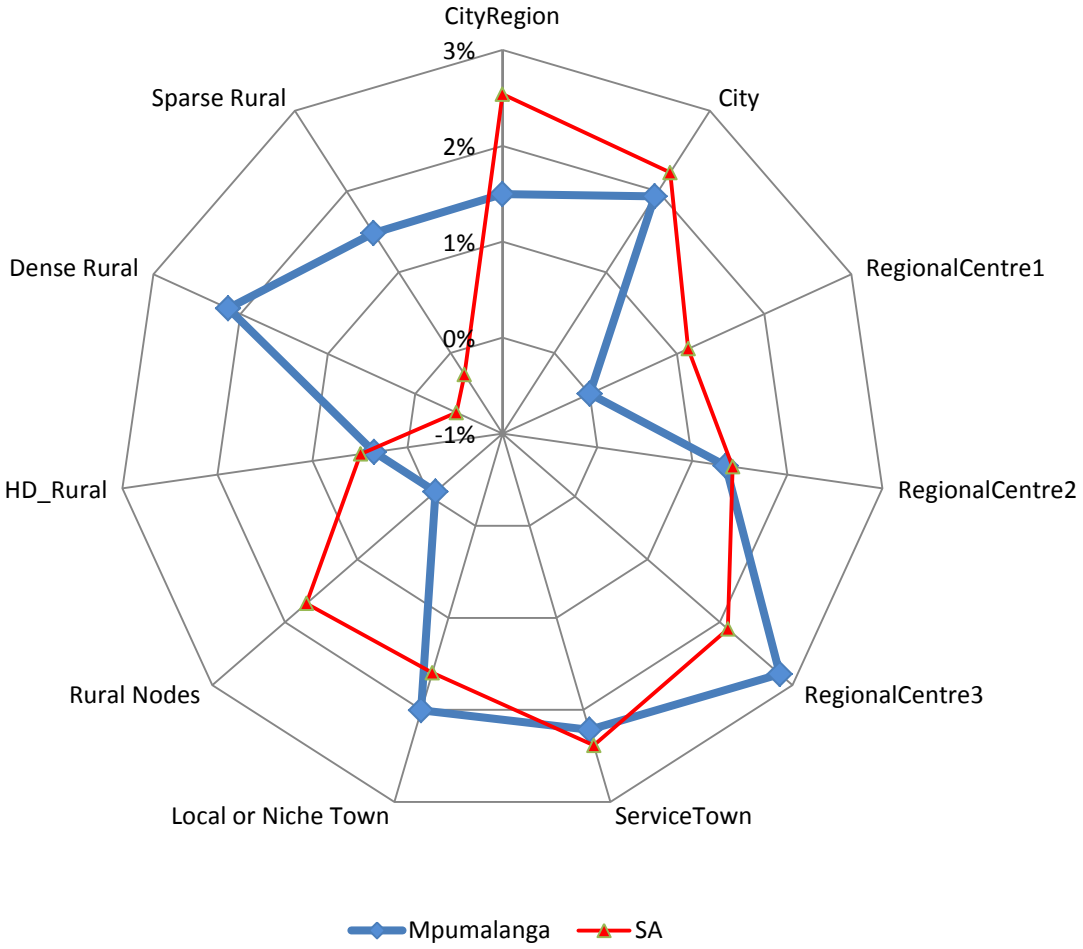
Town growth: differentiated growth (3)

Western Cape



Town growth: differentiated growth (3)

Limpopo



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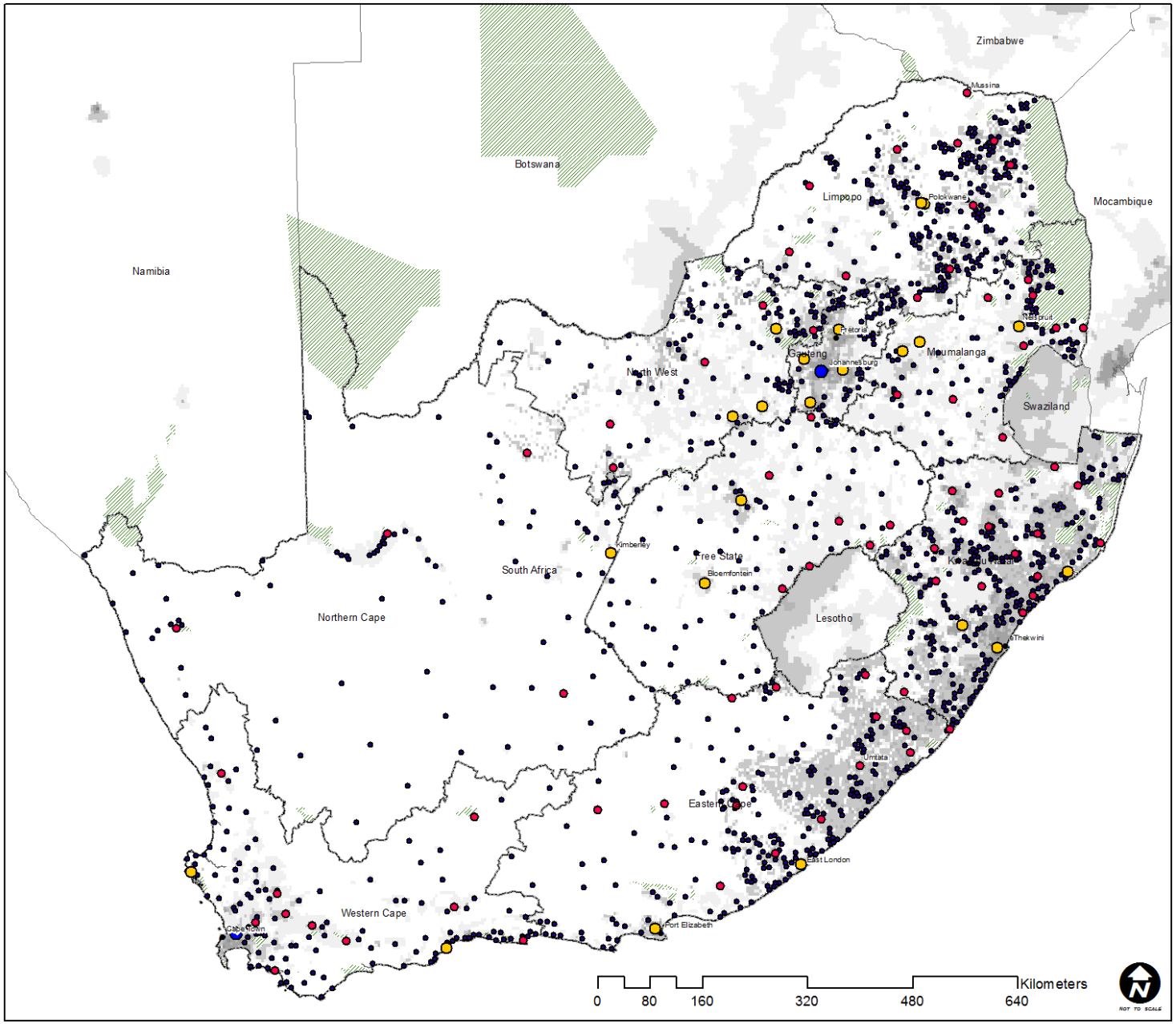
Economic networks

- Towns are hubs of:
  - Economic production
  - Processing and manufacturing
  - But also consuming
- EDD & DRDLR study focus on developing a conceptual network (chains) of the above mentioned



Map Legend:

Gateway-type:

- Global gateway
- Regional gateways
- District gateway
- settlements_(nongateway)
- Main Cities
- Provinces
- nature_reserves_alb
- SADC

SADC Population Density

- 0
- 0.0001 - 200
- 200.1 - 1 000
- 1 001 - 5 000
- 5 001 - 10 000
- 10 010 - 40 000
- 40 010 - 60 000
- 60 010 - 1 580 000

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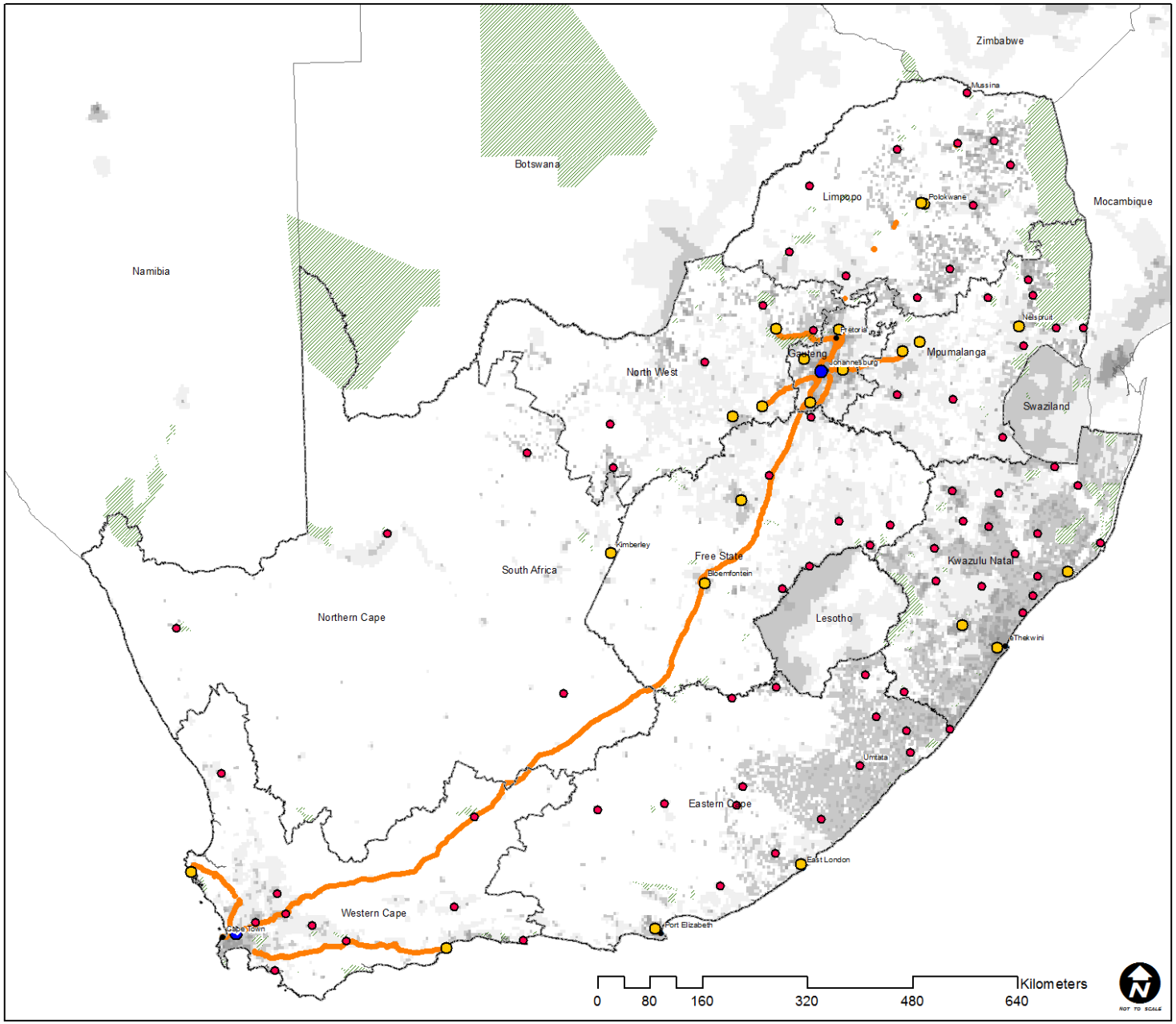
stepSA



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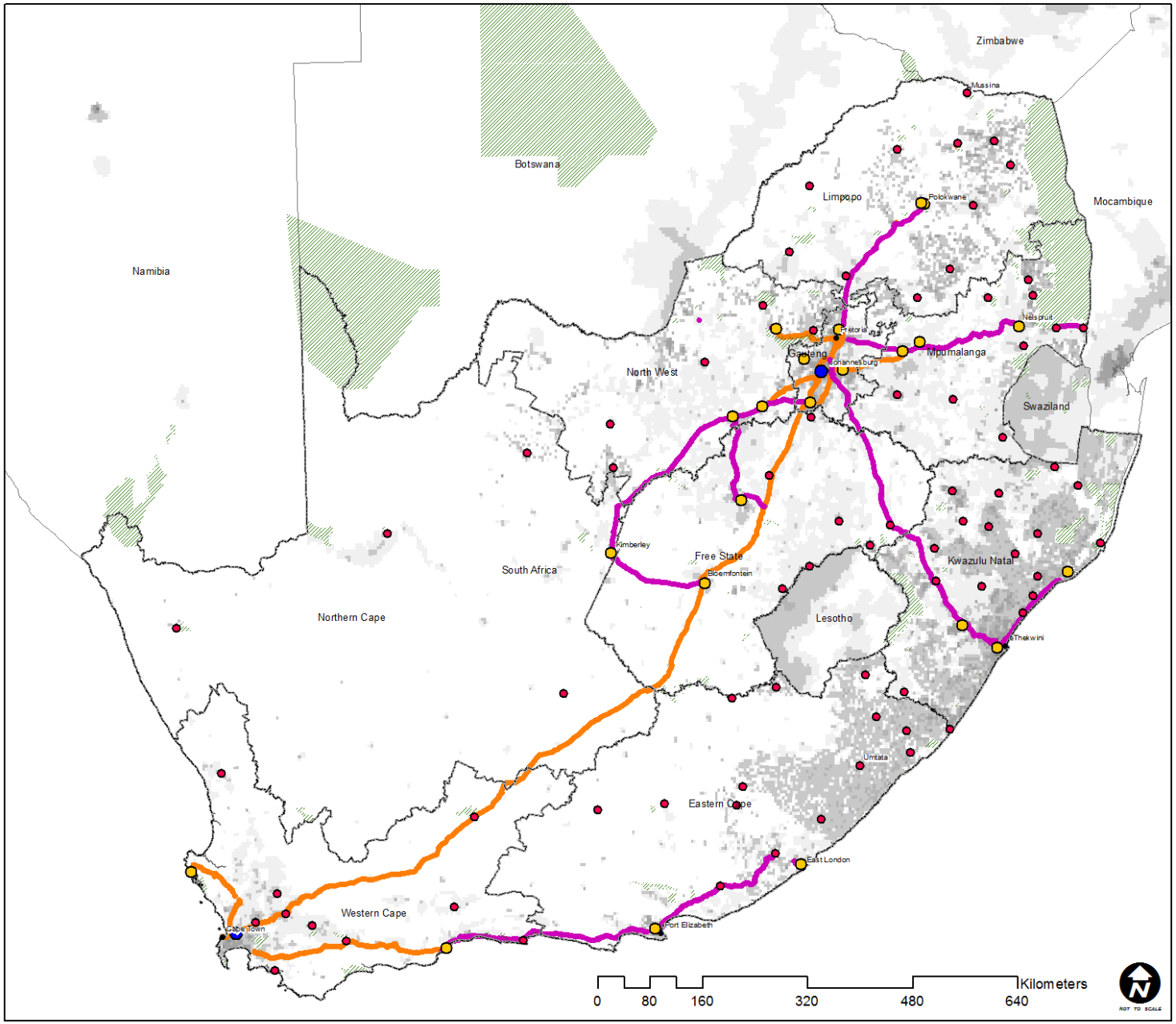

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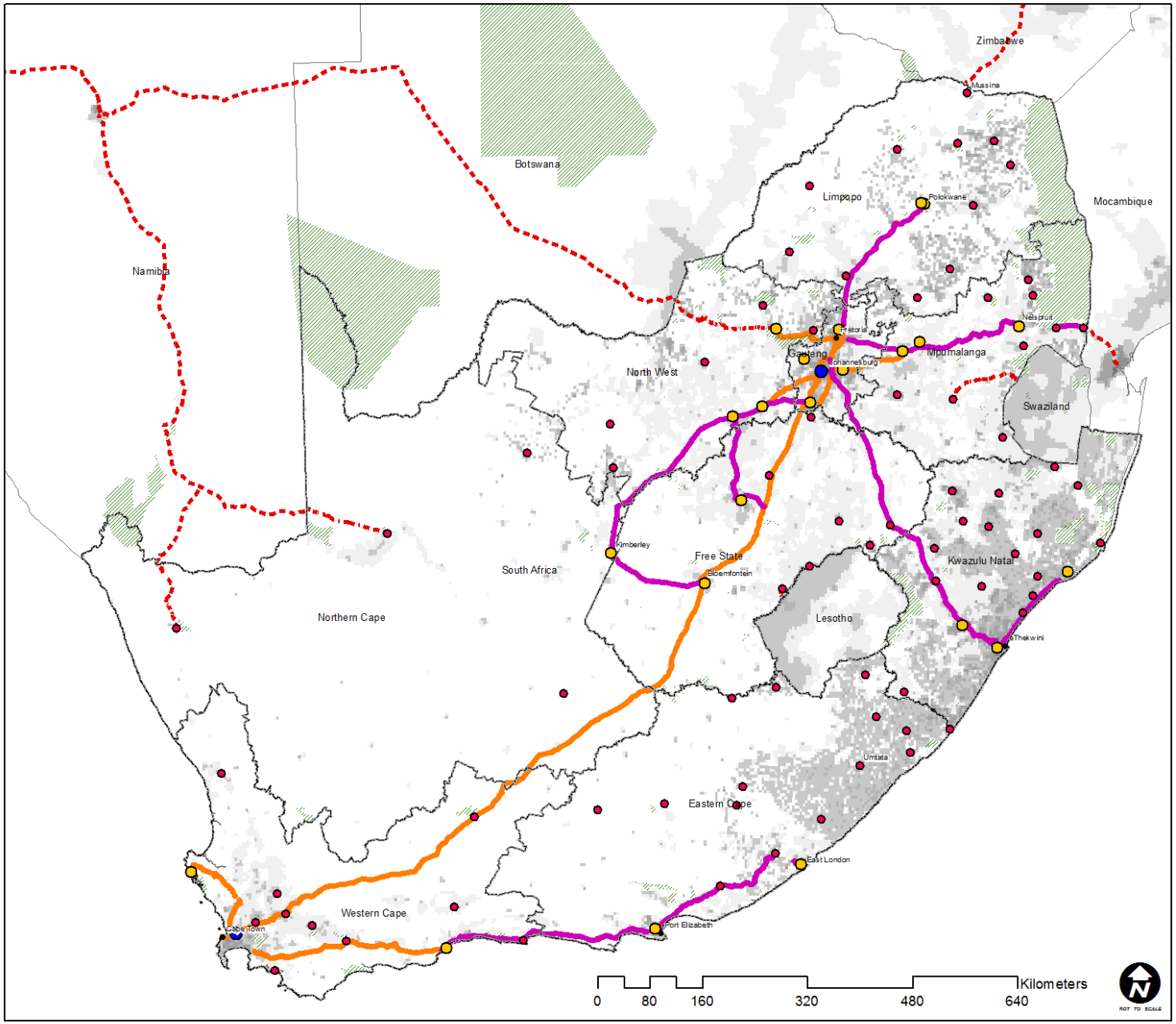

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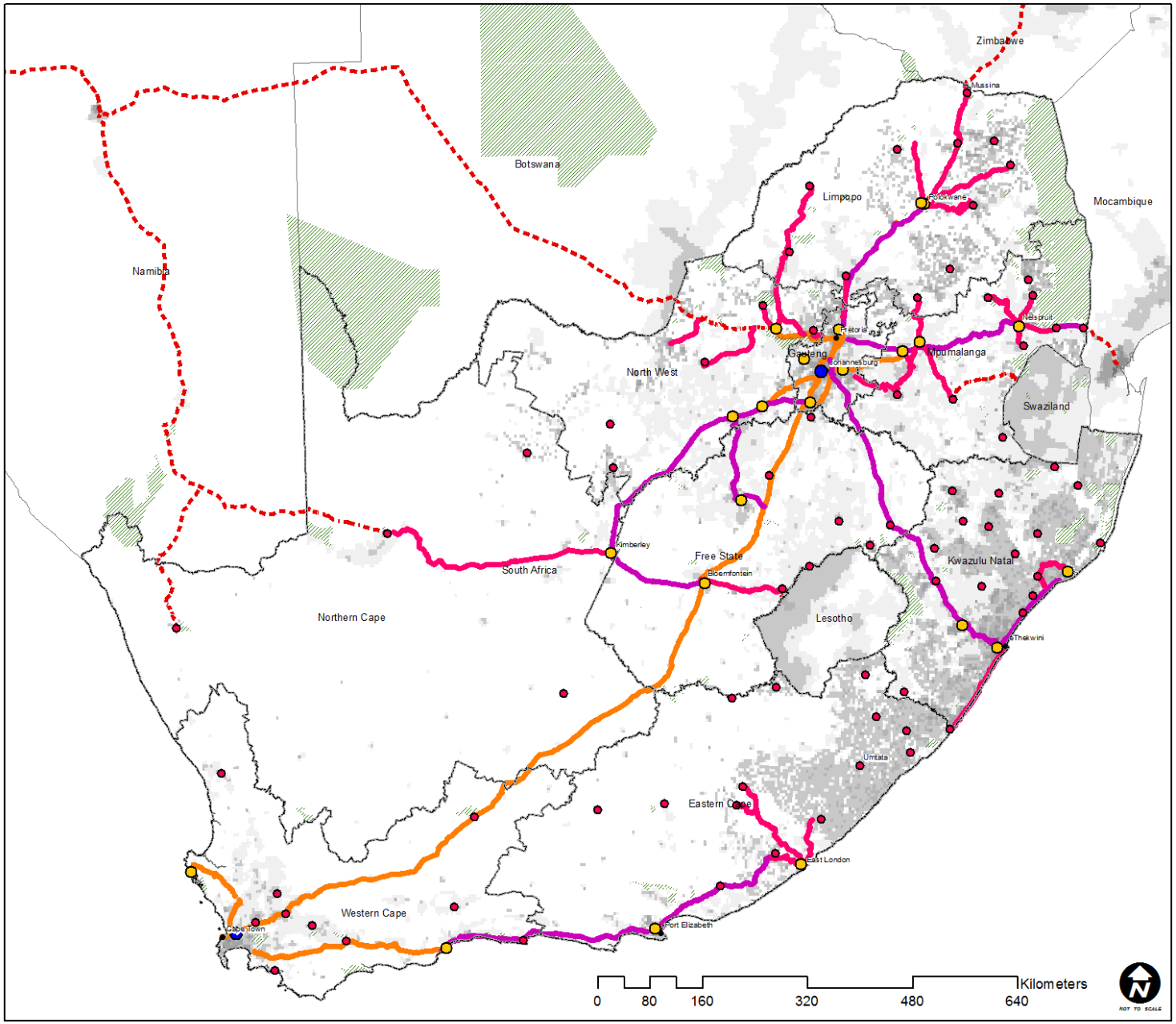

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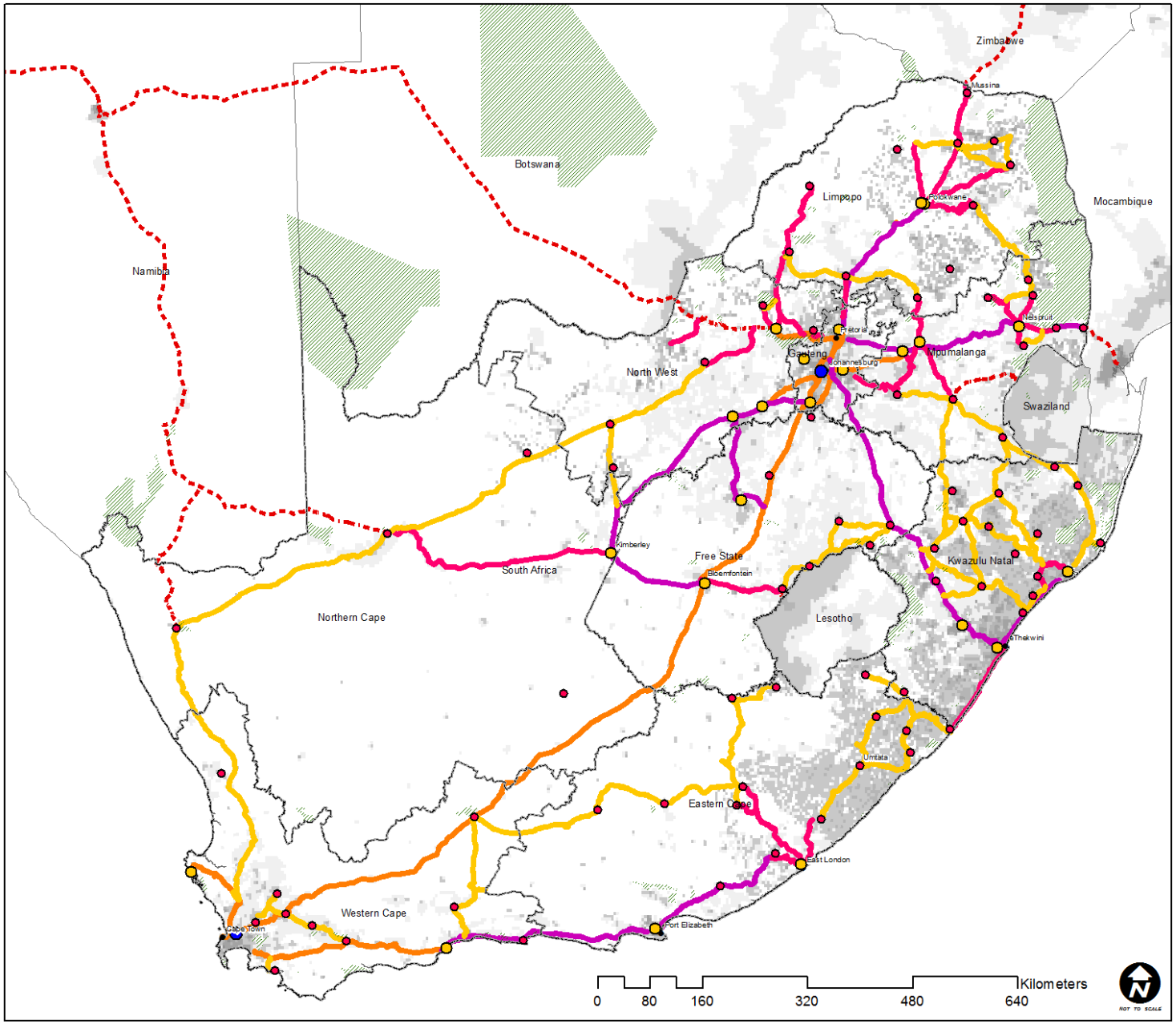

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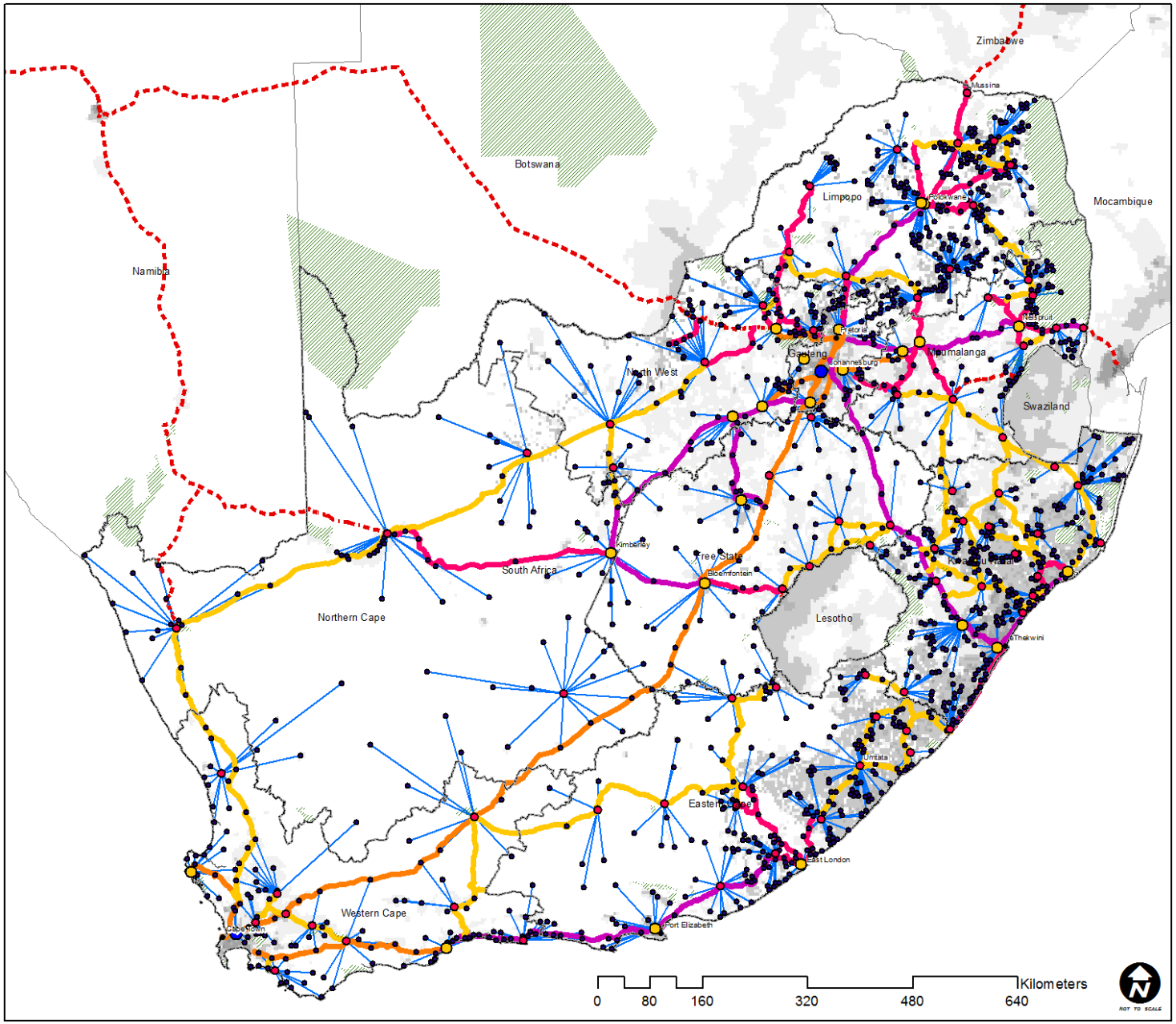

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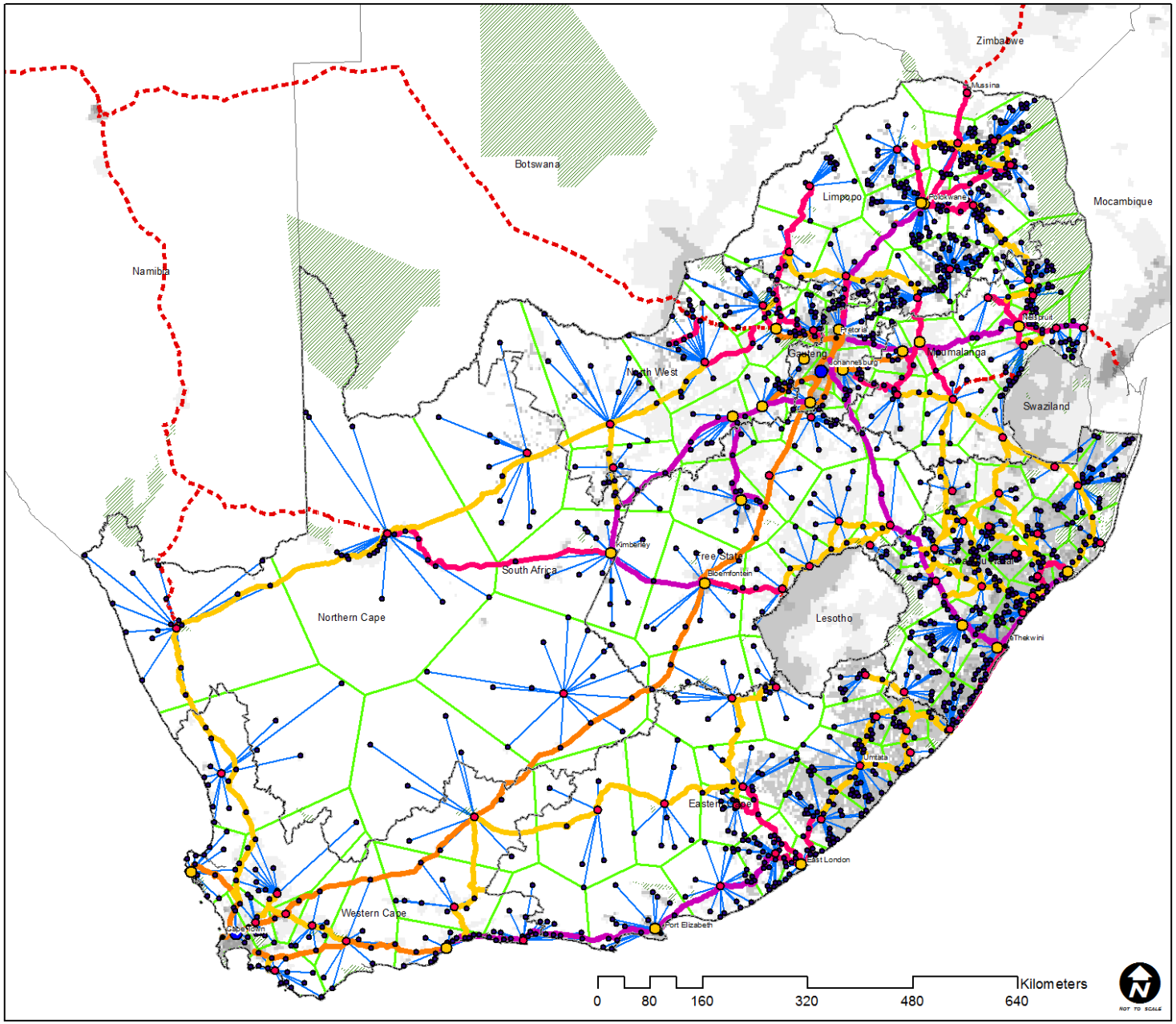

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Town growth: implications

- Different dynamics in different provinces, regions, towns and settlements
- Concentration of people in towns are continuing (jobs & services)
- Many towns are growing at a much higher rate than cities
- Others are declining, some rapidly
- Changing roles of towns: from economic hub to government services hub?

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Further investigation: drivers

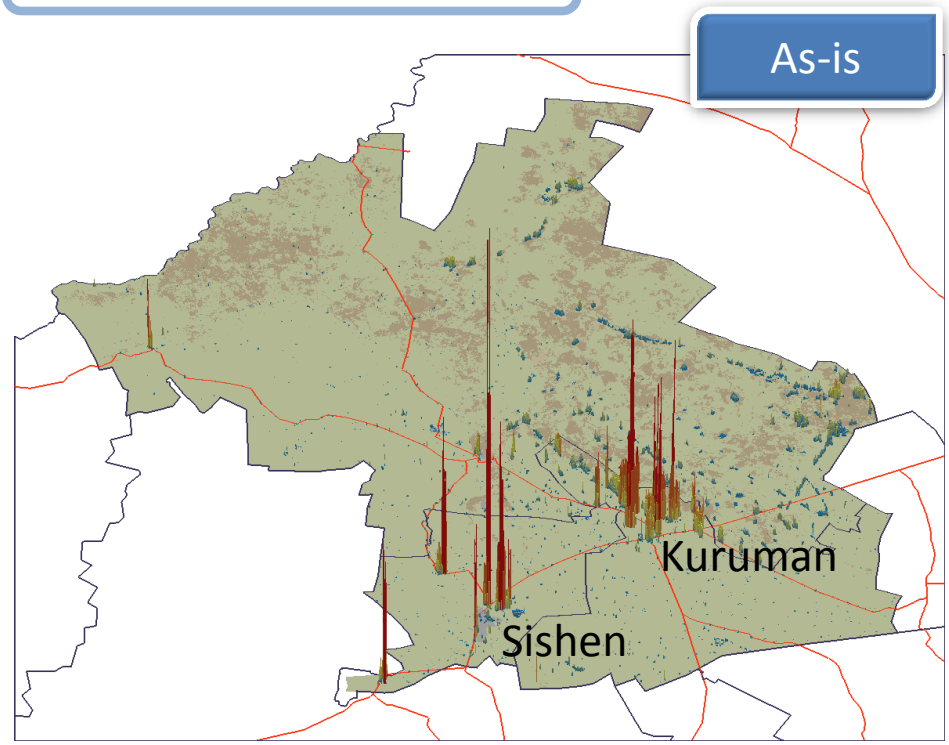
- Trends are informative
- But, need further research on underlying drivers of change (positive and negative)
- And, if we know what drives change, we can start to predict future change to be proactive in our response

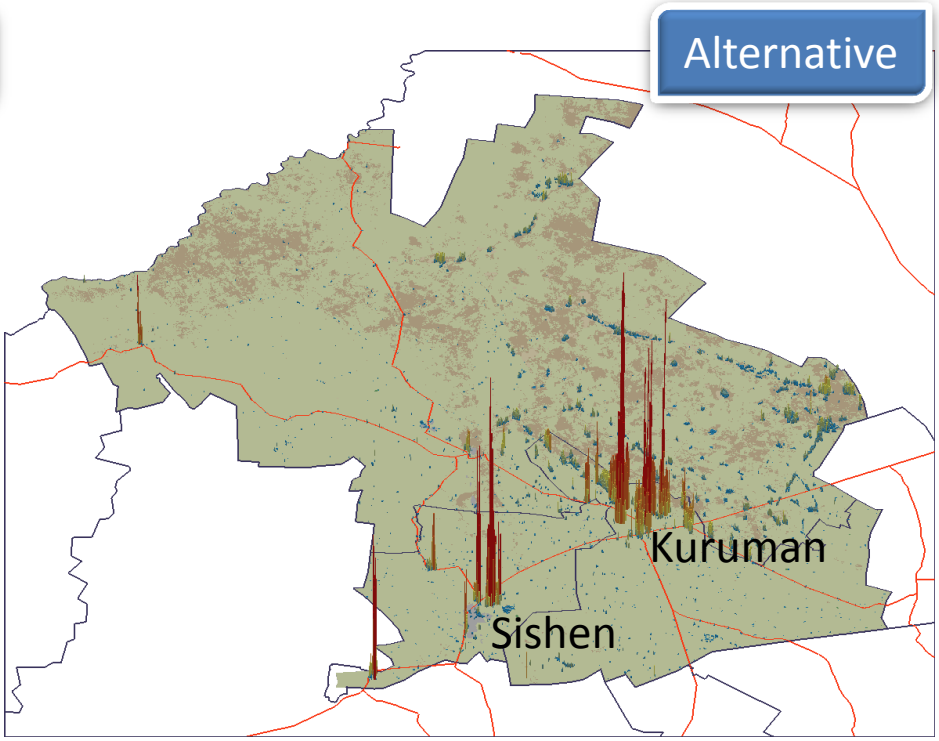
Growth = increased need for JOBS and SERVICES

With limited resources, we need to be strategic

Growth simulation

- John Taolo Gaetsewe (DM)





Population shifts based on alternative economic growth scenarios

Acknowledgements

EDD

DRDLR

SALGA

Presidency

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Website

http://stepsa.org/

Thank you

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