



rural development
& land reform

Department:
Rural Development and Land Reform
REPUBLIC OF SOUTH AFRICA

stepSA

SPATIAL TEMPORAL EVIDENCE FOR PLANNING **SOUTH AFRICA**

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DRDLR LUMT Knowledge Sharing: Progress with Urban Simulation Component

24 November 2014

Objectives

- To investigate the notion that modelling future land use could assist DRDLR and the metros with the implementation of SPLUMA
- With limited budget for this component of the project, to achieve this by using UrbanSim in a metro where we are already involved in simulation work (NMBM)

Modelling land-use change

Land use is the end result of:

- Many policy, planning and administrative processes
- Individual decisions by land owners, developers, firms, households and others

Best modelled by discrete choice or agent based models like UrbanSim

NMBM Scenario planning

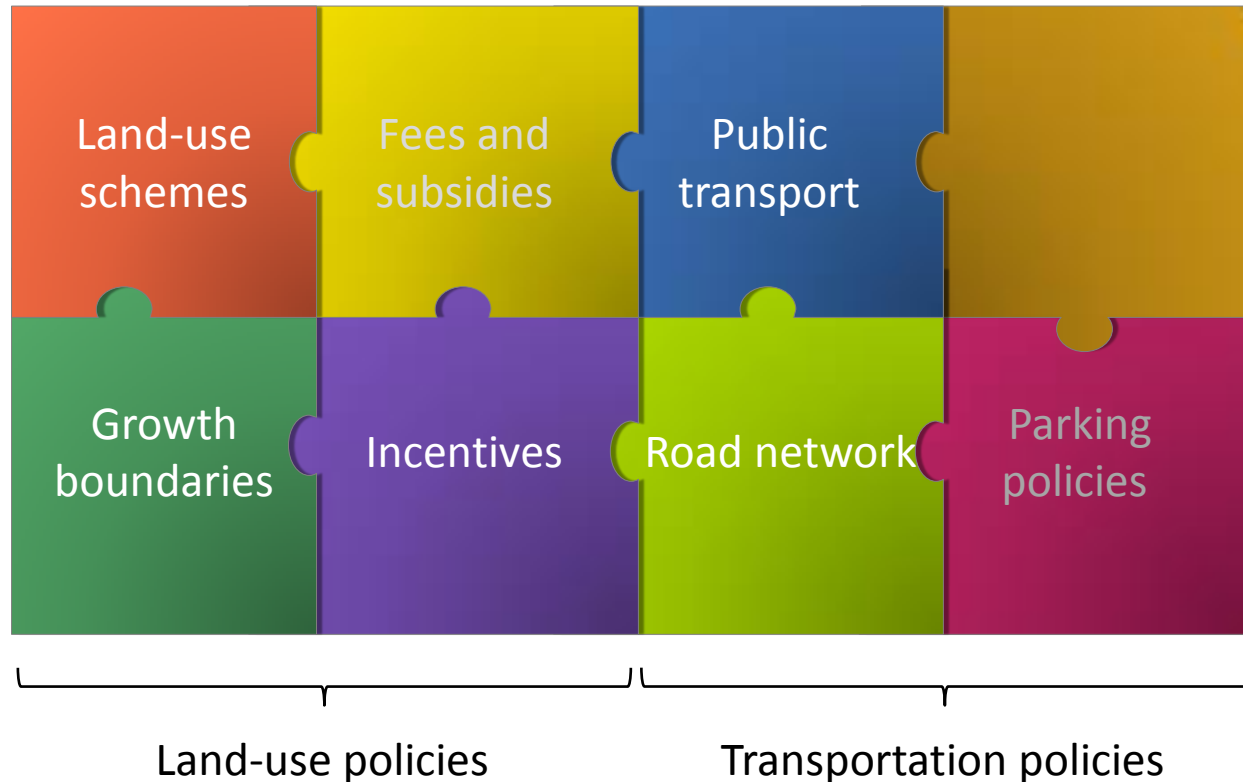
Strategic Development Review facilitated by CSP of NT (Aug 2014) developed the following scenarios:

2.1. Walking together for growth

By 2030, the metro is a dynamic, creative city of choice for residents and investors. Economic growth rates accelerate above the national average, supporting provincial and national economic growth. NMB is a highly competitive global leader in the automobile sector, using this to advantage to diversify its economic base through the active development of auto value chains, and targeted support to strategic sectors such as agro-processing, fisheries and light manufacturing. A growing SMME sector, supported by educational improvements, erodes unemployment and dependency ratios. Fixed direct investment by firms and households grows strongly from 2017, as the economic expands and space is required for production and residential accommodation.

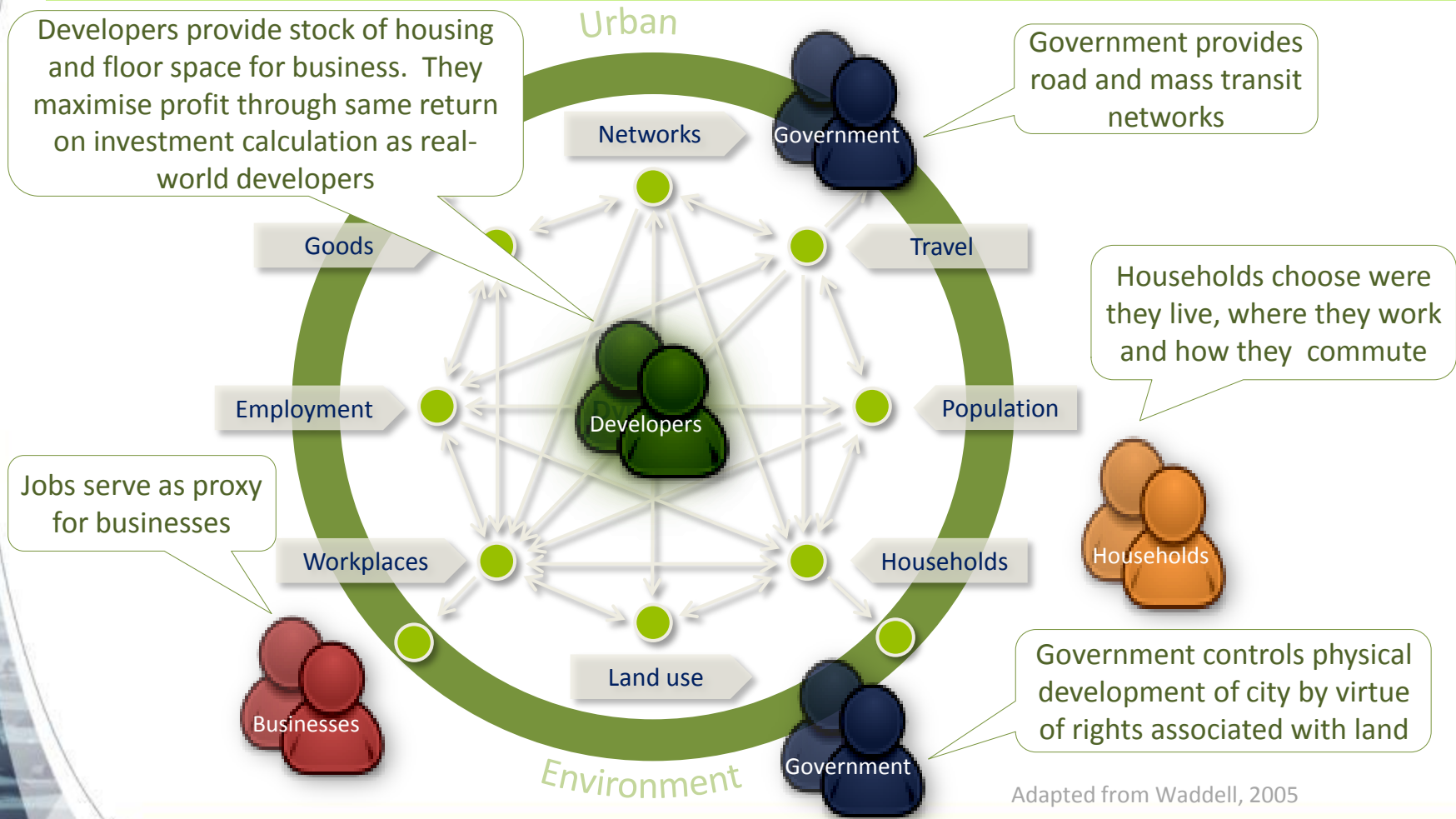
- Integration of spatial planning and sectors strategies
- Partnerships with stakeholders
- Improved administration

Policy alternatives



Source: Prof. P Waddell - *Case study of the First Sustainable Communities Strategy for San Francisco Bay*

What is modelled?





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Results of simulation runs:

Validation: 2001 to 2011

Scenario 1: Walking in circles (30 y)

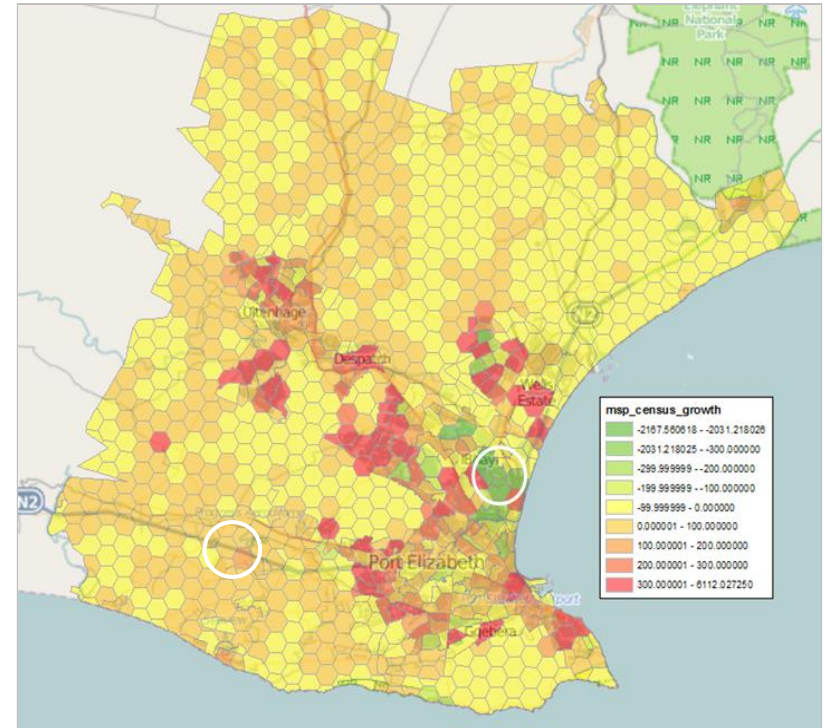
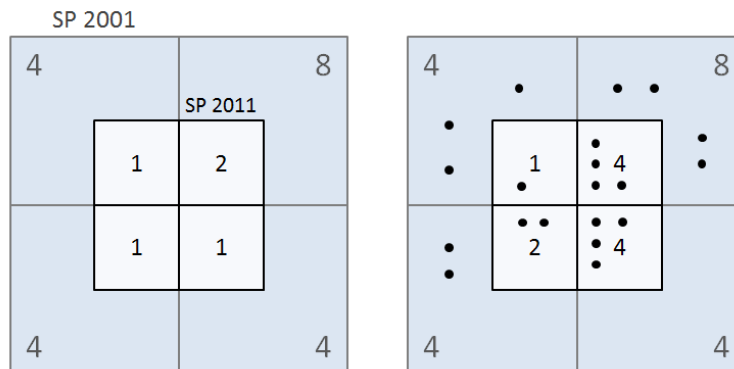
Scenario 2: Walking together for growth (30y)

Scenario 3: Walking together for growth – high growth

Spatial unit of analysis

‘Modified sub place’

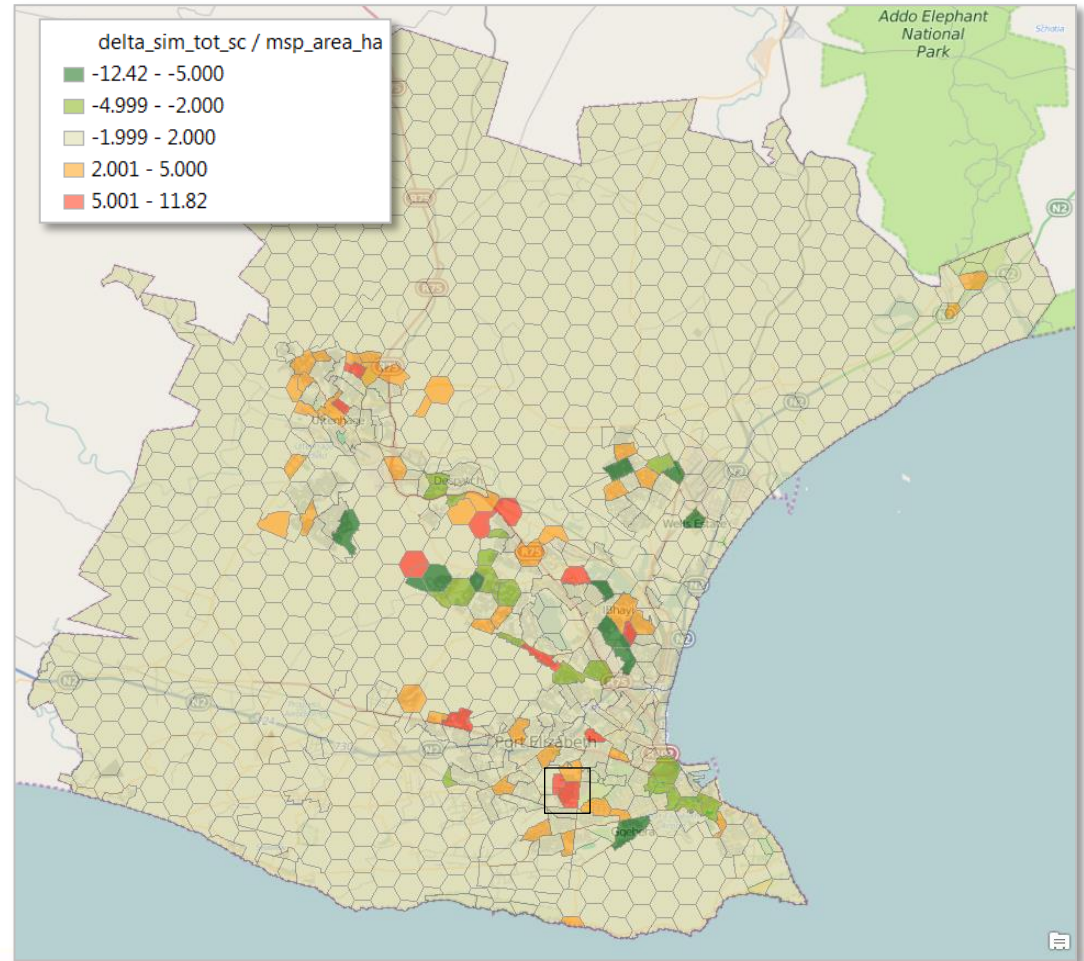
- Most sub-place and small-area boundaries changed 2001 – 2011
- Boundaries adjusted using GTI dwelling points 2002 - 2009
- Modifiable area unit problem



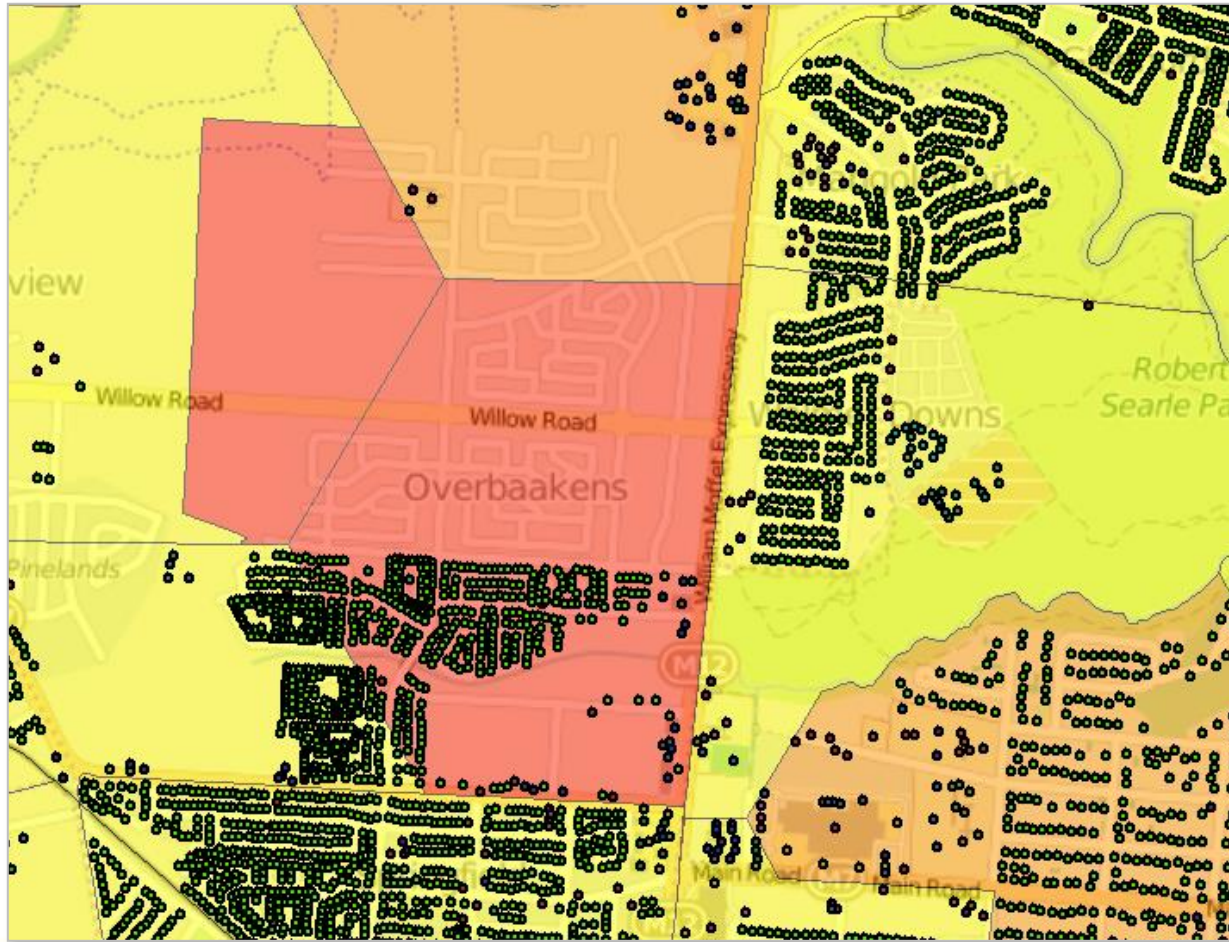
Validation

Simulated growth in total households between 2001 and 2011 compared with actual growth between censuses adjusted to modified sub place

Also done for backyard dwellings

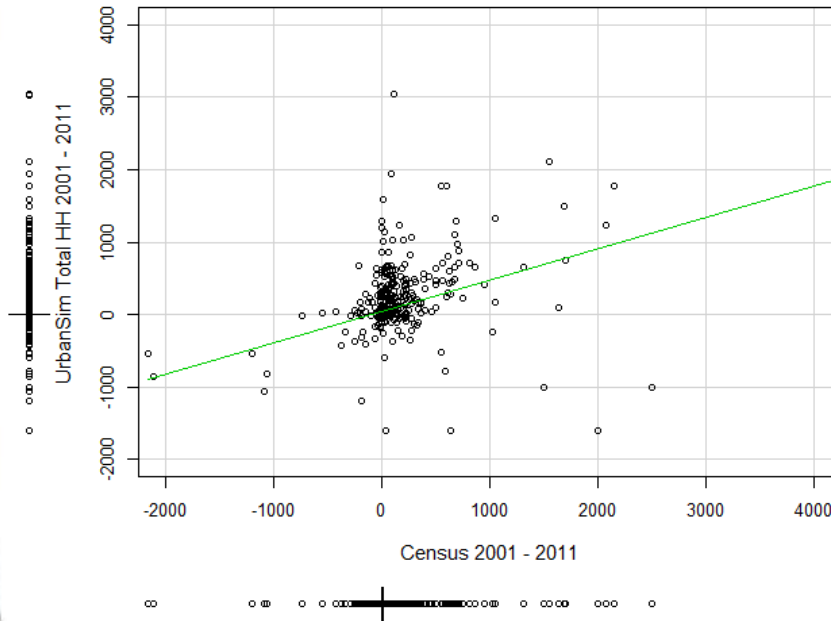


Validation ...

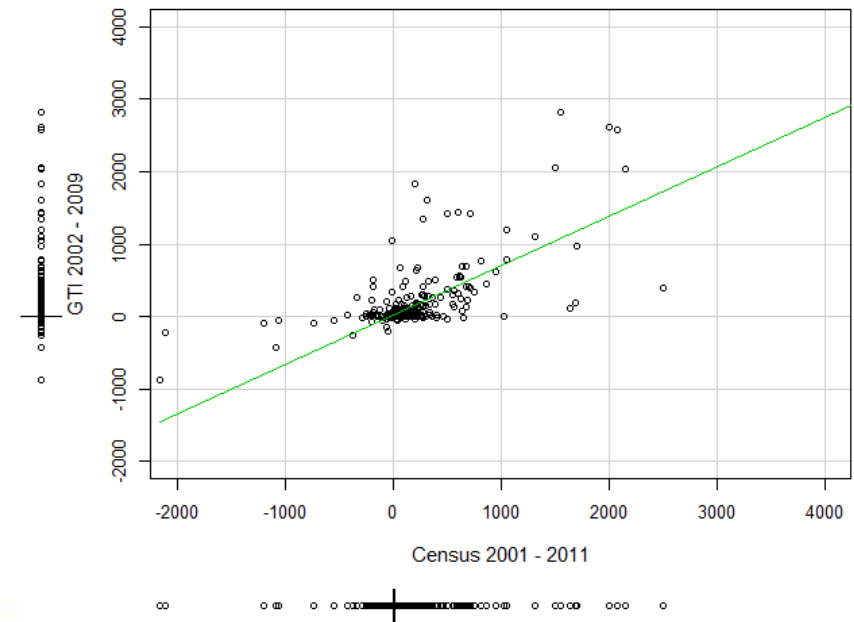


Validation ...

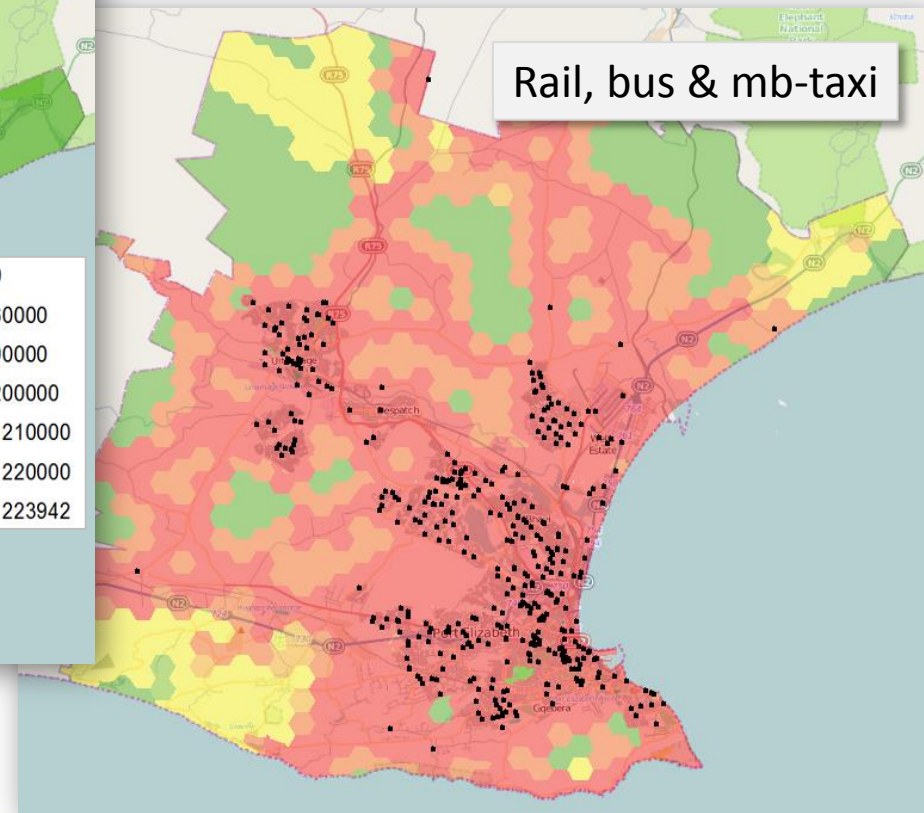
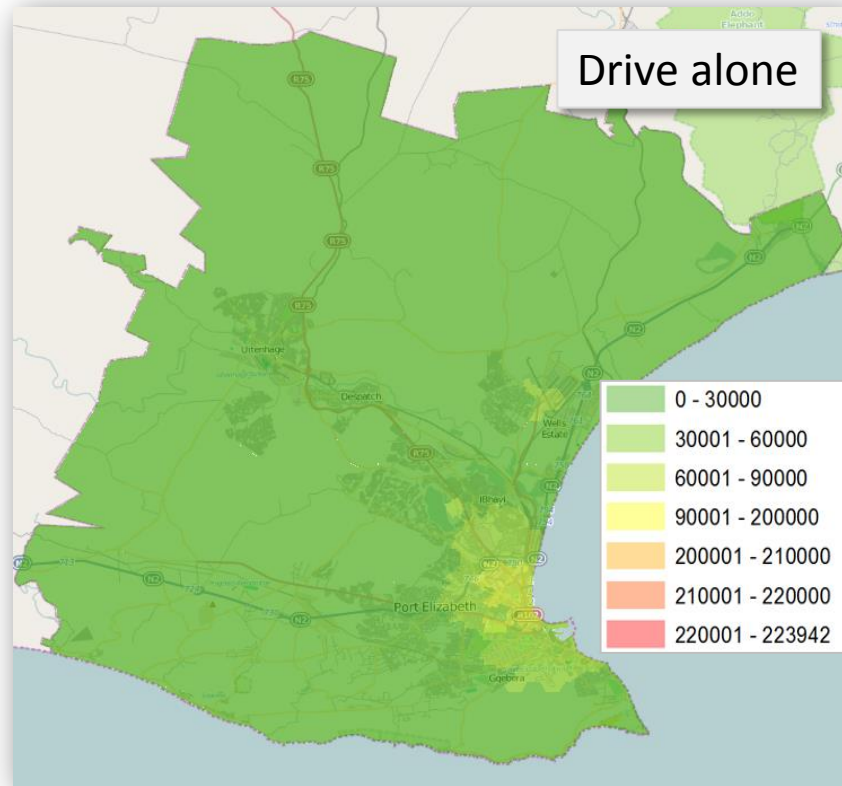
Growth in total households by modified sub place



Growth in households by modified sub place

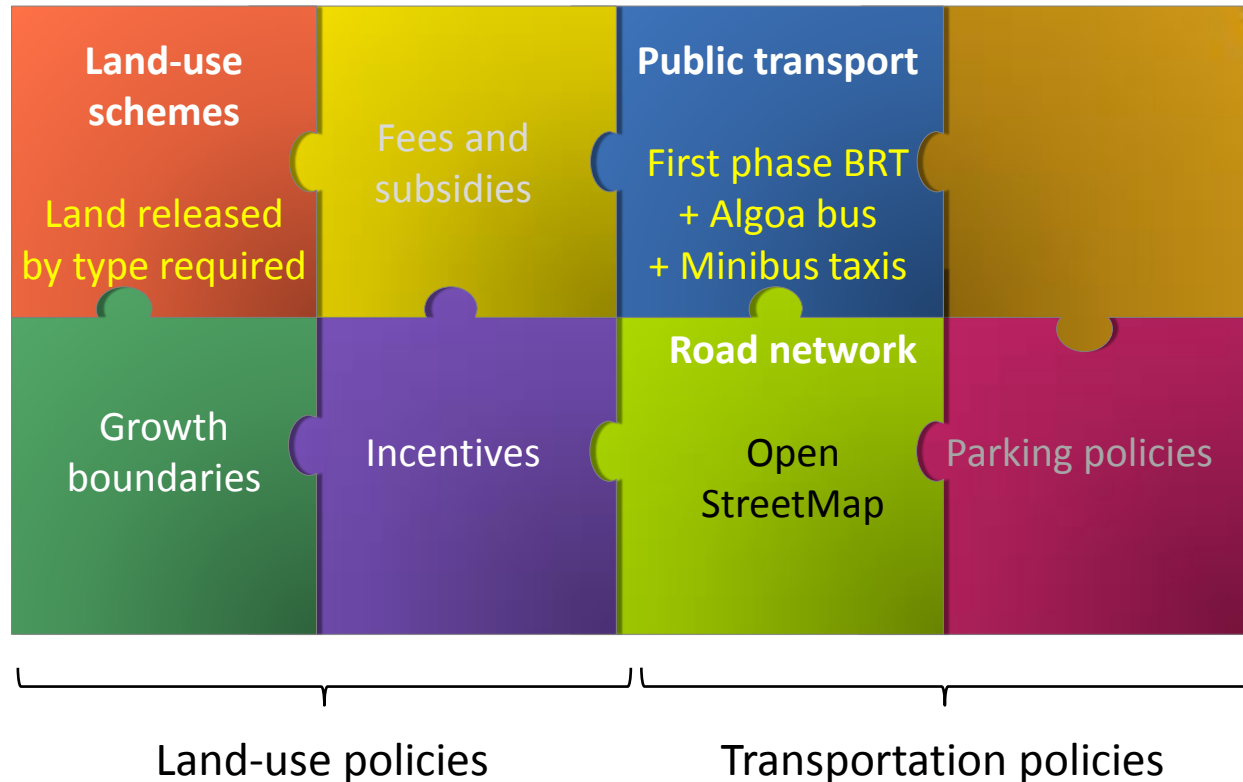


Influence of public transport



Number of jobs that can be reached for less than R40 per day

Scenario 1 - Walking in circles



Scenario 1 - Walking in circles

Simulated growth over 30y

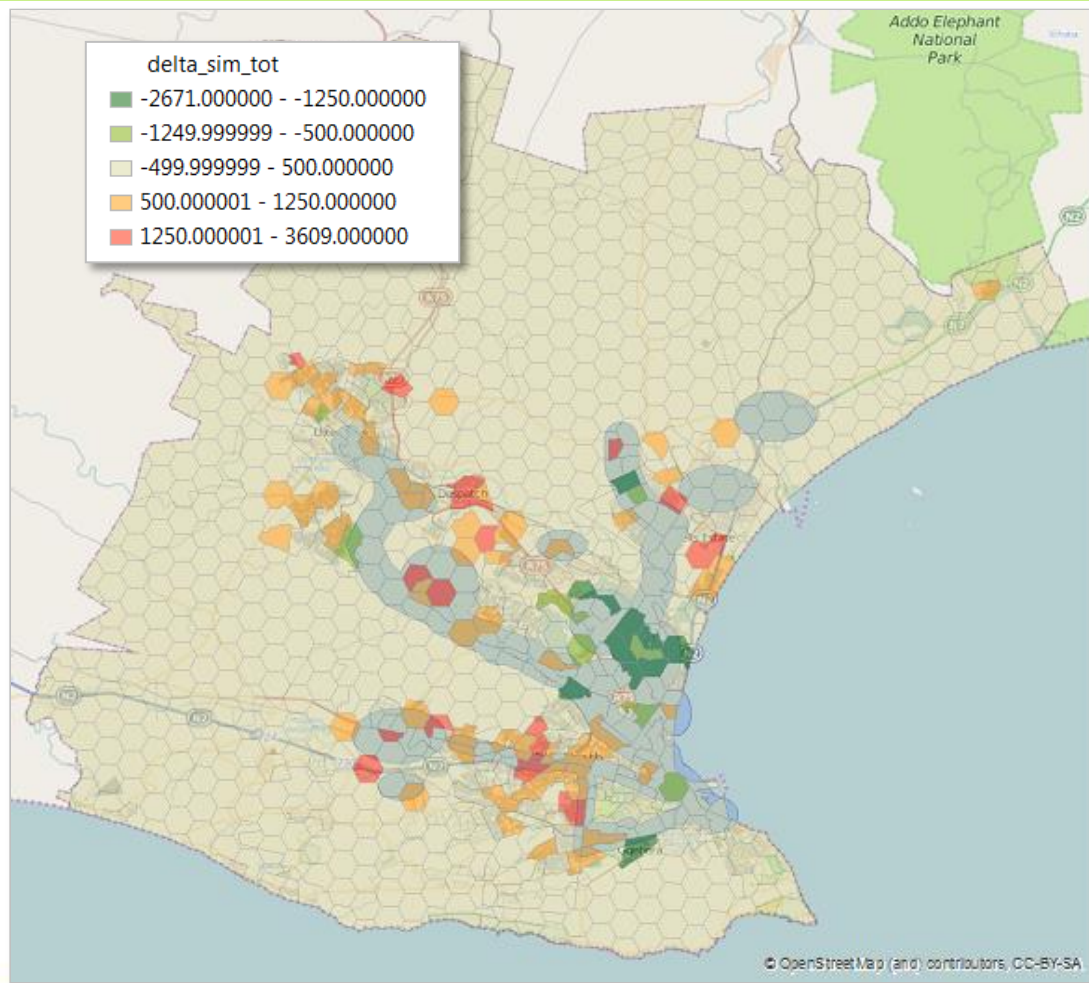
Land-use schemes:

Louis' interpretation

Public transport:

First phase of BRT, Algoa Bus and MB Taxis

Note: Correctly predicted area in decline evident in census 2001 -2011



Scenario 2 – Walking together

Simulated growth over 30y

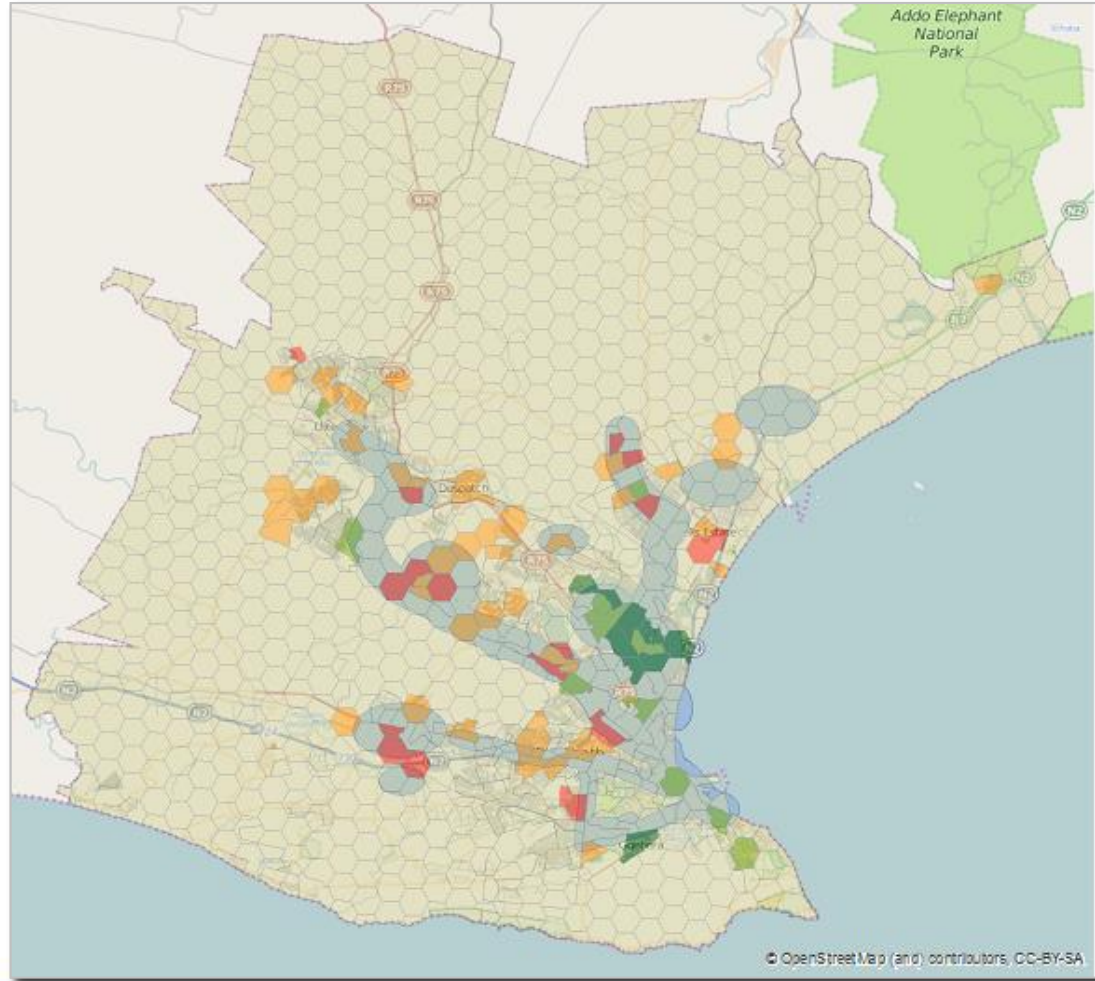
Land-use schemes:

Increase max allowed density in 'corridors' to 250 hu/ha

Public transport:

Full BRT implementation with feeders routes (MB Taxis)

Note: Increase in HH from 75 040 (23.1%) to 92 769 (28.6) in 'corridors' (kind definition) 15hu/ha



Scenario 3 - Walking together HG

Simulated growth over 30y

Land-use schemes:

Same as Scenario 2

Factory Uitenhage

Public transport:

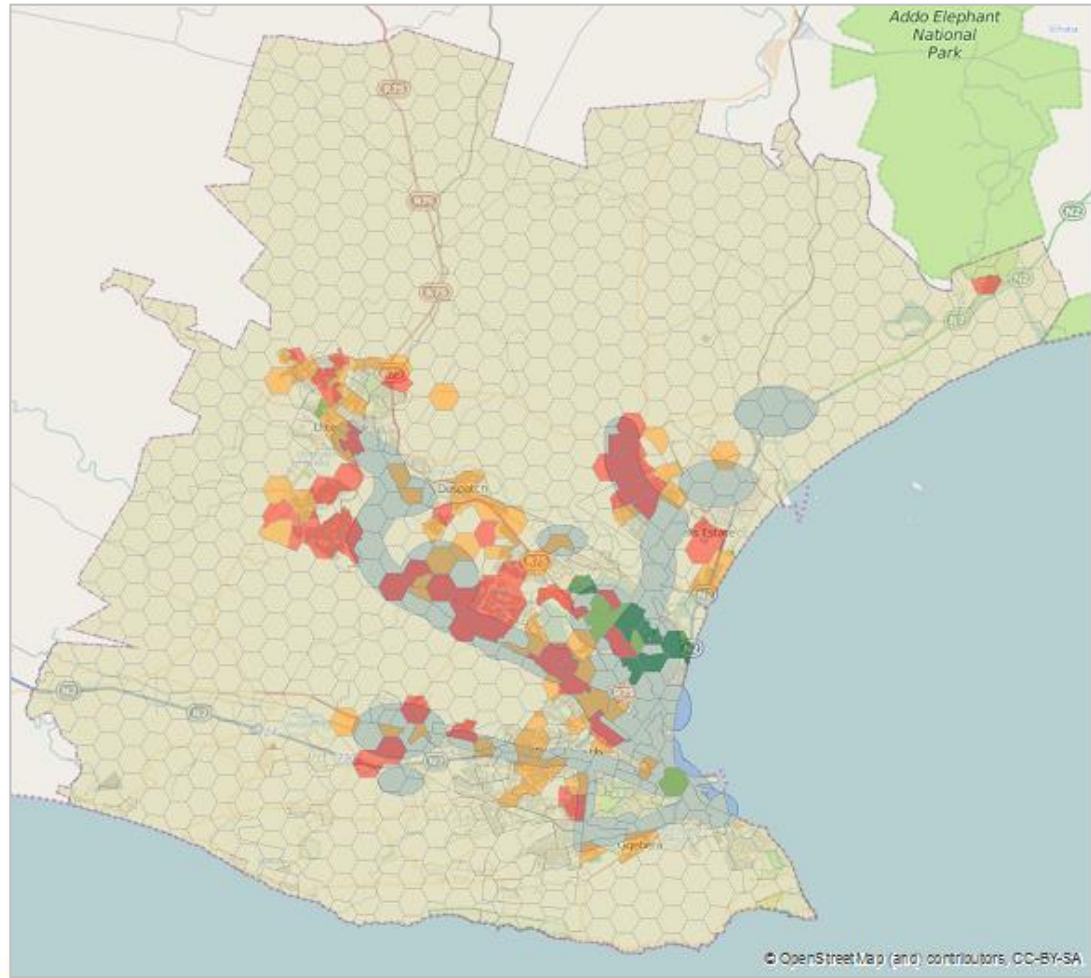
Same as Scenario 2

Population & employment:

HH: IHSGI + 20%

Jobs: IHSGI + 40% (50% in manufacturing)

Note: Increase in density not limited to Uitenhage



Initial reflection on value

- Process helped to consolidate confidence in improved model integrated with Open Trip Planner (DST funded)
- New perspectives on public transport
- The battle to release correct mix of land illustrated that one has almost no change of arriving at appropriate land-use schemes without a spatial modelling tool

Initial reflection on viability as part of LUM tool set

- Challenge to have tool available in all metros being addressed by DST funding to switch from parcel to zone geometry (STATSSA small areas)