Advances in geospatial analysis platforms and tools:

Creating space for differentiated policy and investment responses

Presenter: Johan Maritz

Researchers: Alize Le Roux, Elsona van Huyssteen, Johan Maritz, Maria Coetzee, Gerbrand Mans, Helga Goss

CSIR, Built Environment, Planning Support Systems

1 Sept 2010
CSIR Conference Centre
Introduction

• The importance of **spatial dimension** in planning objectives

• Understanding of **complex spatial relationships**

• S.A policy focused on need for **aligned collaborative & coordinated targeted investment**

• Need for tools, methods & procedures to support collaborative, coordinated and integrated planning and decision-making

• Geo-information(GI) science and analysis to support planning analyses tasks and related decision making processes
Outline of presentation

1. SA planning context and challenges – need for enhanced understanding of the complex spatial dynamics of social, economic and environmental patterns within SA

2. Typical geo-science challenges

3. Targeted responses and collaborative innovations

4. Value and contribution – to support policy development, strategic planning and investment
Outline of presentation

1. SA planning context and challenges – need for enhanced understanding of the complex spatial dynamics of social, economic and environmental patterns within SA

2. Typical geo-science challenges

3. Targeted responses and collaborative innovations

4. Value and contribution – to support policy development, strategic planning and investment
1. SA planning context and challenges

- Related to key government (MTSF) priorities
- Typical fields in which this work is situated
  - Service delivery and improved quality of life
  - Viable and resilient development in rural areas
  - Sustained economic growth and regional development
  - Challenges of rapid urbanisation and unprecedented urban growth
  - Improved governance – 3 spheres alignment
Questions often asked / challenges raised when addressing development and policy priorities:

- Where are settlements growing, where are service delivery backlogs increasing? Where will this happen in space?
- What is the accessibility of various settlements to socio-economic opportunities and services?
- How can governance and investment responses be coordinated in time and in space between three spheres, multiple departments, agencies of government?
1. SA planning context and challenges …

- Need for enhanced understanding of complex dynamics of social, economic and environmental spatial patterns within South Africa:
  - Current magnitudes, past trends and future implications
  - To access and ‘making sense’ in data scarce environments and capacity constrained contexts
  - To enable *temporal analysis* (given change in admin boundaries), cross border regional analysis, and cross-sector analysis
Outline of presentation

1. SA planning context and challenges – need for enhanced understanding of the complex spatial dynamics of social, economic and environmental patterns within SA

2. Typical geo-science challenges

3. Targeted responses and collaborative innovations

4. Value and contribution – to support policy development, strategic planning and investment
2. Geo-science challenges

- To enable more rigorous and spatially nuanced socio-economic data analysis to answer questions such as:
  - What is where? How much is where? How do these relate?
  - Spatial data availability and analysis on areas that are not bound by administrative areas - analysis across data sectors, scales, time and boundaries
- Ability to access and process large amounts of data and information for integrated planning purposes
- Easy communication, access to- and display of spatial data (visualisation) to answer specific policy questions
- Simulations of future trends
2. Geo-science challenges (…continued)

Example 1: Need to compare varying types of spatial data

Absence of common analysis zones and databases – e.g. for comparing economic and other territorial statistics

Mphumulanga’s *economic* statistics (per Magisterial District, 2001)

Mphumulanga’s *ecosystem* statistics (per water catchment)
Example 2: Need for spatial data availability for IDPs

Data and analysis gaps leading to more serious gaps downstream...
Outline of presentation

1. SA planning context and challenges – need for enhanced understanding of the complex spatial dynamics of social, economic and environmental patterns within SA

2. Typical geo-science challenges

3. Targeted responses and collaborative innovations

4. Value and contribution – to support policy development, strategic planning and investment
3. Targeted responses and collaborative innovations

- Geospatial Analysis Platform (GAP)
  - A demarcation of South Africa into more than 25 000 “mesozones” of approximately 50 km² in size (about 7 x 7 km), nested within important administrative and physiographic boundaries.

- Analysis tools & aggregate data
  - Integration of:
    1. Aggregate area statistics,
    2. Point data (e.g. facilities per town)
    3. Land cover data (from satellite imagery)
3. Targeted responses and collaborative innovations (…continued)

- GAP Example 1: Population density
3. Targeted responses and collaborative innovations (...continued)

• GAP Example 2: Regional economic context

- Role of area in broader functional region,
- relative size / importance of e.g. economic activity and poverty in relation to country as a whole,
- opportunities and threats in nearby and further away localities

Example: see the size of Gauteng’s economy versus (1) the Witbank area and (2) smaller nodes in rural areas to the east.
3. Targeted responses and collaborative innovations (…continued)

- Spatial Relational Analysis
3. Targeted responses and collaborative innovations (...continued)

- Simulation and modeling
3. Targeted responses and collaborative innovations (…continued)

- Web portals
- Web-based portals that provide:
  - Interactive maps
  - Tables
  - Databases
  - Frameworks
3. Targeted responses and collaborative innovations (…continued)

- Planning support systems

![Diagram showing various factors and their combinations leading to increased complexity]
Outline of presentation

1. SA planning context and challenges – need for enhanced understanding of the complex spatial dynamics of social, economic and environmental patterns within SA

2. Typical geo-science challenges

3. Targeted responses and collaborative innovations

4. Value and contribution – to support policy development, strategic planning and investment
4. Value and contribution

Example 1: National Spatial Development Perspective

- Developed with The Presidency
- Need: Inform strategic plans, guide infrastructure investment decisions (Areas of national economic significance and concentrations of people living in poverty)
- Innovation: Use geospatial platform & spatial relational analysis, aggregated data
- Value: Strategic planning guidance for national, provincial, local spheres. Rolled out to all 9 provinces, all district and metro municipalities
4. Value and contribution

Example 2: Policy question: Former Bantustan areas

- Developed on request of The Presidency (2009)
- Need: To determine the progress in quality of life of former Bantustan areas, compare development indicators
- Innovation: GAP, aggregated data, spatial relational analysis to compare data over time, in spite of no data capturing on former borders since 1994
- Value: Address policy question re. Comparative development between the former Bantustan areas and the rest of SA
4. Value and contribution

Example 3: Toolkit for Integrated Planning (TIP)

- Developed collaboratively with DST, HSRC & municipalities
- Need: Support IDPs & SDFs & sector plan development
  Access to all local and district municipalities in country
- Innovation: Spatial planning information web/portal
- Value: Address spatial planning data and analysis gap
  Capacity building
4. Value and contribution

Example 4: LEDET geo-spatial medium client

- Developed for Limpopo Economic Development and Tourism (LEDET)
- Need: Ability to view multiple data dimensions
- Innovation: Medium client integrating background mapping with live layers that can be compared, can initiate remote (server) processing for inclusion to data parcel
- Value: Serves as a delivery mechanism (where no GIS tools are available)
Conclusion

• Proven need for evidence-based planning
• Significant progress made in geo-science innovations over last few years, within CSIR and within domain
• Highly data intensive, thus urgent need for better data management, sharing and access by all stakeholders
• Importance of collaborative innovations, that require innovative solutions and has specific value
• Geo-science innovations (spatial data, analysis planning support systems) not the only answer but can contribute significantly
• Advances in geo-science can create ‘space’ for differentiated policy and investment responses
Thank you

For more information:

www.csir.co.za/Built_environment/Planning_support_systems