

Achieving focused infrastructure investment in South Africa: Technical advances in provincial spatial planning

C MEIKLEJOHN, H GOSS, J WHISKEN
CSIR Built Environment, PO Box 395, Pretoria, 0001
Email: cmeicklej@csir.co.za

Abstract

This paper presents the CSIR's contribution to technical advances in the approach to provincial spatial planning in South Africa. It demonstrates the CSIR's involvement in conducting the national Provincial Growth and Development Strategy Assessment for The Presidency, and in making a contribution towards addressing some of the weaknesses of provincial-level spatial planning identified in this assessment. The specific focus is on specialist services (spatial analysis and policy advice) undertaken by CSIR Built Environment's planning support systems group for Gauteng and Mpumalanga provinces. This involved sharpening and refining spatial planning by i) applying a national spatial analysis frame developed by the CSIR, ii) implementing a normative, principle-led approach to spatial planning by quantifying spatial dimensions of poverty and economic activity, iii) quantifying flows and linkages within and between provinces, and iv) providing recommendations for spatially focused and differentiated investment responses.

1 Introduction

Provincial Growth and Development Strategies and Provincial Spatial Development Frameworks are key elements of the intergovernmental planning system in South Africa, designed to foster coordinated and focused infrastructure investment and improved service delivery within the country.

This paper draws attention to the weaknesses in provincial spatial planning approaches identified in the national assessment process of Provincial Growth and Development Strategies conducted by the CSIR for The Presidency. It sets these findings in the context of international challenges in the contribution of spatial planning to spatially focused infrastructure investment. It then points to examples within the Gauteng Spatial Development Perspective and the Mpumalanga Integrated Spatial Framework and Provincial Growth and Development Strategy (completed by CSIR, Built

Environment teams) where specialist spatial analysis tools, approaches and techniques, as well as policy recommendations, were targeted at addressing some of the weaknesses of provincial-level spatial planning identified in the abovementioned assessment.

2 Background: Spatial planning to enable focused infrastructure investment

2.1 International challenges

Over the past number of years there has been a renewed interest internationally in the role of spatial planning to achieve to goals of government and society. The main thrusts encapsulated in this renewal are captured by Healy (2004: 45) in referring to the reasons for the resurgence of interest in spatial planning in Europe, one of which is "the persistent problem of coordinating public policy in specific localities". This "long standing quest for better coordination" (horizontal and vertical) is also referred to by various other authors internationally (in Albrechts, 2006: 1149).

The relationship between strategic spatial planning and investment decisions is captured in the way Healy (2004:46) defines strategic spatial planning:

"My understanding of 'strategic spatial planning' refers to self-conscious collective efforts to re-imagine a city, urban region or wider territory and to translate the result into priorities for area investment, conservation measures, strategic infrastructure investments and principles of land use regulation... The term 'spatial' brings into focus the 'where of things', whether static or in movement; the protection of special 'places' or sites; the interrelationships between different activities and networks in an area; and significant intersections and nodes within an area which are physically co-located.... 'Planning' (or 'development') also highlights a developmental movement from past to future. It implies that it is possible to decide between appropriate actions now in terms of their potential impact in shaping socio-spatial relations. This future

imagination ... is expected to be able to project a transgenerational temporal scale, especially in relation to infrastructure investment, environmental management and quality of life."

The challenge of spatially focusing and coordinating infrastructure investment is compounded by disjunctures between spatial and infrastructure planning, or the spatial component of sectoral infrastructure plans, as is both stated in international literature and is becoming apparent from international case studies. On the side of spatial planning, the trend is for conceptual, non-quantified guidance to be given to infrastructure investment by strategic spatial plans at all scales (national, sub-national and city region). This is true for a number of leading examples of spatial planning internationally – e.g. the Netherlands Spatial Strategy (2004), the East Queensland Regional Plan (2005-2026) and the Toronto Plan (2002) (as described by Goss, 2008). Similarly, the level and detail of spatial referencing in strategic infrastructure planning instruments is often not sufficient for alignment with spatial planning/spatially focused investment decisions, as for example illustrated in a case study by Harris and Hooper (2004) conducted in Wales.

Weaknesses in spatial analysis and planning are not the only causes of unfocussed and uncoordinated infrastructure investment – other challenges include capacity challenges, political processes/power of actors, financing and statutory systems, and governance mechanisms (as in Mattingly & Winarso, 2000; Romein et al, 2003, UK MCGL, 2007 & Fedderke et al, 2006). However, from international literature on the subject, two important issues could be distilled: firstly, strategic spatial planning at different scales can give guidance to and act as a coordinating/integrating concept with respect to infrastructure planning and investment; secondly, there is a need for strategic infrastructure planning that is spatially referenced to the extent of being able to inform strategic spatial planning (Goss, 2008).

2.2 Weaknesses in SA provincial spatial planning

The first round of national Provincial Growth and Development Strategy (PGDS) assessment took place in mid-2005. It was seen by Cabinet to be part of the work to strengthen the performance of the state by realising the alignment of the National Spatial Development Perspective (NSDP), PGDSs

and Integrated Development Plans as outlined in Government's Programme of Action.

The initial assessment of PGDSs revealed a general weakness in spatial analysis. The strategies proposed in the PGDSs were generally not spatially-referenced, nor were they aligned with the national. This mitigated against the envisaged role of PGDSs in supporting focused infrastructure investment in agreed upon geographic priority areas of economic potential.

A particular weakness highlighted in PGDS Assessment 2005 was "*lack of consideration of a broader regional and global perspective of spatial drivers, patterns and trends and linkages impacting on the provincial space economy and on social and environmental dynamics within provinces*" (Presidency, 2007: 12). A potent example is that of migration dynamics. All PGDSs could have been significantly strengthened by portraying a better understanding of movement patterns (temporary, cyclical, stepwise and permanent) within provinces and across regions.

The assessment of the **Gauteng Growth and Development Strategy (GGDS) (April 2005)** highlighted a disjuncture between the analysis and the choice of strategies and targets in the GGDS. It was argued that it did not sufficiently build in the national and continental significance of the province and highlight how it impacts on, and is impacted on by, dynamics outside of the province. The deeper poverty, economic, environmental and inequality/social exclusion issues were not sufficiently addressed. The lack of clear spatial analysis as a basis for the provincial strategy was noticeable in the GGDS. The Gauteng Spatial Development Perspective (discussed below) explicitly set out to provide the basis for agreement around a spatial framework which incorporates the NSDP approach and principles and provides a stronger basis for spatial strategies in a reviewed GGDS.

The **Mpumalanga PGDS (Feb 2005)** assessment found that there was a lack of systematic understanding of the status, potential and constraints impacting on growth and development of the various geo-political spaces in the province. It lacked a coherent analysis of areas of potential and need within the province, and did not convey a clear sense of Mpumalanga's role in, and relationships with, the national space economy (how trends and

issues outside the province's borders impact on its growth and development). Trend analysis was absent, with no indication being given of how areas of potential and need may evolve over time or what the long-term effect of external forces may be.

In this national assessment of all PGDSs, particular challenges were highlighted in the **Provincial Spatial Development Frameworks** (Presidency, 2006b), around:

- i) Getting current data and information at the right time, scale and format to facilitate analysis across the entire province. Sufficient grain of detail in provincial scale data and analysis is crucial for decision-making around infrastructure investment. Particular difficulties occur in getting data that reflect trends over time and relationships between factors/regions/ sectors. This results in the lack of temporal analysis and makes exploring future scenarios almost impossible.
- ii) Conducting analysis of development need (poverty) and economic potential in line with the NSDP approach.
- iii) Dealing with broader (cross-boundary) spatial contexts and dynamics which have a bearing on understanding the provincial space economy in relation to the national space economy.

3 Towards improvements

3.1 Problem statement

These weaknesses and challenges mitigated against the PGDSs and Provincial Spatial Frameworks becoming instruments that optimally fulfilled their envisaged role in better coordinated and spatially focused infrastructure investment and service delivery within provinces by all three spheres of government.

To better enable these instruments to play their expected role, specific solutions were formulated to address the general weakness in spatial analysis in provincial spatial planning, and in particular:

- i) The lack of a spatial analysis mechanisms and appropriate information to enable both fine grain analysis of the provincial space economy and comparative analysis of the provincial space economy in a broader functional context.
- ii) The lack substantive application of the principle-led approach to spatial planning advocated by the National Spatial Development Perspective.
- iii) The lack of analysis of spatial dynamics.

3.2 Approach/methodology

The technical advances presented here were implemented in an attempt to address the weaknesses identified in the PGDS assessments, and to meet specific legal, policy and client requirements. The examples described here are as such not findings of pure research or experimental development, but rather of knowledge application in the form of specialist services.

3.3 Key message

This paper presents the specialist services in the form of spatial analysis and policy advice undertaken by the CSIR for Gauteng and Mpumalanga provinces. It is argued that significant advances were made in these two provincial strategic planning processes by sharpening and refining the spatial planning approaches in terms of:

- i) Applying the national mesoframe (developed by the CSIR as part of the South African Geospatial Analysis Platform)¹, thereby enabling comparative and relational analysis between different geographic areas.
- ii) Quantifying the spatial dimensions of both poverty and economic activity to enable the province-specific contextualisation of the NSDP principles and methodologies.
- iii) Acknowledging and quantifying flows and linkages between districts and provinces, including movements (of people, goods and services), outward-looking analysis and a stronger basis for intra- and inter-provincial planning.
- iv) Providing the basis for a more differentiated view of various types of areas within a province enabling the proposed investment responses to be spatially focused and appropriately differentiated for these different types of areas.

4 Gauteng Spatial Development Perspective

4.1 Background

The Gauteng Spatial Development Perspective (GSDP) (GDED, 2007) ushered in the application of a novel approach to spatial planning in Gauteng province and nationally. Commencing in 2006, the GSDP process was the first direct attempt nationally to contextualise and apply the principles and methodologies introduced by the NSDP at a provincial scale. In this role, the GSDP provides a principle-led reading of the provincial space economy, using the organising concepts of potential and need as introduced by the NSDP to structure the reading / analysis.

The GSDP was also not conceptualised as a 'traditional' spatial planning tool such as, for example, a spatial development framework. The primary function of the GSDP was not to designate land uses and spatial structuring elements to specific localities, but to serve as a tool to help all stakeholders in the province agree on a common understanding of the nature and functioning of the provincial space economy. This shared understanding should then serve as a common platform for spatial planning and infrastructure investment decisions affecting the province among role players in all three spheres of government, as advocated in the Harmonisation and Alignment Framework (The Presidency, 2004).

The GSDP was, however, not a mere compliance-driven response to implement the NSDP and/or the Harmonisation and Alignment Framework. Gauteng is regarded as the economic powerhouse of South and southern Africa, with economic activity contributing around 40 % of the national Gross Value Added in 2004 (RSA, 2006: 71). Simultaneously, it houses a substantial proportion of the country's poor (11,3 % of people living below the Minimum Living-Level nationally) (RSA, 2006: 36). In striving to fulfill this role, the province faces a complex set of challenges. These include high but unequal growth, environmental degradation, socio-economic and spatial fragmentation manifesting in huge differences in quality of living, as well as the institutional challenge of prioritising, focusing and coordinating the actions of the three spheres of government and the business community.

In this context, recent initiatives in Gauteng all raised the importance of, and need for, a common spatial perspective of the province. These initiatives include the development of a provincial growth and development strategy, the vision of making Gauteng a globally-competitive city region, the development and review of long-term metro and district development strategies, and the study of various land use, environmental and housing issues conducted by the Land Use Task Team. To address this need, the GSDP was prepared by the CSIR's Planning Support Systems group in fulfillment of a memorandum of understanding between the CSIR, the Gauteng Department of Transport and the Gauteng Department of Economic Development.

The GSDP was officially adopted by the Gauteng provincial government in 2006 and published in 2007, and has since been used to inform planning

processes in the provincial and local (metropolitan and district) spheres of government in the province.

4.2 Advances in strategic spatial planning

The technical challenges in the development of the GSDP were twofold. Firstly, a context-specific perspective of the provincial space economy, centered on the concepts of need and potential, had to be formulated, but with due regard to Gauteng's prominent role in the national economy. It could therefore not adopt an inward-looking, isolated approach. Secondly, it had to be determined whether the principles, concept and indicators used in the NSDP which proved appropriate for analysing the national scale space economy, would also be appropriate for use at the provincial scale, especially in view of the intensity of development of Gauteng as a predominantly urban region. These challenges have been addressed by a range of innovations and analysis techniques.

4.2.1 Spatial analysis across scales: Using the SA mesoframe

The CSIR has developed the South African mesoframe, a demarcation of South Africa into just less than 25 000 'mesozones' or spatial analysis units, on average 50 km² or roughly 7 km by 7 km in size, and nested within important administrative and physiographic boundaries, as part of the Geospatial Analysis Platform. This was the main spatial analysis unit used in the NSDP, and was also applied in the GSDP. This enabled the GSDP team to 'zoom out' to view Gauteng in its broader national context, as well as to 'zoom in' to analyse the detailed spatial manifestation of economic activity and poverty within the province. This ability to work across scales, and at an appropriate level of granularity or detail to enable the identification of spatial patterns in the intensely developed urban development context of Gauteng, proved highly significant.

The NSDP spatial profiles show the entire Gauteng as an area of high accessibility to significant levels of economic activity, and an area where significant concentrations of poor people have good access to significant levels of economic activity (RSA, 2006: 71, 72, 81). While this level of understanding is appropriate for national scale planning and infrastructure investment prioritisation, the true spatial manifestation of socio-economic inclusion and exclusion only became apparent in the lower scale analysis conducted in the GSDP.

The basis for analysis using in the GSDP was the identification of significant spatial clusters of economic activity and poverty at a provincial scaleⁱⁱ, using the same indicators as those used in the NSDP (gross value addedⁱⁱⁱ as an indicator for economic activity or 'potential' and minimum living level^{iv} as an indicator for poverty or 'need'), , Gauteng emerged as an area of a centralised spatial concentration of economic activity, but of spatial marginalisation of the poor in distinctive poverty clusters, with very little physical overlap / relatively low levels of accessibility between areas of economic activity and poverty (GDED, 2007: 15, 36-7).

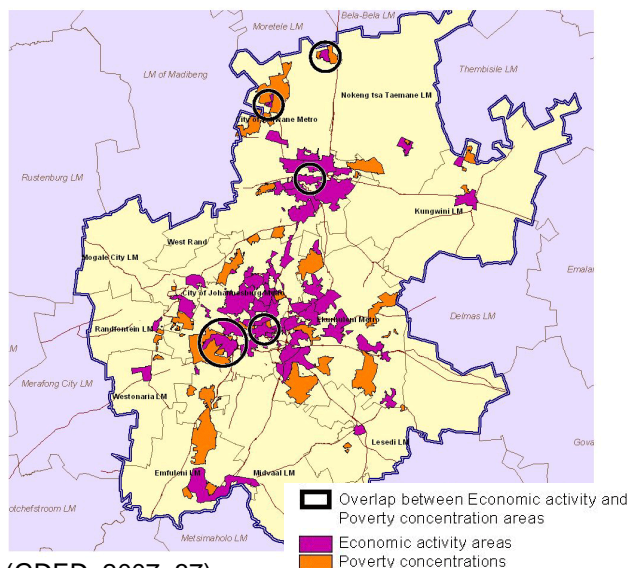


Figure 2: Concentrations of poverty and significant economic activity in Gauteng

This identification of predominant spatial clusters of economic activity and poverty sufficiently enabled both quantitative and qualitative analysis.

4.2.2 Quantifying spatial and temporal patterns

The GSDP confirmed the value of quantifying spatial patterns as an important component of spatial analysis. This quantification in turn confirmed the necessity for and potential scope of spatially focused infrastructure investment and social development spending, based on the high degree of spatial concentration of both economic activity and poverty in the province.

Spatially, economic activity in Gauteng is highly concentrated – the most significant areas of

economic activity, mostly located in the central areas of the province, cover only 8,4 % of the provincial land area, but generate 86,5% of the total provincial gross value added in 2004 (GDED, 2007: 15). The same is true for the spatial concentration of poverty and the scope and intensity of socio-economic exclusion and spatial disparities: 60% of all households in the province, and 81% of all households living under the minimum living-level, reside in 30 dispersed poverty concentrations mostly located in peripheral areas, far from the central core of economic activity (GDED, 2007: 36).

The indicators used in the NSDP proved useful for establishing an initial basis for understanding the provincial space economy, but were supplemented by trend analysis and the analysis of complementary indicators to gain a more context-specific understanding of the provincial space economy and to confirm the basis that was established. For example, recent trends point to a strengthening and intensification of the spatial concentration of economic activity, as opposed to a major spatial expansion or change in urban form (GDED, 2007: 22-3):

- Private sector investment in infrastructure projects from 2000-2004 concentrated almost exclusively in the existing areas of significant economic activity
- The central areas of the province experienced the highest growth in gross value added from 1996-2004, coinciding with the areas with the highest gross value added per hectare in 2004.

Similarly, indicators that could potentially point to a continued spatial marginalisation of the poor were considered. For example, all the significant spatial concentrations of the youth (persons aged 15 years and under) and growth in unemployment occurred within some of the major poverty concentrations in the province, as did the majority of areas experiencing a lack of access to services (GDED, 2007: 39, 42, 58).

4.2.3 Identifying and quantifying flows

The quantification of the movement of people proved to be an important dimension in understanding the place of poverty and economic activity clusters in the context of the provincial space economy, and what this means in terms of socio-economic inclusion or exclusion. Flow analysis was conducted using information from the Gautrans EMME/2 transport model. This analysis

was based on examining the morning peak hour traffic flows between the spatial concentrations of poverty and economic activity that were identified.

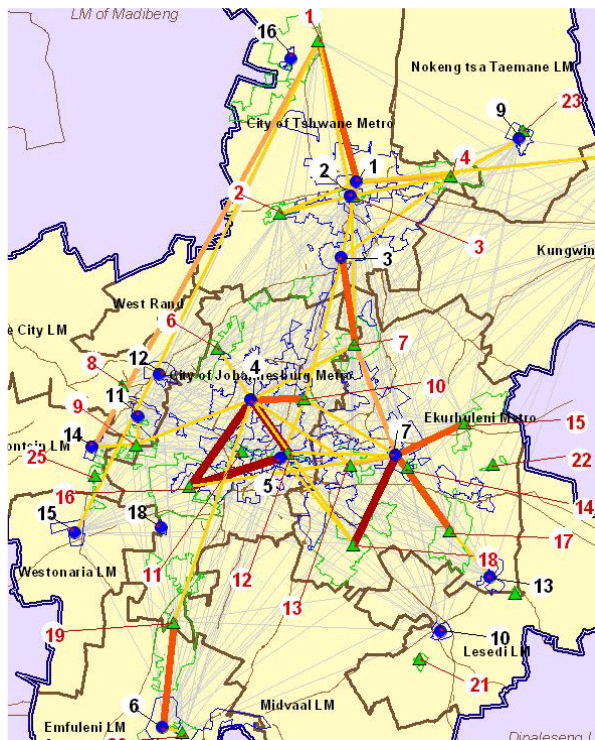


Figure 3: Flows between concentrations of poverty and economic activity

Flow analysis was found to be useful in describing and differentiating the degree of spatial economic exclusion or inclusion of the different poverty concentrations. This was achieved by using weighted accessibility indices (viewing the relative accessibility to economic activity in terms of travel times, taking congestion into account), which highlighted the majority of poverty concentrations to be located in less accessible areas.

To further determine current connectivity patterns between places of residence and work, the intensity of flows between economic activity areas and poverty concentrations were examined. The results of this analysis point to certain overarching characteristics of the space economy in Gauteng, e.g. the interrelatedness of activity across municipal boundaries as part of a functional region.

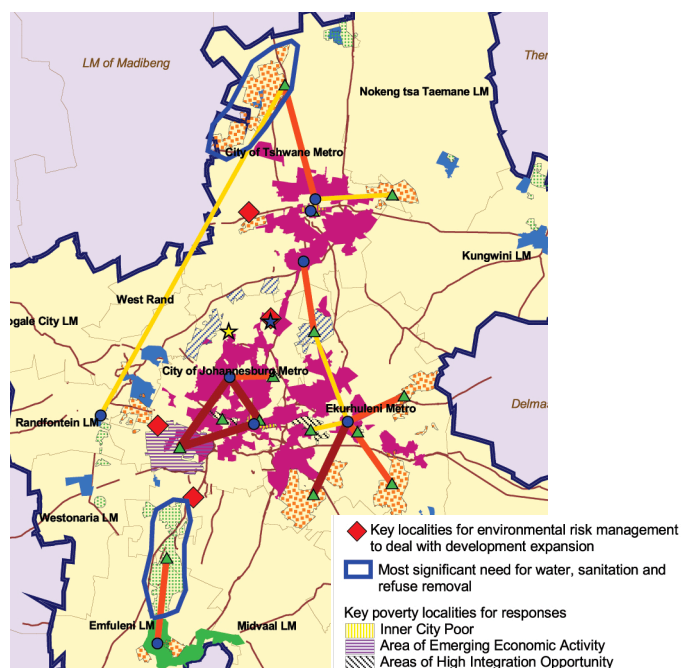
It also shows the degree of spatial flows that occur in spite of spatial marginalisation, e.g. the significant flows between the poverty area in

northern Tshwane and the mining areas in the western parts of Gauteng (GDED, 2007: 46).

4.2.4 Providing a differentiated view

The purpose of the GSDP was not only to contribute to a shared understanding of the provincial space economy by stakeholders from all three spheres of government, but also to provide a reading of the space economy that was sufficiently differentiated to support decision-making regarding appropriate, spatially focused infrastructure investment. To this effect, the analysis of the identified poverty concentrations and concentrations of economic activity was used to 'typologise' different localities in the province.

This differentiated reading of the provincial space economy enabled (1) the province-specific contextualisation of the NSDP principles and (2) a series of high level, principle-led differentiated investment responses to support economic growth and the spatial economic inclusion of the marginalised poor.



(GDED, 2007: 64)

Figure 4: Key localities for differentiated responses

In terms of contextualising the NSDP principles, the main

challenge in Gauteng was finding a way to address the marginalised poverty concentrations. While all located in an area with high accessibility to significant economic activity when viewed from a national perspective, these areas are spatially marginalised at the provincial scale and do not physically overlap with area of significant economic activity. The response to this challenge was to differentiate between the poverty concentrations in terms of their degree of spatial exclusion or inclusion into the economic urban fabric, and to formulate appropriate access-oriented infrastructure investment responses.

5 Mpumalanga Provincial Growth and Development Strategy 2nd Edition 2008^v

5.1 Background

The Mpumalanga Provincial Growth and Development Strategy (PGDS) provides a spatially referenced framework for both public and private sector investment, indicating areas of opportunity and development priorities, and enabling intergovernmental alignment. The spatially referenced component of the PGDS was provided by the Mpumalanga Integrated Spatial Framework (MSIF), at least in this province both the PGDS and ISF are the responsibility of the same unit within the Premier's Office (which is not the case in all provinces).

The MISF was developed in 1999 within the framework of the Reconstruction and Development Programme (RDP), GEAR, DFA and the original PGDS (1996). Subsequent to this the PGDS was updated in 2005 as was the ISF, before a slew of national policies were released including ASGI-SA, the NSDP and SDIs. In addition, the realignment of provincial borders occurred, which resulted in both the Mpumalanga PGDS and ISF requiring update and alignment. The 2005 PGDS assessment also made recommendations around strengthening the PGDS/ISF (Presidency, 2005).

In Mpumalanga, there have been several challenges limiting effective integrated development planning. These include:

- The lack of a common understanding between the province and municipalities regarding problems and issues faced in different geographical spaces
- A limited understanding of the role of, and challenges faced by, the Mpumalanga region in the national space economy and a resulting

lack of synergy between various national and provincial sector departments operating in the region

- Limited strategic guidance on key provincial development thrusts and their application within the province.

It was evident that the PGDS did not provide clear guidance in the form of spatially referenced strategies to the departmental strategic planning processes and consequentially the departmental strategic plans did not give any guidance to municipalities on the implementation of these spatial strategies in their localities. It is also evident that guidance on spatial strategies provided in the ISF (2005) has not been contextualised and applied in the strategic plans of line departments.

The Office of the Premier, Mpumalanga, thus initiated a process of technical refinement of the Mpumalanga Integrated Spatial Framework (MISF) and PGDS in mid-2006, culminating in the Mpumalanga PGDS: 2004-2014, 2nd Edition.

5.2 Advances in strategic spatial planning

Spatial dimensions which received attention included:

- i. The integration of economic, social and ecological dimensions to reflect a more sustainable approach to growth and development.
- ii. More rigorous analysis of key linkages, relationships and province-wide trends.
- iii. Clearer expression of the relevant cross-boundary relationships and dependencies with other regions.
- iv. Aligning various spatial planning mechanisms such as the NSDP, PGDS/MISF and municipal SDFs.

5.2.1 Spatial analysis across scales: The value of the SA mesoframe

The revised spatial component of the PGDS was developed within the principles of the NSDP but also took note of existing municipal spatial development frameworks. The use of the mesoframe in which mesozone units allow for area differentiation at a finer level than that of municipalities, enables relevant data to be recalibrated at various planning levels, effectively provides a consistent framework for analysis at any scale above that of the mesoframe unit itself. This overcomes some of the challenges of comparative analysis between spatial plans of different sector

departments and of different scales. It also strengthens the possibility of cross-provincial boundary analysis that lays the basis for spatial planning that goes beyond the constraints of administrative provincial boundaries.

A second advantage of the mesoframe approach is that in the poverty analysis, for example, it is possible to see that although poverty occurs across the province, distinct and significant concentrations of poverty stand out. Provincially significant poverty concentrations were broadly grouped into two categories which are illustrated in Figure 5:

- 1) Poverty pockets around areas of economic activity.
- 2) Areas coinciding with the former Bantustan found within the province.

The mesoframe allows prioritisation of these areas based on quantifiable figures (both of absolute numbers of poor people as well as densities of poverty).

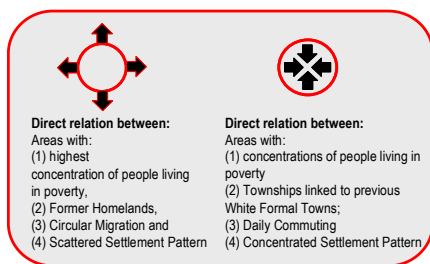
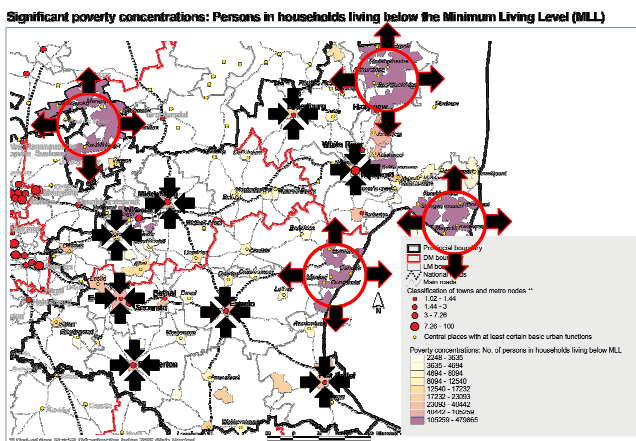


Figure 5: Distinctive/significant poverty pockets

The mesoframe is useful in analysing trends in MLL and GVA for particular areas. Overlays can show areas of growth and decline, it is important, for example, to know if poverty is increasing or decreasing, what the responses of the poor have been to deal with their situation and the possible

effect it is having on other factors or dimensions that have been identified as critical. Thus trend analysis is facilitated by this mesoframe analytical approach.

The ecological component of the PGDS (Figure 6) was informed by the Mpumalanga Biodiversity Conservation Plan (2006) .

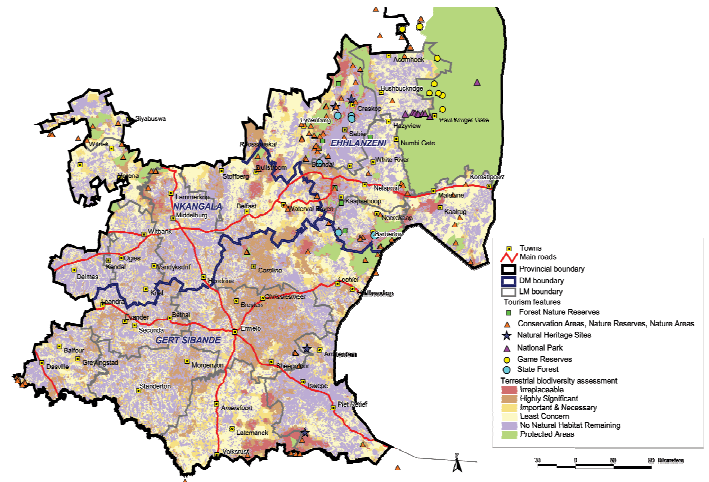


Figure 6: Biodiversity protection categories

The mesoframe was used to divide the province into six categories based on terrestrial biodiversity. This makes it possible to highlight areas already protected as well areas of ecological sensitivity and those requiring protection.

5.2.2 Quantifying spatial and temporal patterns

The economic analysis of the province was able to point to some structural changes in the provincial space economy. By doing a spatial analysis of GVA by sector over three decades it became evident, for example, that there has been a decline in mining in terms of jobs and output; a decline in manufacturing in terms of jobs, but growth in output; and growth in terms of both jobs and output in the tertiary or services sectors.

Two particular examples of advances made in profiling the province and unpacking patterns and trends as a basis for differentiating investment responses within the provincial strategy are briefly highlighted here.

Human settlement hierarchy

The analysis of the human settlement hierarchy of Mpumalanga used the Business Function Index, developed by Statistics South Africa (2006) and gave consideration to the sphere of influence of settlements within the province and their economic catchments (see Figure 7). Catchments were determined using the urban functional index in conjunction with the Department of Transport's Travel Survey (2003) and accessibility maps. This analysis revealed, for example, that the higher order settlements have strong linkages with Gauteng whereas the lower order settlements have a high dependence on the Mpumalanga high order settlements for specialised goods and services. This is especially apparent in the case of Nelspruit, which provides specialised services not only to the eastern half of Mpumalanga but to areas of Lesotho and Mozambique as well. The importance of Gauteng's sphere of influence on the manufacturing and industrial areas of Mpumalanga was also evident.

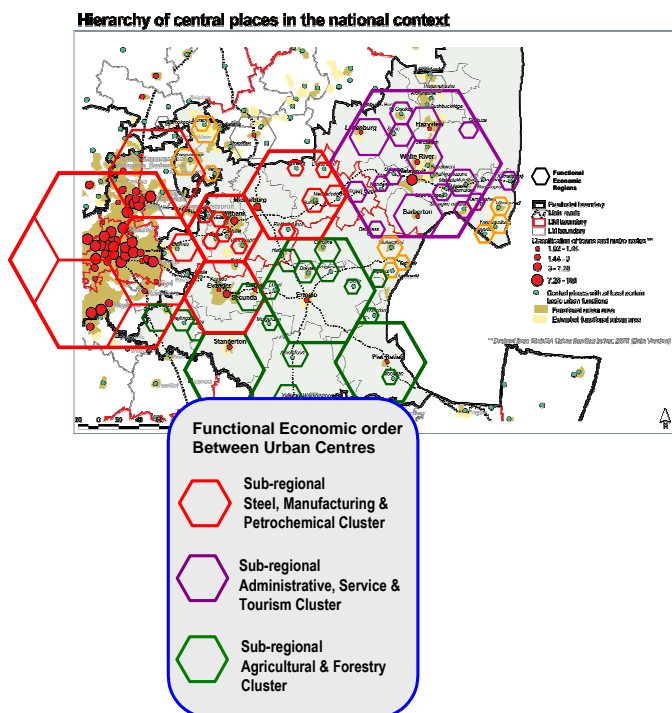


Figure 7: Hierarchy of central places in a national context

Value chain analysis

An in-depth analysis of the steel and iron alloy industry was done. The analysis provides a spatial perspective of the role of Mpumalanga in the steel value chain focusing on the automotive industry. While the analysis is not definitive it does highlight the current role of Mpumalanga in the value chain and the possible hurdles to its proposed role as a player within the industry.

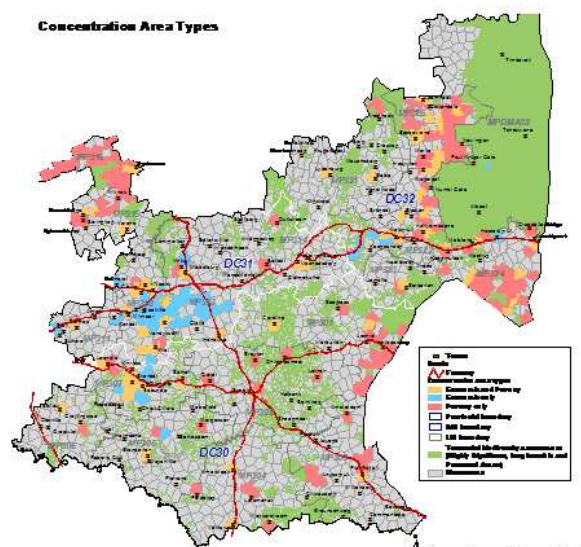
5.2.3 Identifying and quantifying flows

Acknowledging and quantifying flows and linkages within districts and between districts and provinces, has proved a challenge and was tackled here using Department of Transport's National Household Travel Survey (2003), which provides insight into a number of relationships including:

- The link between areas of poverty and economic opportunity: where do job seekers search for economic opportunities?
- How does an area's location in the national and provincial space economy affect the type of migration occurring?
- Why are learners traveling further to attend schools in a different district when there are schools closer to them?
- What factors may contribute to the existence of a band of informal housing in Thembisile?

5.2.4 An integrated framework – basis for differentiated investment responses

At a spatial level the combinations show important relationships between dimensions, illustrated in Figure 8.



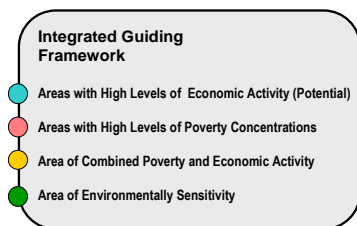


Figure 8: Key localities for differentiated responses

The simple classification shows significant areas for all three dimensions (poverty, economy and ecology) in a single map that provides the basis for significant spatial differentiation of investment responses based on quantifiable factors throughout the province. This forms a strong evidence-base for a prioritisation and infrastructure investment decision-making framework that can be used to guide all sector departments within the province by providing examples of specific types of investment responses for specific types of areas.

6 Concluding comments

It is clear that the two provincial case studies contain significant value addition at a technical level, including the demonstration of the importance and successful application of a common spatial analysis unit (the SA mesoframe) that provides the basis for intergovernmental planning and prioritisation at different scales based on a common understanding of the space economies at these various scales. They also show the value of a normative, principle-led approach to spatial analysis in the successful application of the NSDP principles and methodologies. They demonstrate the need for more nuanced indicators of 'potential' and 'need' when planning at lower scales, as well as the value of trend analysis.

The application of the spatial analysis tools and techniques as described in this paper has contributed to putting in place a series of spatial planning instruments that is in a better position to guide coordinated and spatially focused infrastructure investment. The impact of these instruments on government decision-making and investment in infrastructure is a key area for further research over the next few years.

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ⁱ The Geospatial Analysis Platform is a common, mesoscale geo-spatial platform for the assembly, analysis and sharing of economic, development and demand information, of which the first version (GAP1) – completed in May 2006 – was strongly informed by specific requirements derived from the Department of Trade and Industry's endeavour to develop a Regional Industrial Development Strategy (RIDS) and The Presidency's endeavour to review and update the National Spatial Development Perspective (NSDP). Accordingly, outputs from GAP1 were used for 2006 update of the NSDP, as well as for the first draft of the RIDS (produced in July 2006). Since May 2006, CSIR undertook further work to refine GAP1 and address a wider range of requirements, resulting in the release of GAP 2 (July 2007). The additional work was funded partly as independent research undertaken by the CSIR, as well as partly funded through GTZ as part of the NSDP District Application Project (2006-2007). (CSIR, 2007)

ⁱⁱ The statistical technique of agglomerate clustering (also known as hierarchical clustering) was used to identify regions that are spatially contiguous. With this method, each observation forms its own cluster. Next the two closest clusters are merged to form a new cluster that replaces the two old clusters. The process of merging of the two closest clusters is repeated until only one cluster is left. (as described in technical project documentation prepared by Renee Koen, CSIR Built Environment, Logistics and Quantitative Methods).

ⁱⁱⁱ Gross Value Added (GVA) measures the contribution to the economy of each individual producer, industry or sector. GVA can be defined as follows: Gross Domestic Product (GDP) (at current market prices) less taxes on products (available at whole economy level only; i.e. not per sector) plus subsidies on products (available at whole economy level only; i.e. not per sector) equals GVA (at current basic prices; available by industry only (an industry is a part of an economic sector). $GVA = GDP - \text{taxes on products} + \text{subsidies on products}$.

^{iv} This indicator is used to indicate the absolute number of people living below the minimum living level. Other than a mere indication of percentage of people living below this line, the number of people under MLL provides the indication of quantum, which is crucial for planning purposes. Minimum Living Level is defined as the minimum monthly income needed to sustain a household and varies according to household size. The larger the household the larger the income required to keep its members out of poverty. The poverty income used was based on the Bureau of Market Research's Minimum Living Level (BMR report no. 235 and later editions, Minimum and Supplemented Living Levels in the main and other selected urban areas of the RSA, August 1996; for identification of poverty concentrations in the GSDP, this data was augmented by household data, Stats SA 2001). While various definitions and accompanying indicators of poverty exist, the majority of these merely indicators enable a more nuanced understanding of poverty and are not suitable for disaggregated and spatial representations of concentrations of poverty on a national and provincial base.

^v This version of the PGDS although it has been presented to Cabinet and discussed with sector departments has not yet been formally approved by Province.