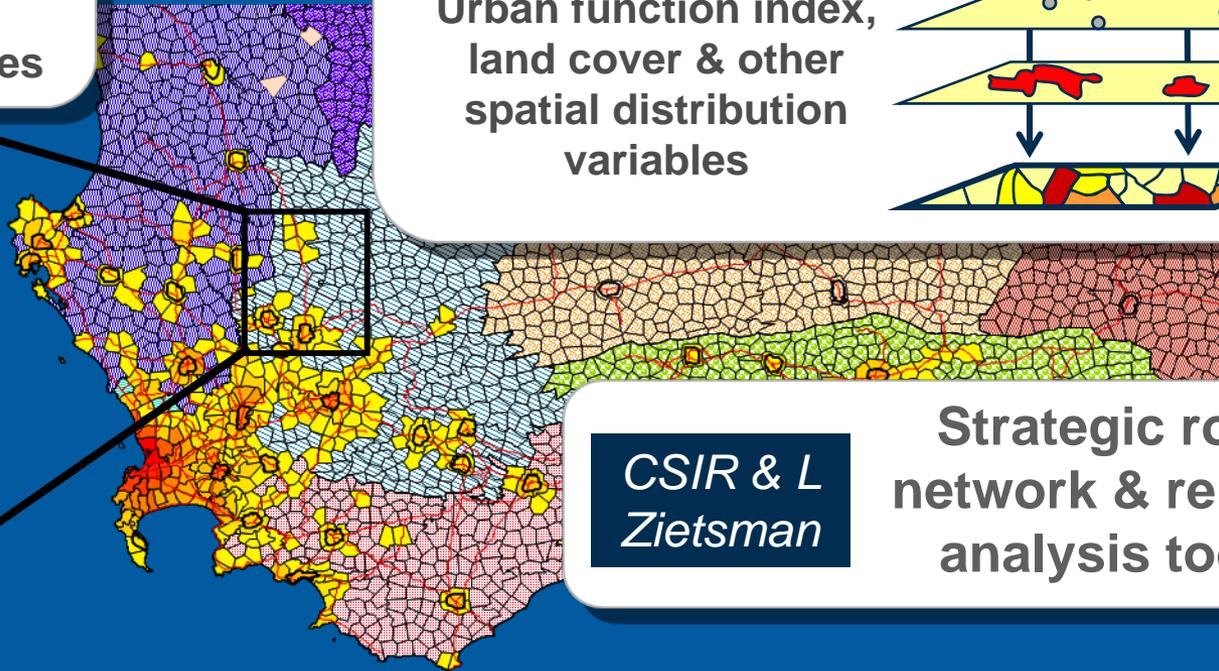
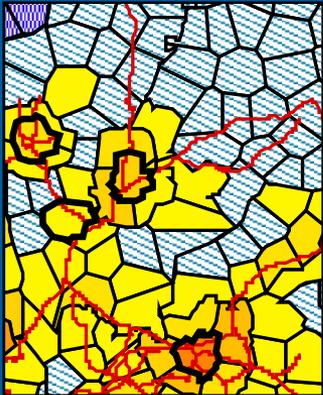


SA Geospatial Analysis Platform (GAP) Methodology*, collaborators & data sources

Mesoframe

*CSIR, dti , the
Presidency & GTZ*

Demarcation of South
Africa into a grid of
50 Km² “mesozones”,
nested within
important boundaries



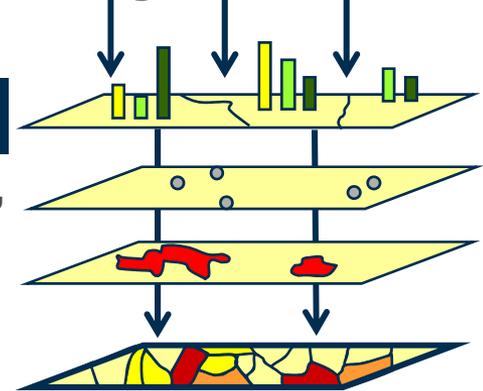
Data and data
mining
methodology

CSIR & StatsSA

Urban function index,
land cover & other
spatial distribution
variables

Global Insight

“Control totals” per
Magisterial District



*CSIR & L
Zietsman*

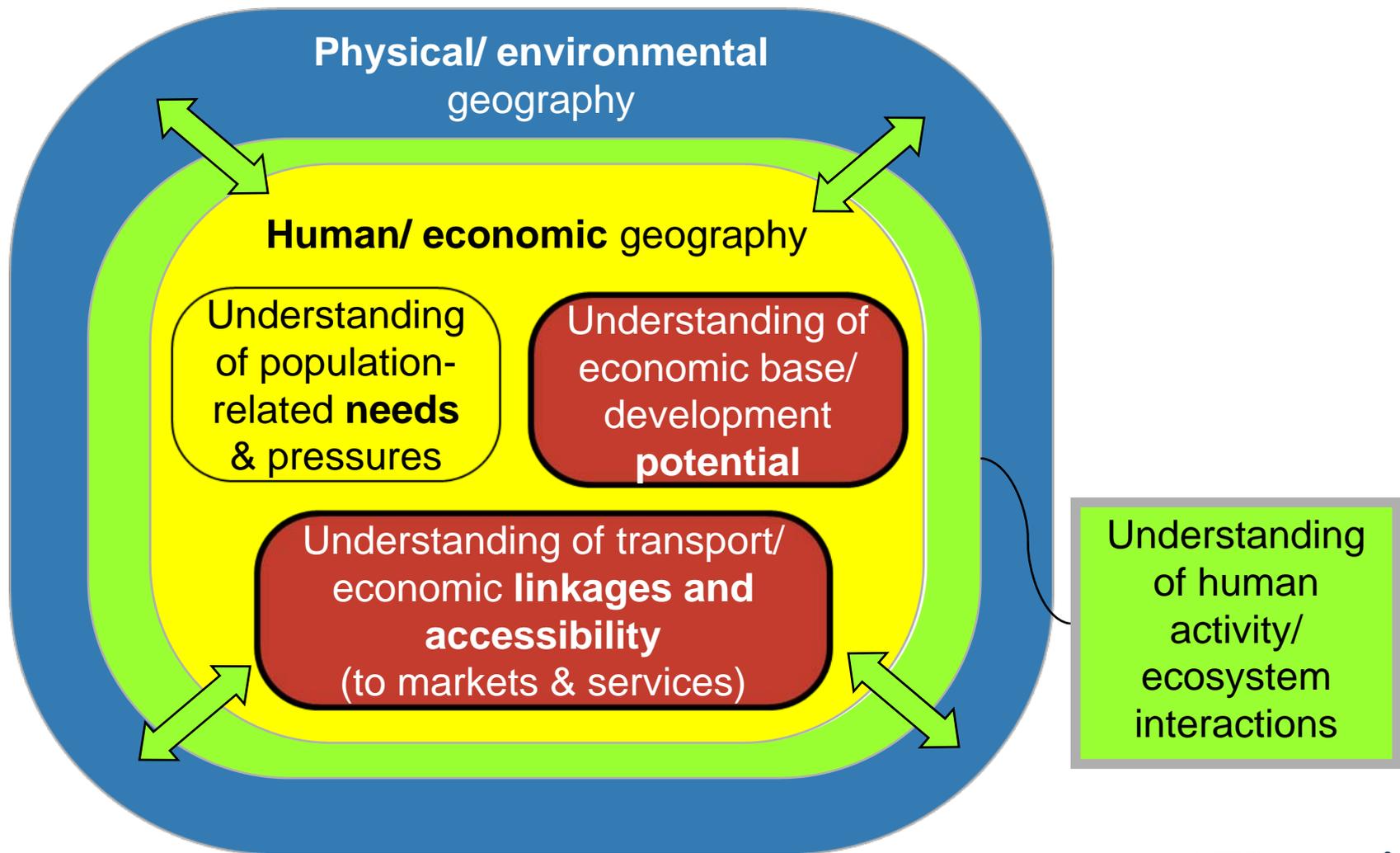
Strategic road
network & related
analysis tools

* The underlying *Mesoframe methodology* was developed by CSIR,
funded by the DST Parliamentary Grant

Preview: What is GAP?

= a common, mesoscale spatial data assembly and analysis platform for:

1. Developing an enhanced, more balanced understanding of *South Africa's human/economic geography* and the associated interactions with the built and natural environment



What is GAP?

= a common, mesoscale spatial data assembly and analysis platform for:

1. Developing an enhanced understanding of SA's *human/economic geography* and the associated interactions with the built and natural environment
2. Profiling and comparing *local development magnitudes* (needs, potentials, service and economic accessibility levels) from a strategic, district/ regional perspective
3. Providing a basis for addressing key development planning questions

How much (of population/ economic activity) ***is where?***

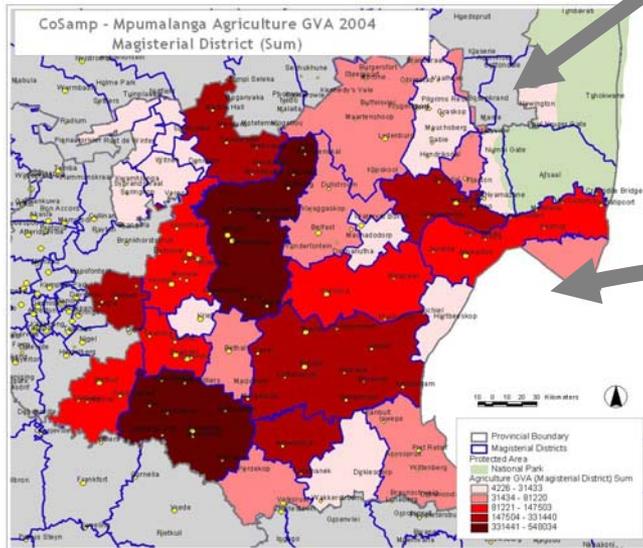
Where are the main concentrations/ hot spots to be targeted?

What (proportion of population in need) ***can we reach from where?***

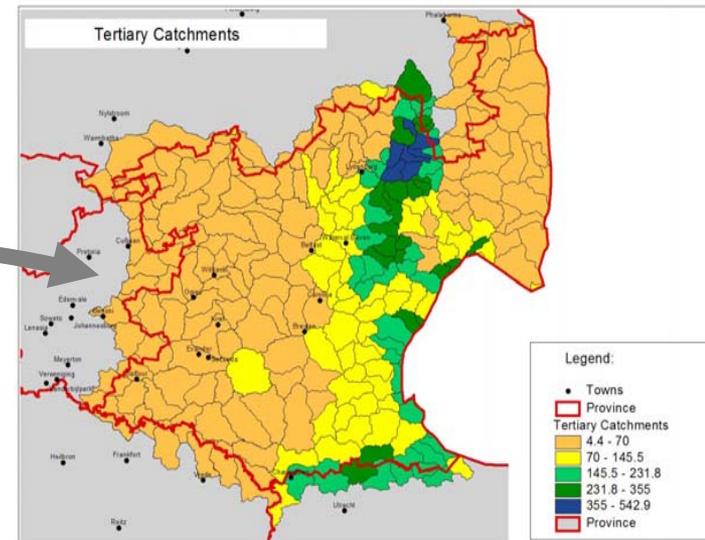
Limited data and model inter-operability

Wrong scale of data: Need for more localised/ disaggregated data

Differing analysis units:
Economic model cannot 'talk' to ecosystem model



Mpumalanga's economic statistics (per Magisterial District, 2001)



Mpumalanga's ecosystem statistics (per water catchment)

The problem of differing analysis units & scales

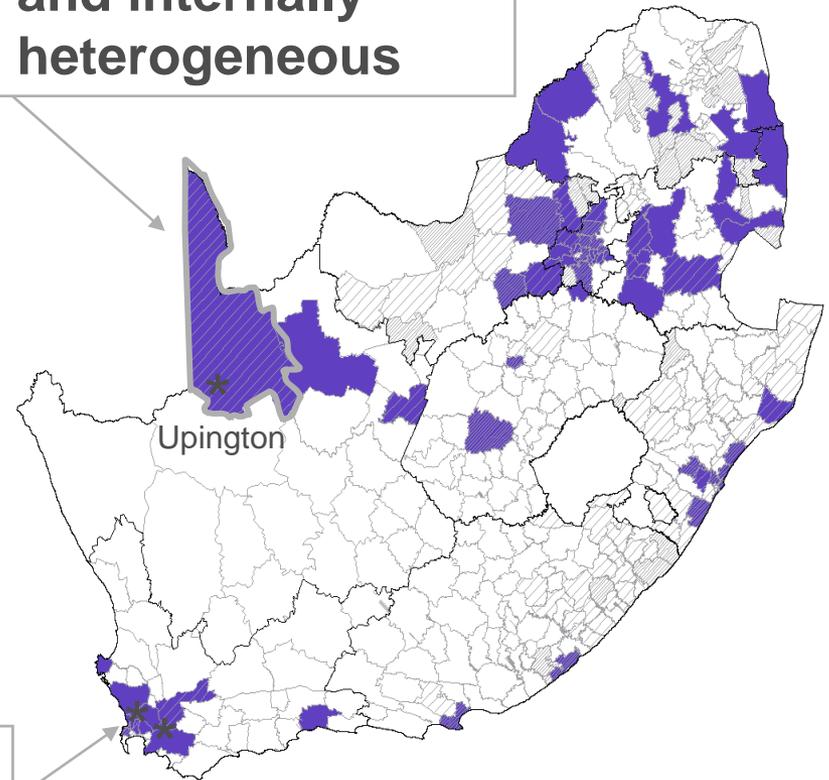
Gordonia District

Zone is very large and internally heterogeneous

“Gordonia problem”: Zone-size distortions of quantity maps – i.e. maps indicating “how much is happening where”

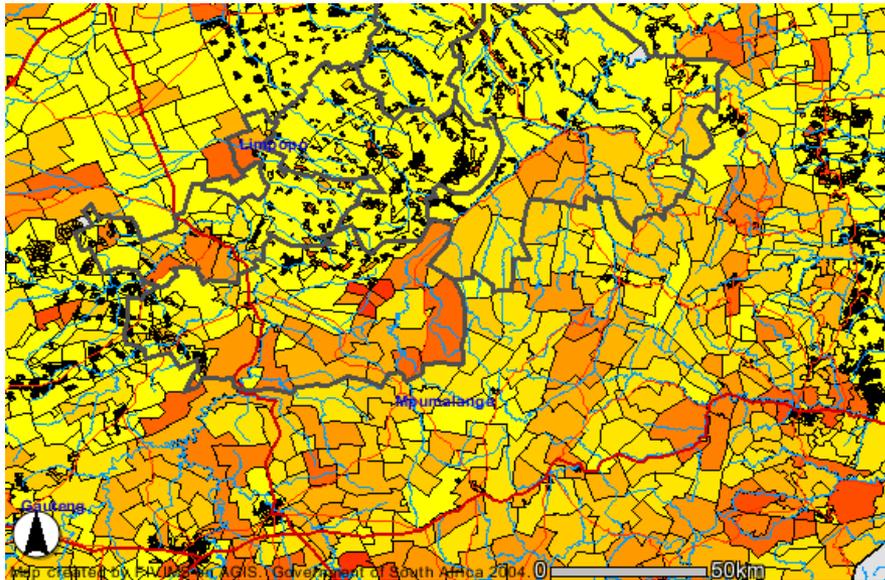
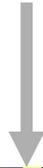
Wynberg District

Zone is too small to see at this scale

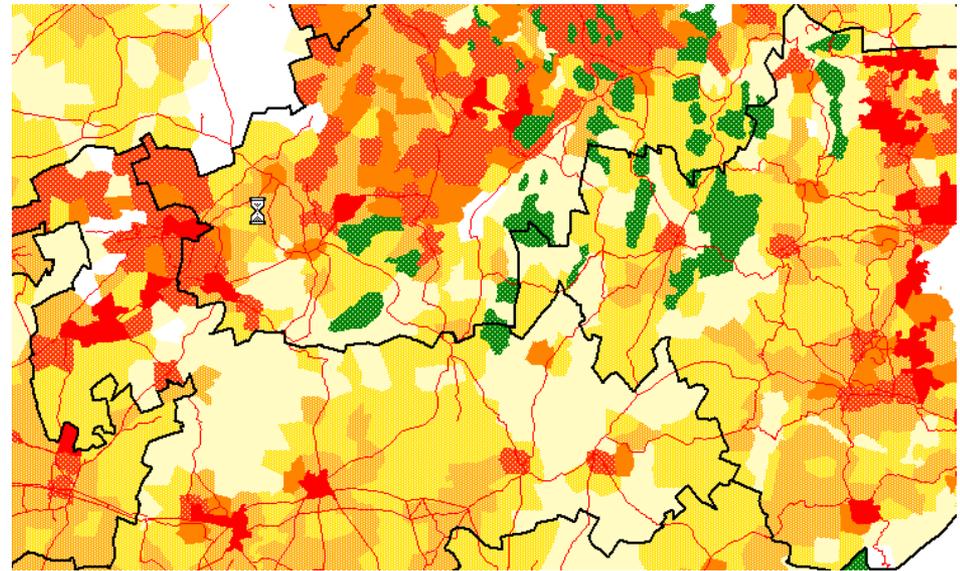


Map of districts with high levels of labour-intensive economic activity (2002 NSDP)

Example of “distorted picture” (population per SAL area)

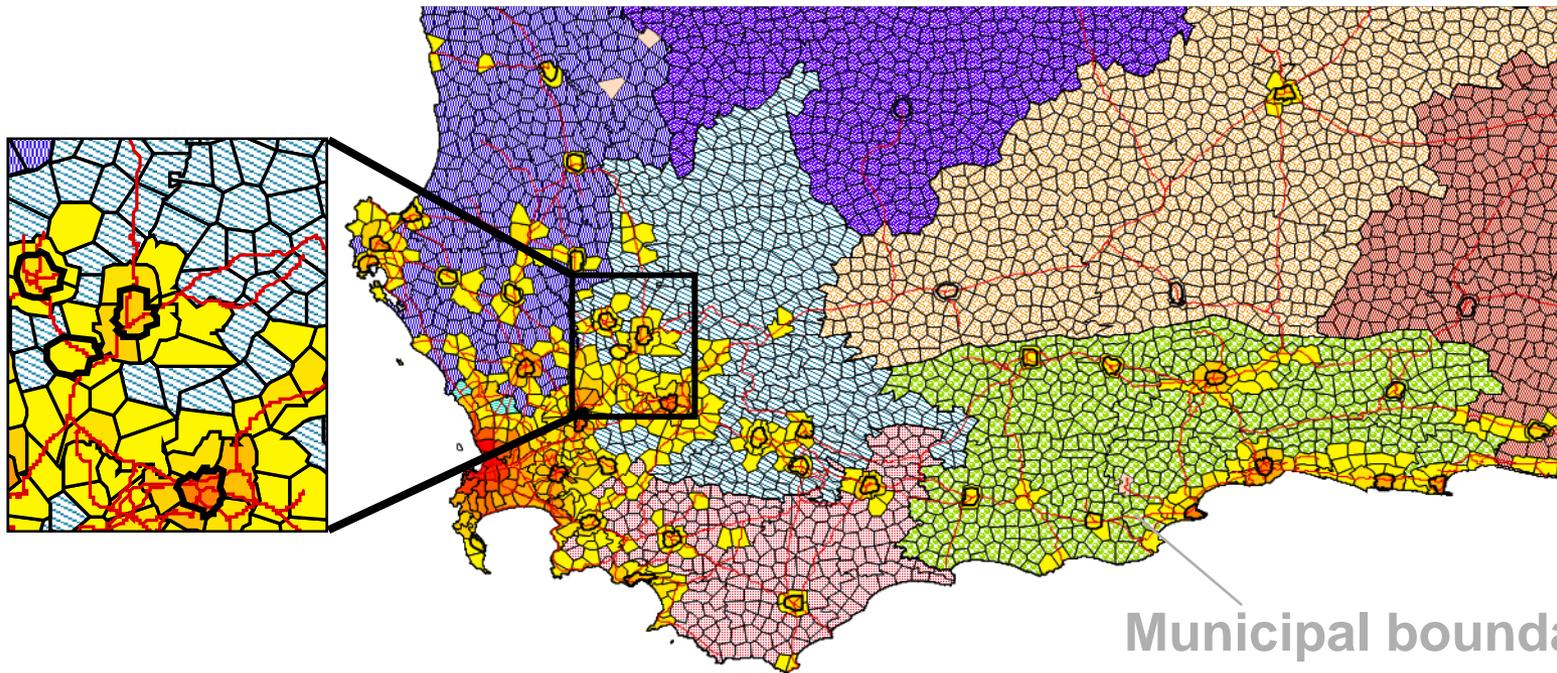


New GAP-based picture (population per mesozone)



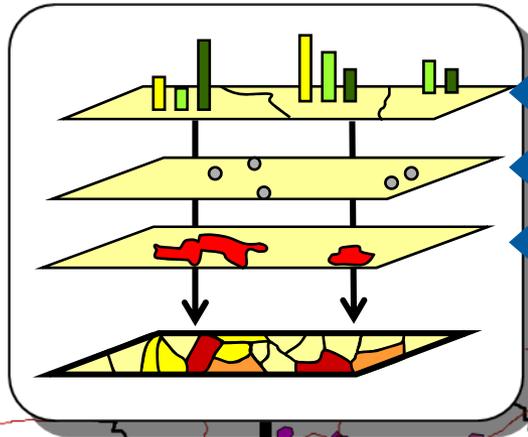
The solution (1): Mesoframe demarcation:

A demarcation of South Africa into more than 25 000 “mesozones”/ Standard Local Economic Areas: 1) each approximately 50 km² big, and 2) nested within important administrative & physiographic boundaries



Municipal boundary

The solution (2): "Data mining"



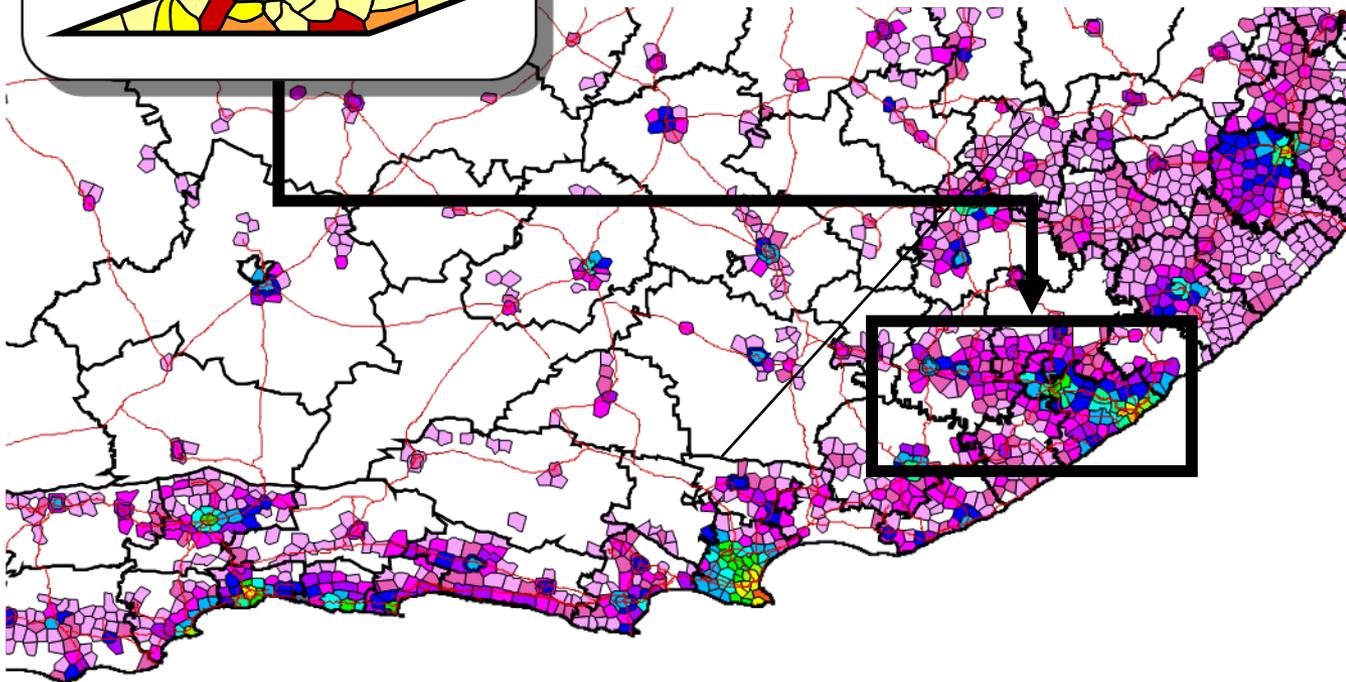
"Mining" and integration of:

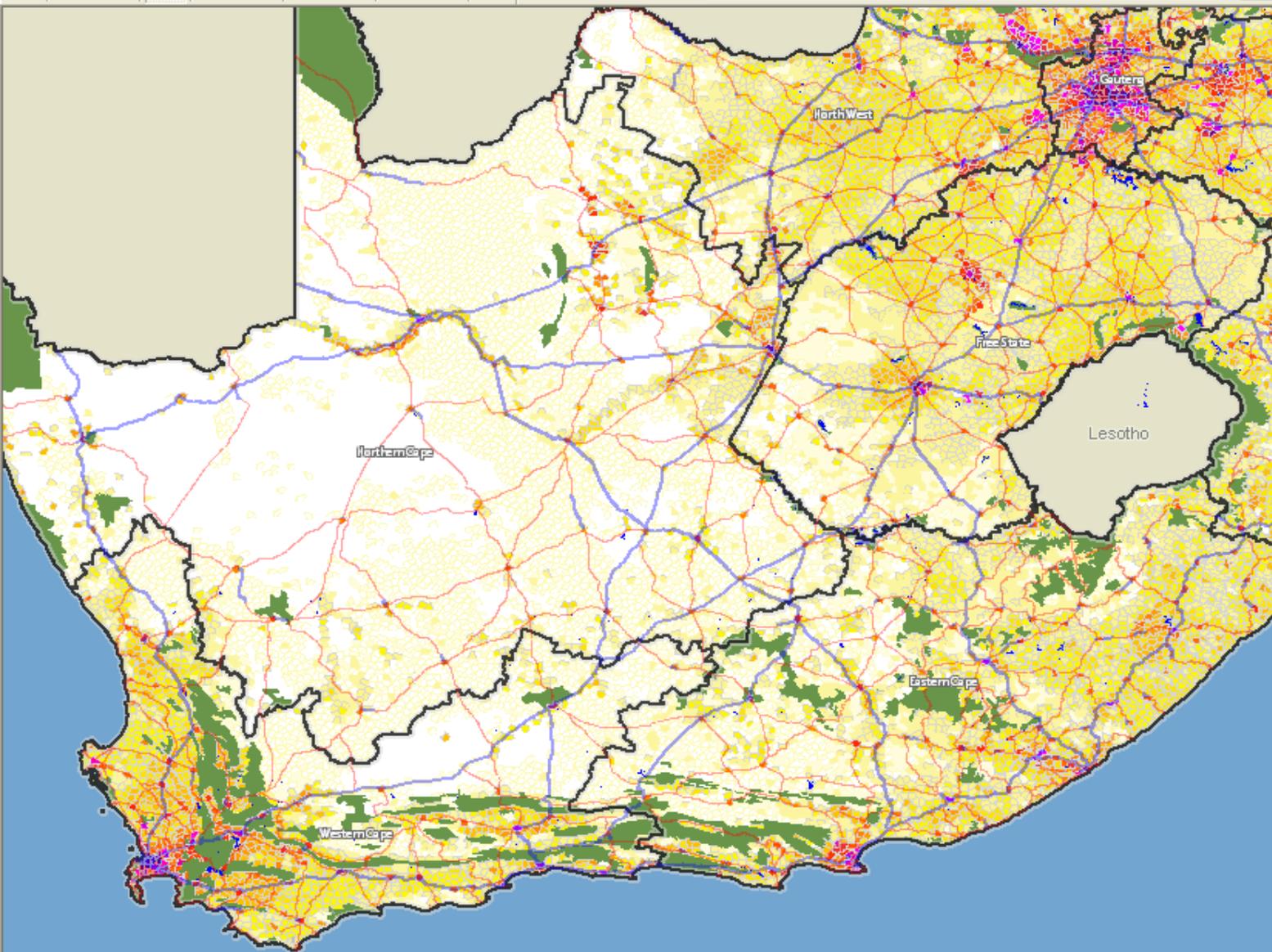
Aggregate area statistics

Point data (e.g. facilities per town)

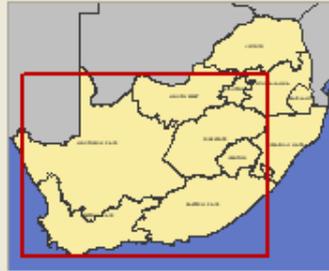
Land cover data (e.g. derived from satellite images)

Estimated Rand value of economic activity per mesozone





Overview and navigation map

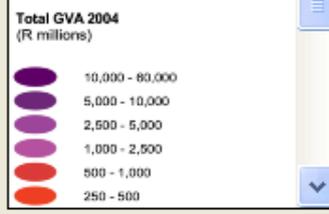


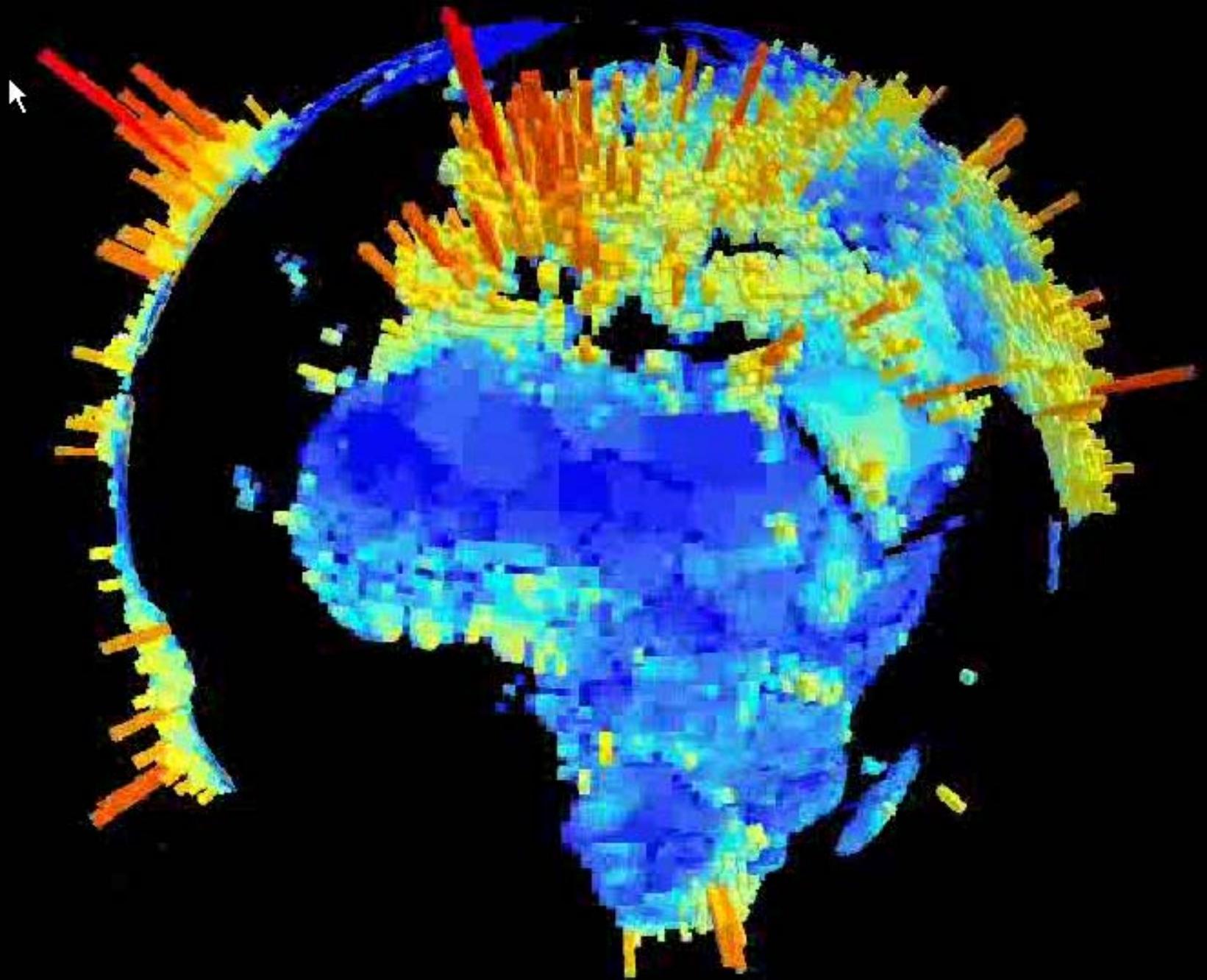
Select map theme

2.1 Total GVA per mesozone

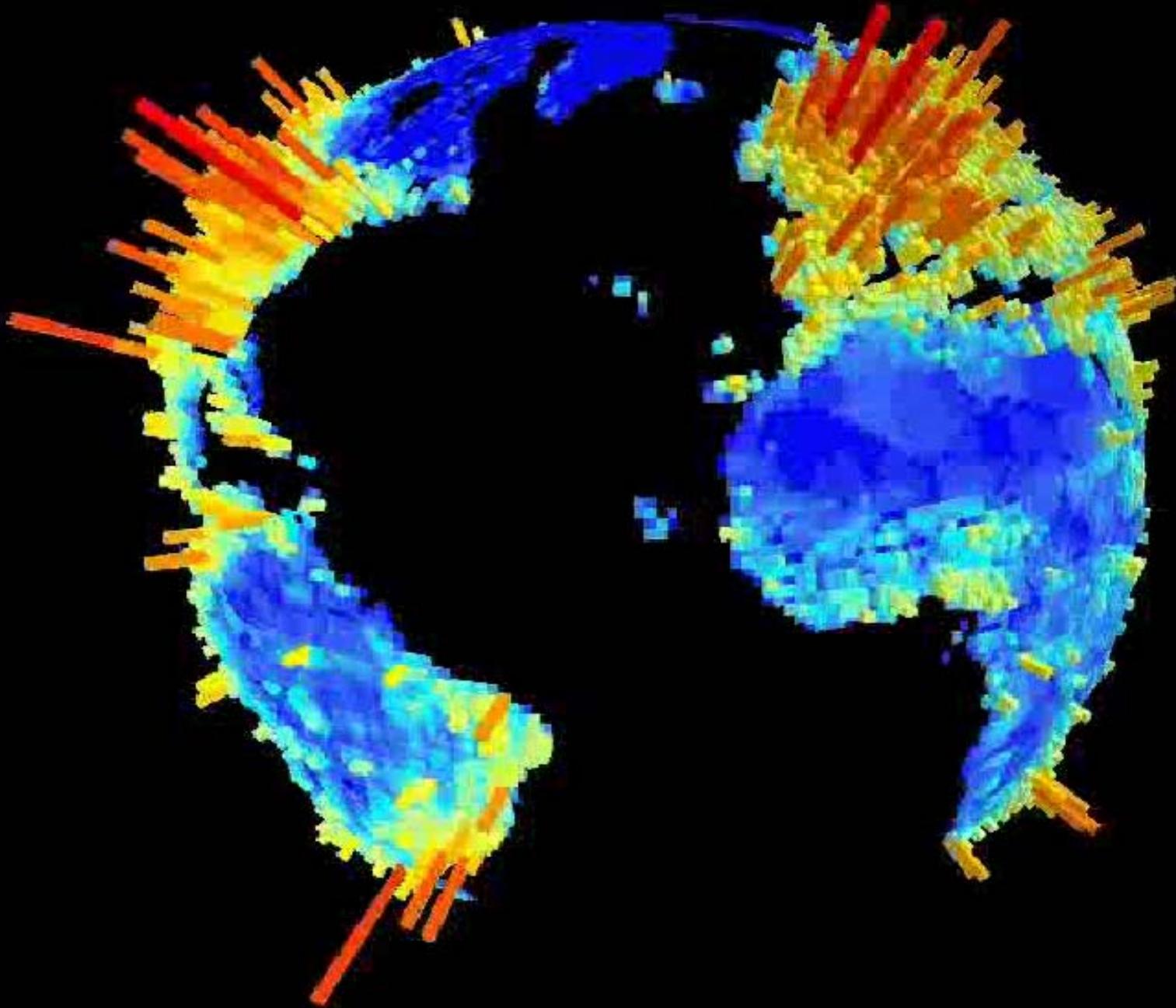
- About GAP
- Map viewer
- User Guides
- GIS files and other data
- NSDP Spatial Profiles
- Map Descriptions

Total GVA per mesozone

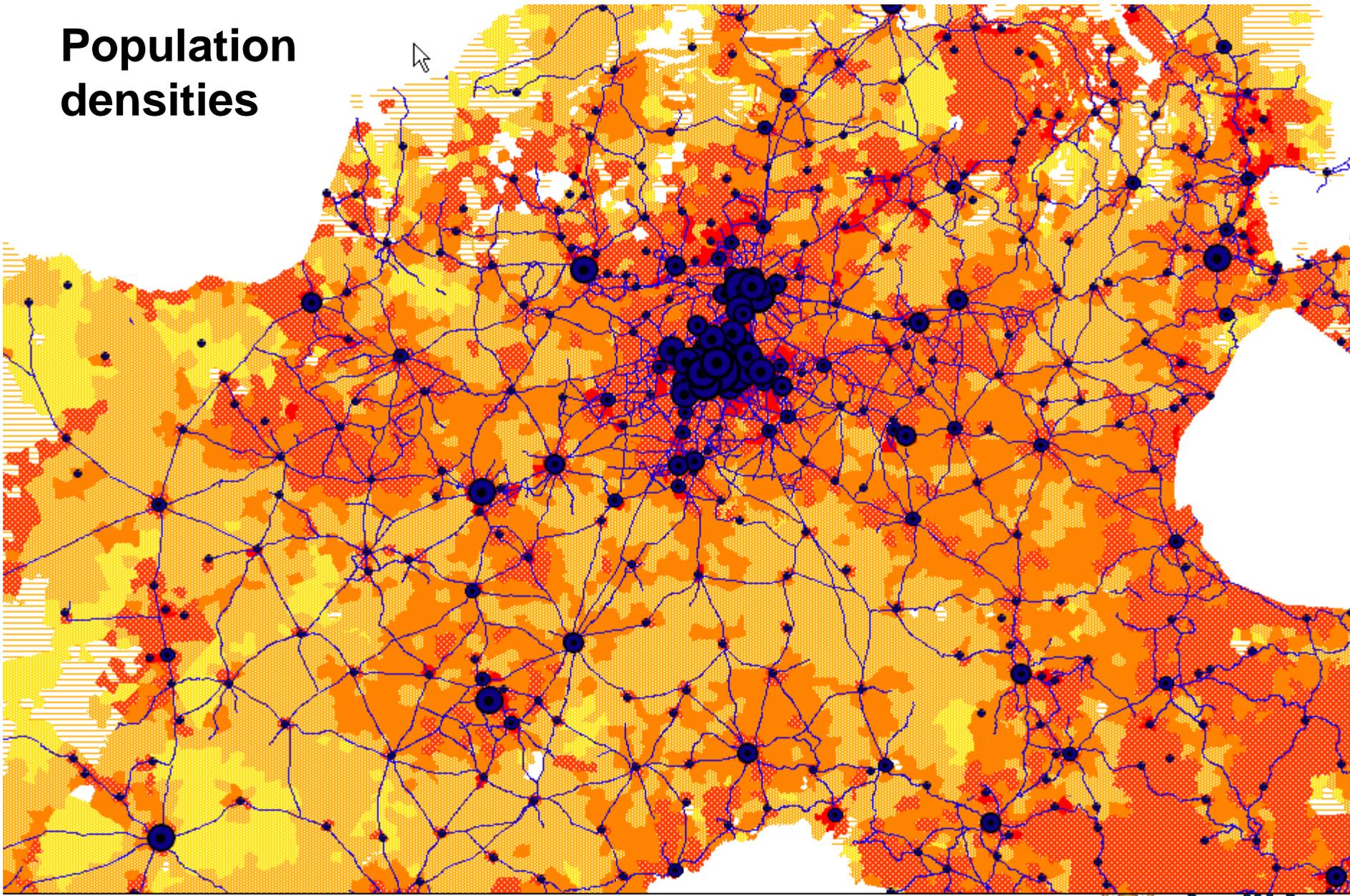




G-Econ output: similar method applied to world

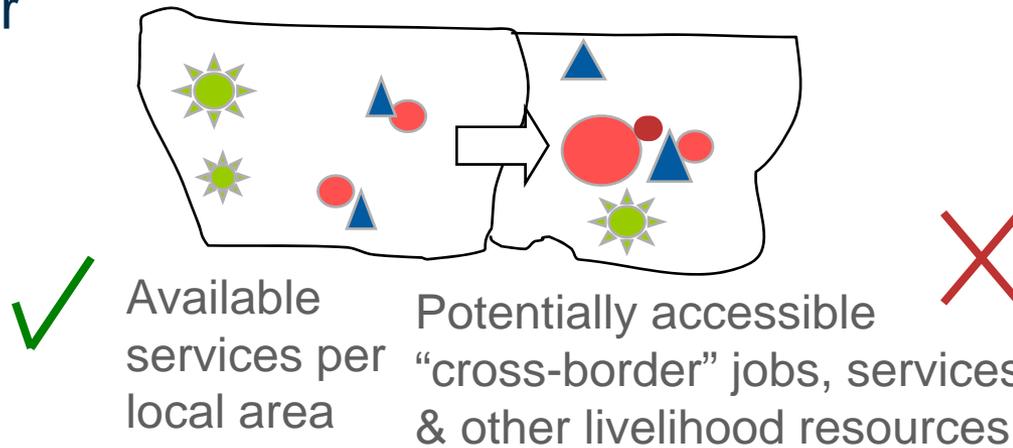


Population densities



The Island Approach to spatial profiling (e.g. of needs/opportunities) and targeting (e.g. of service delivery)

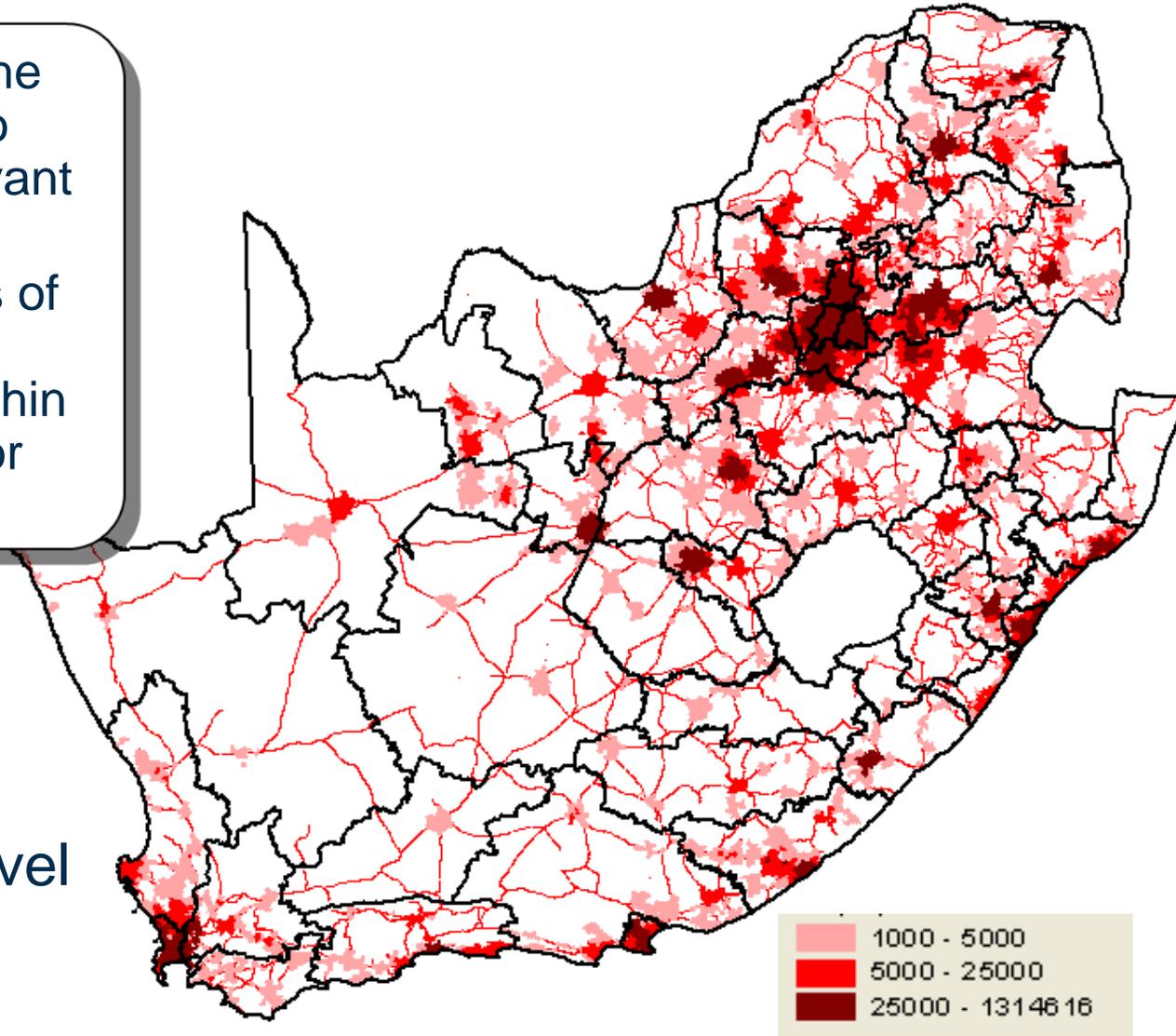
- The increasing availability of sub-place, ward-level, and local municipality data gives quite good indicators of service demand and *available* facilities, services and jobs per local area
- But this does not necessarily provide a good basis for assessing *accessible* services and other opportunities, some of which might just across the ward or municipal border



The solution (3): “Geo-linking”, concentration and accessibility mapping

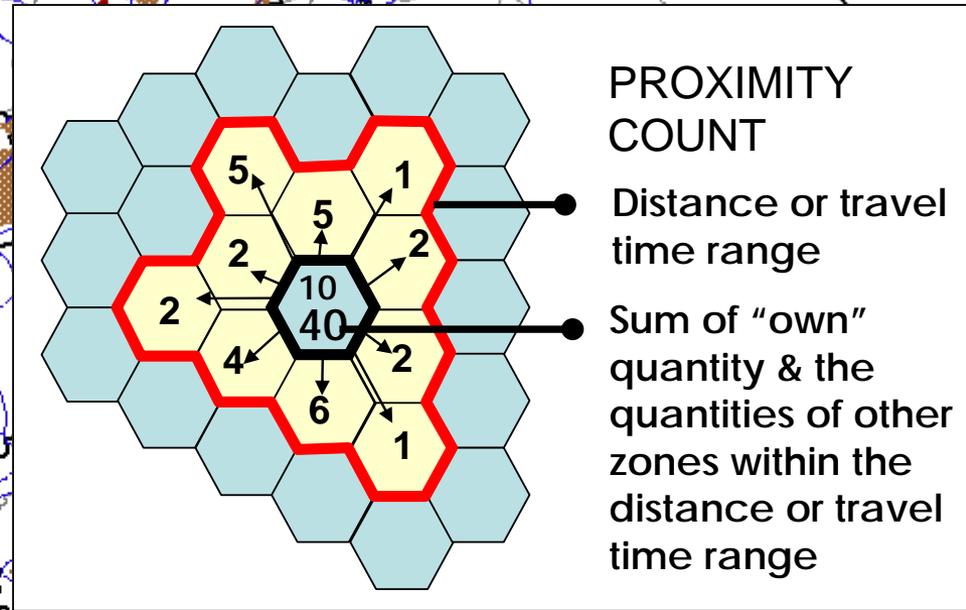
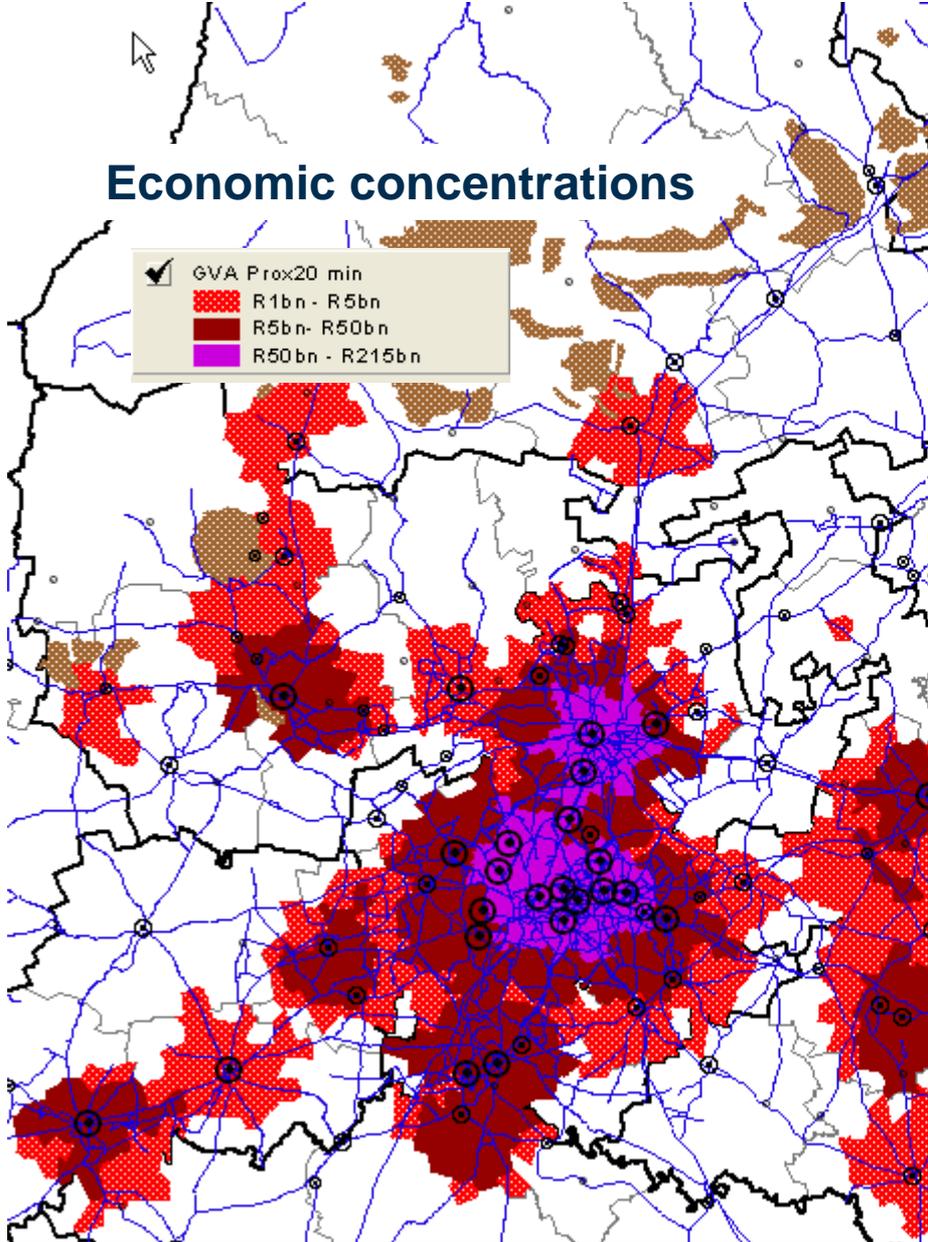
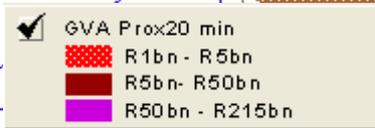
- Link each zone to the road network and to other zones in relevant wider regions
- Calculate quantities of economic & other human activities within specified distance or travel time ranges

Accessibility of employment
(numbers of jobs)
within a 20 min travel
distance range



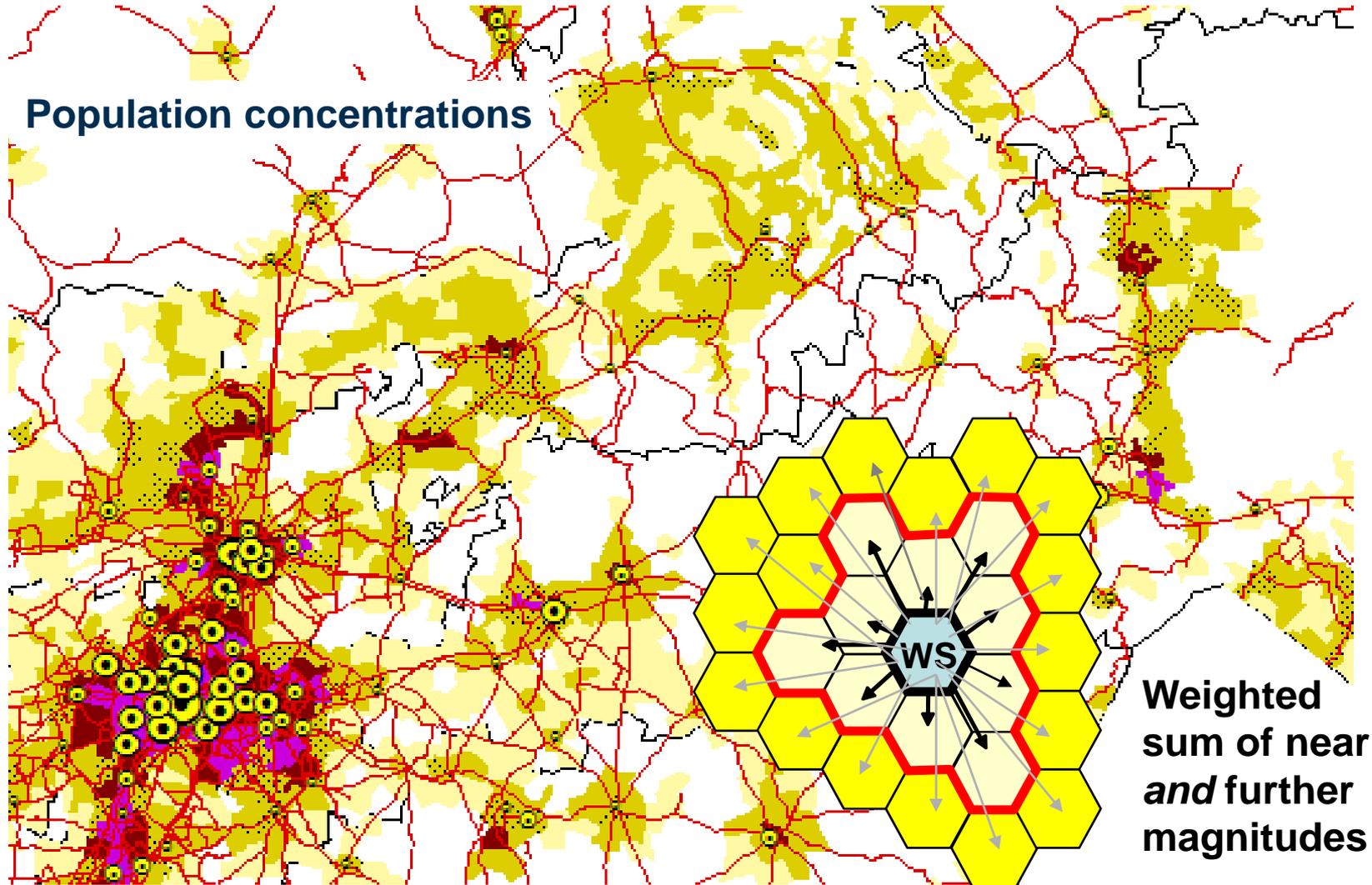
First calculation method

Economic concentrations

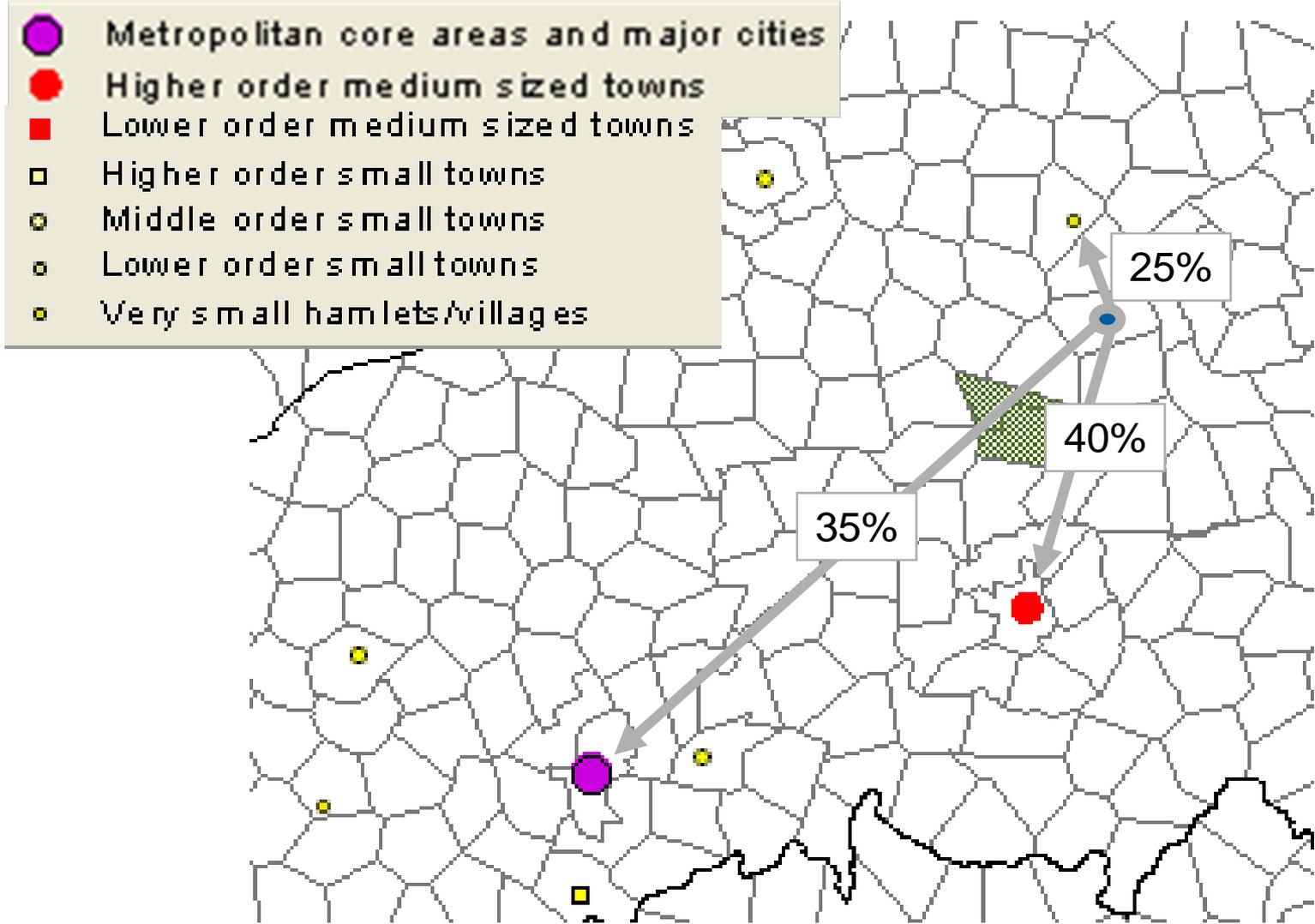


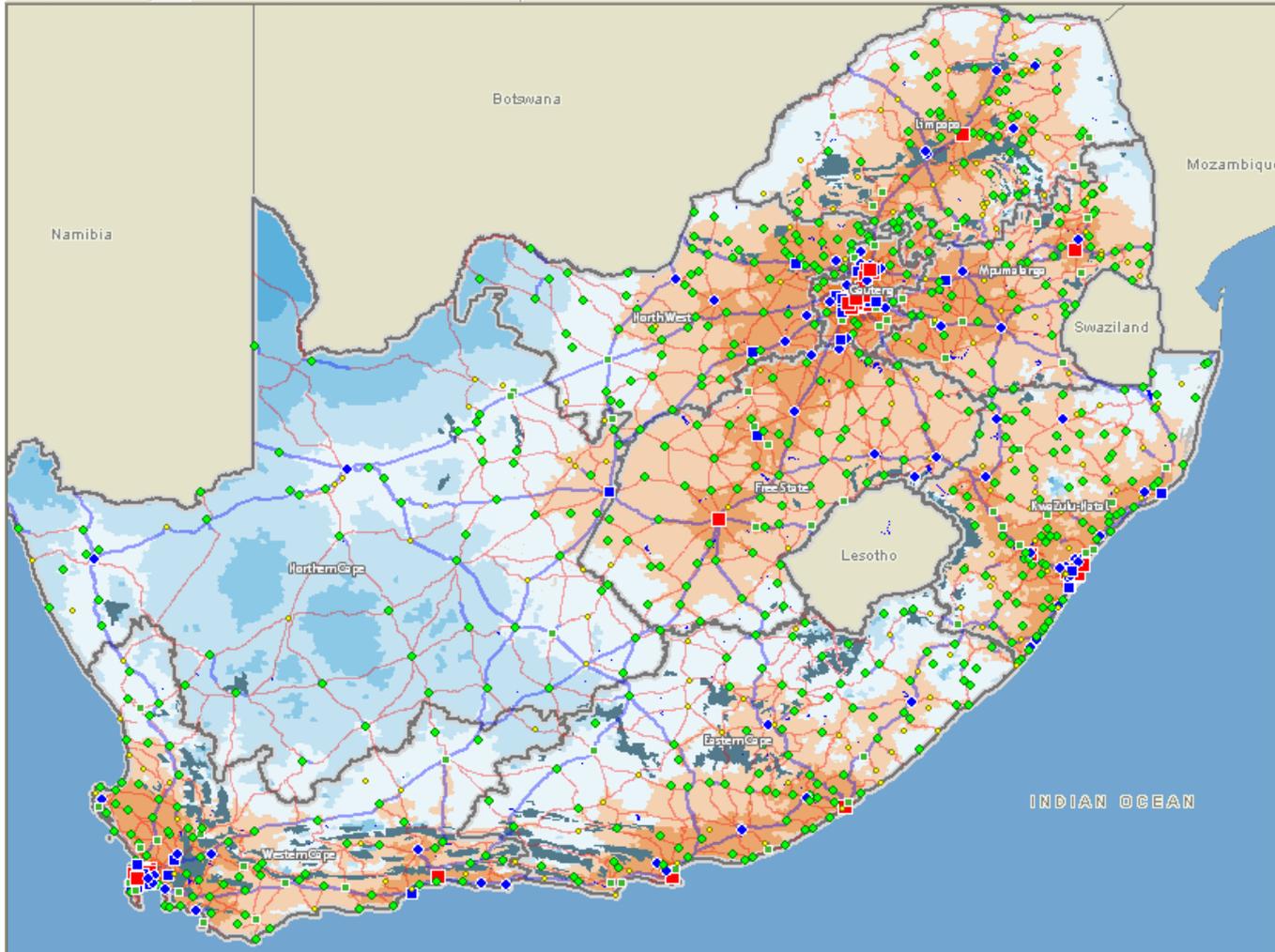
Proximity counts are sums or counts of local or "own" quantities (such as the total volume of local economic activity within a 4km radius or 50km² mesozone) and the quantities within surrounding zones or wider regions

Second calculation method



Third calculation method





Select map theme
 4.1 Town hierarchy and acces

- About GAP
- Map viewer
- User Guides
- GIS files and other data
- NSDP Spatial Profiles
- Map Descriptions

Town hierarchy and accessibility

Central Place Hierarchy

- Major towns and metropolitan nodes
- Higher order medium sized towns and equivalent metro nodes
- Lower order medium sized towns and equivalent metro nodes
- Higher order small towns and equivalent metro nodes

Ready Scale: 1:7740232 0 m. 127 km 255 km 382 km Latitude: 32°00'41"S Longitude: 31°12'29"E



Example of using different features of GAP

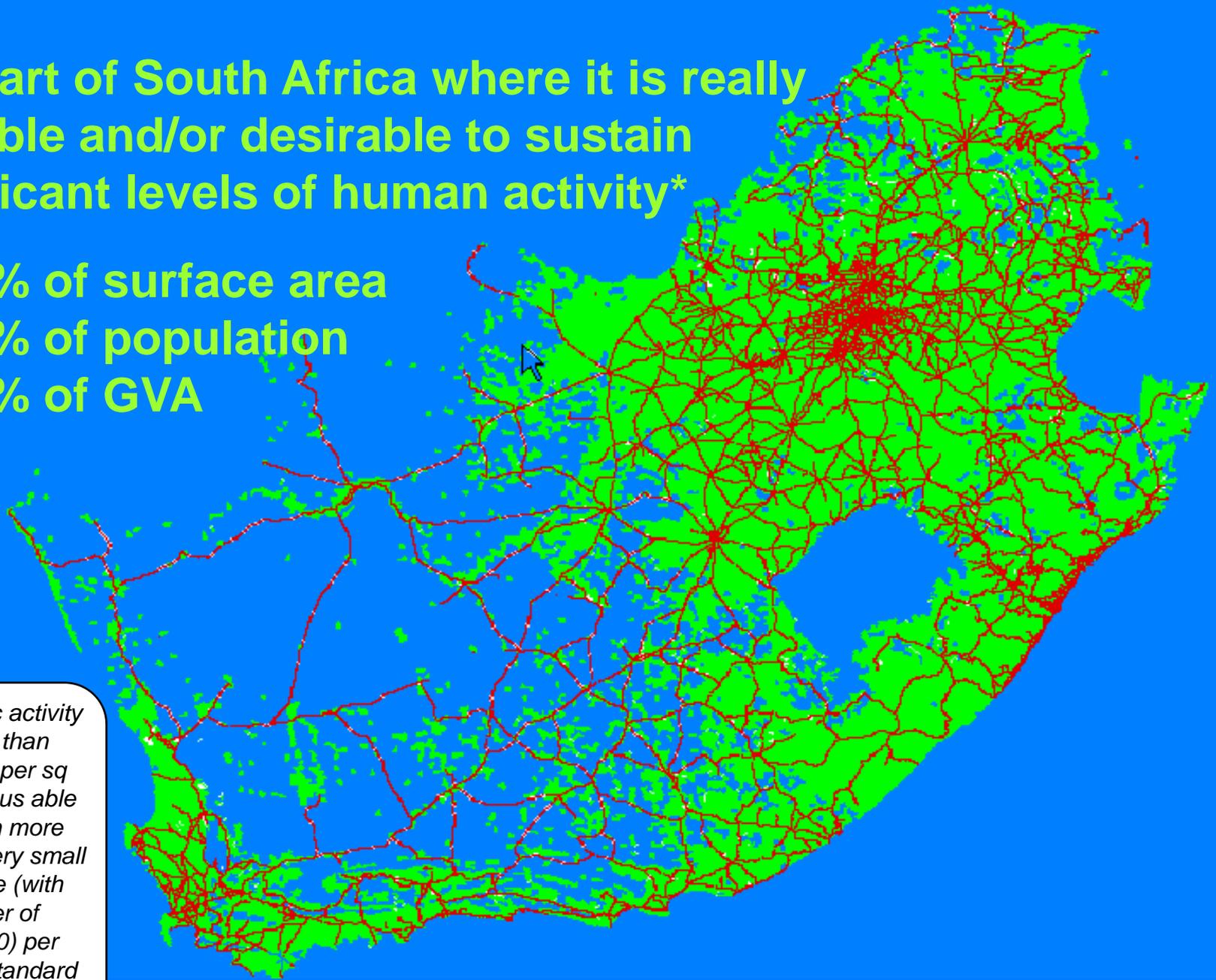
Combining “quantity mapping”
(maps of how much is where)
with “accessibility mapping”
(maps of what can be reached
from where)

The part of South Africa where it is really possible and/or desirable to sustain significant levels of human activity*

54.7% of surface area

99.2% of population

99.9% of GVA



* Economic activity of more than R 10 000 per sq km, and thus able to sustain more than one very small enterprise (with turnover of R500 000) per 50sq km standard local econ area

Percentage surface area, population and economic activity

"Populated" South Africa

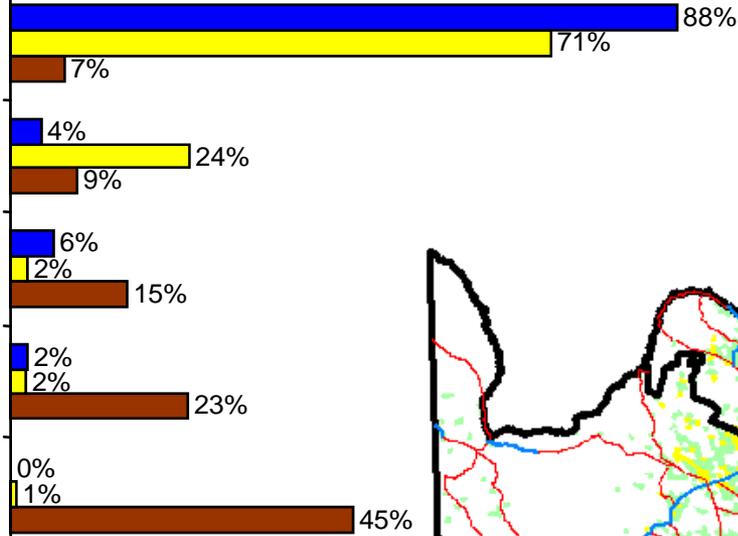
High density high accessibility

High density low accessibility

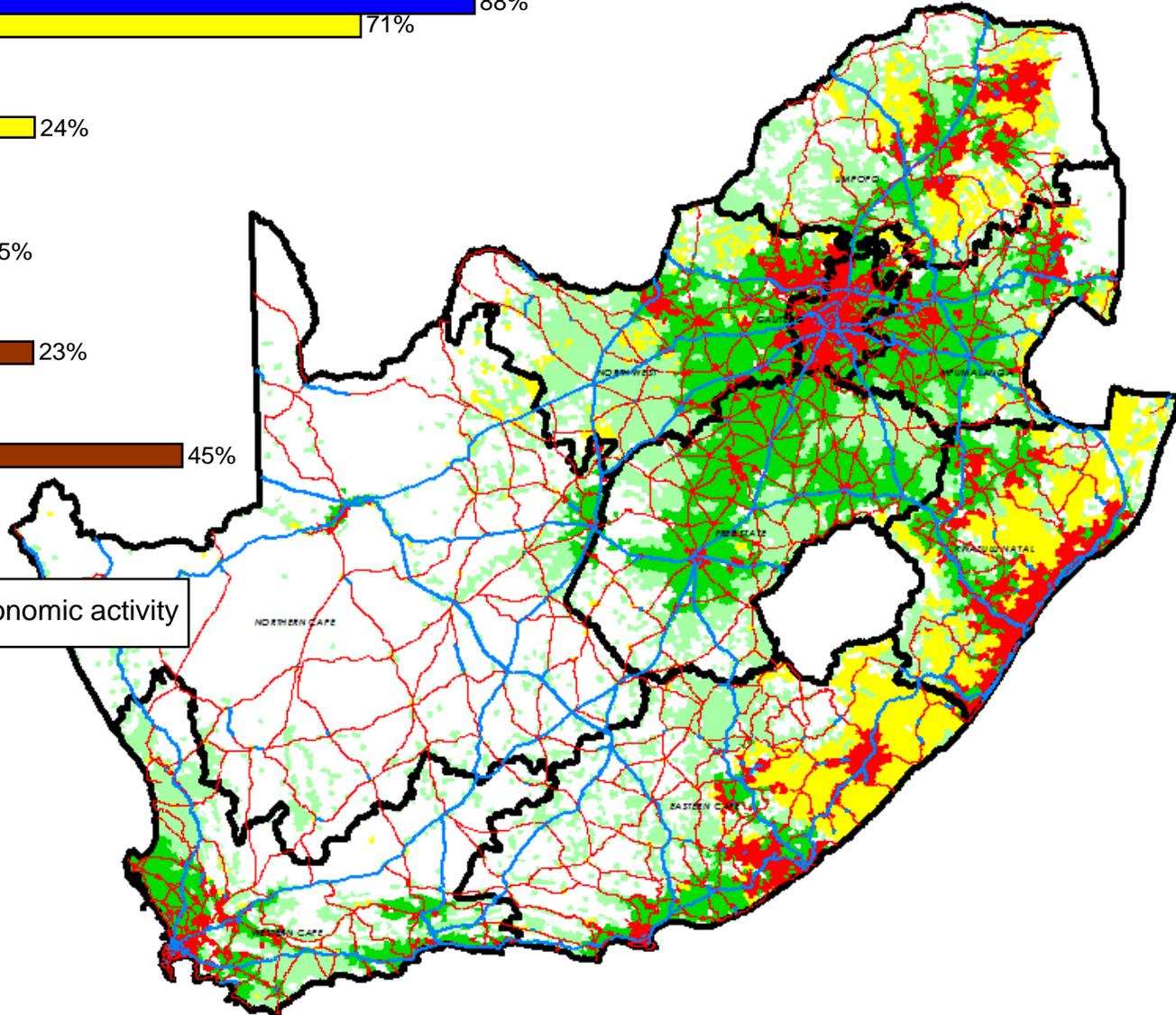
Low density high accessibility

Low density low accessibility

Sparse South Africa



Surface area Population Economic activity



Achievements thus far

- Solution for “Gordonia problem” & associated distortions of geo-statistical indicators & comparisons (of “how much is where ?”)
- Good utilisation of data-mining tools to address critical spatial data gaps
- High profile applications and good responses from clients and other stakeholders

Remaining/new challenges

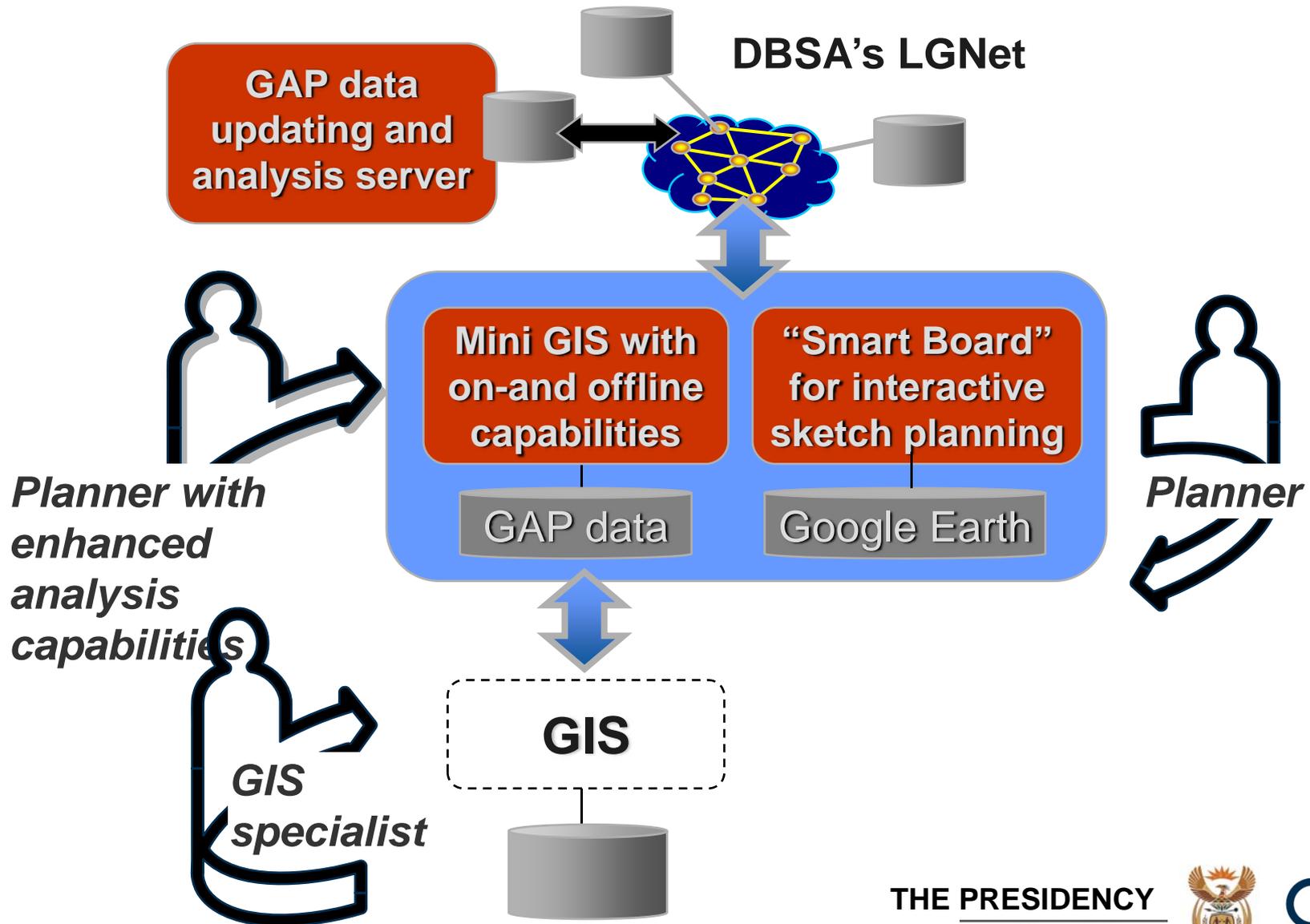
APPLICATIONS

- Demonstrate extended range of applications (from pattern analysis to interaction/ dynamics modelling)

DEPLOYMENT/ SUSTAINABILITY

- Get user feedback, pilot and develop Web-linked Version 3
- Explore wider applications in rest of Africa

Version 2 upgrade & new form of dissemination



Longer-term linkage & deployment plan

Geoportals &
Web mapping /
Geoprocessing
Services

2. GeolCT support services
*(focussed on spatially
intelligent rural collaboration
& service delivery)*

**3. Urban & regional
dynamics modelling**

Sensor-webs

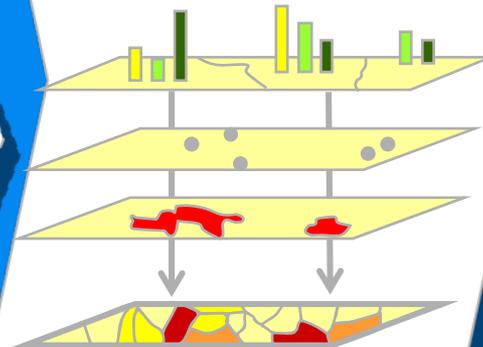
Remote sensing
& processing

Land cover

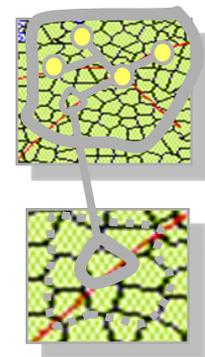
Land Use

1. Spatial Analysis/ Modelling infrastructure

1a. "Planning SDI",
& Geospatial
Analysis Platforms



1b. Multi-scale
geo-modelling
& spatial
decision
support



THE PRESIDENCY

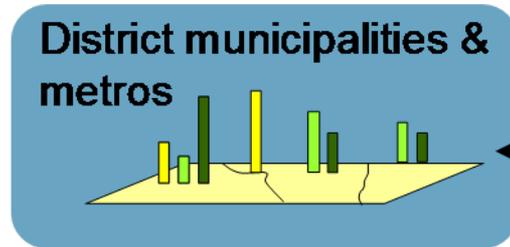
the dti



CSIR
our future through science

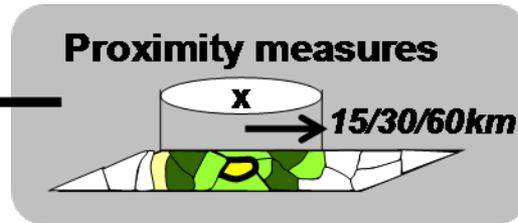
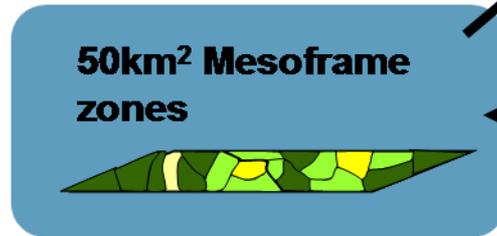
Basis for: 1) “upscaling” (from meso-level to a variety on macro-levels) & 2) analysis of spatial linkages

Analysis of macro-scale trends/ quantities



- Provinces
- Municipalities
- Water catchments & other ecosystem analysis areas

Analysis of spatial distribution & proximity



Geo-assembly & geo-computation

