

Integration and Transformation of Rural Service Delivery: The Role of Management Information and Decision Support Systems*

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Abstract:

The paper deals with two main themes: 1) the integration and transformation of rural service delivery; and 2) role of management information and decision support systems in this process.

Referring specifically to the types of rural areas, conditions, challenges and institutional environment in South Africa, the argument for the transformation of rural service delivery is largely based on Cook's critique of the prevailing *catch-up development philosophy* (Cook, 2001). Instead of an urban-biased, capital project–focussed conception of service delivery priorities, a fundamental refocusing is needed which places greater emphasis on core rural realities such as poor accessibility, environmental sustainability and infrastructure maintenance.

The second theme is introduced by an overview of different types of rural service delivery decisions and associated decision support requirements. Depending on the type of decision problem or mode of planning, there may be a need for MIS-type or DSS-type decision support systems. However, neither of these can be effectively deployed before achieving at least some degree of system inter-operability and information sharing – which is the main aim of the IDP Nerve Centre initiative. The paper briefly provides a brief case study review of this initiative, and provides some pointers about the extensions that are ideally required to provide a sufficiently integrated, “spatialised” perspective of different service delivery activities (i.e. the capital investment, operations *and* maintenance undertaken by different sectors), as well as the effective coverage, outcomes and sustainability thereof.

* The basic themes of this paper and some of the material has been taken from an earlier paper by one of the authors (Naudé, 2002) presented at the *6th Seminar on GIS and Developing Countries*, ITC Enschede, The Netherlands. May 15-18, 2002.

1 Introduction

The main aim of this paper is to explore the contribution that different forms of decision support can make towards the *strategic assessment* and *integrated planning* of rural service delivery, and – in so doing – also contribute to the *transformation* thereof.

The context is the rural areas of South Africa, which in recent years have experienced an overall decline in the proportion of rural dwellers, from 46,3% in 1996 to 42,5% in 2001 (Statistics South Africa, 2001). During the same time period, the urban population accounted for a rising share of the total population – from 53,7% in 1996 to 57,5% in 2001. One of the main reasons for this rapid population decline in rural areas is the vastly inferior access to basic social services and economic opportunities.

1.1 Structure of paper

The discussion is structured in terms of two general themes and a brief case study review of a key government initiative in the field of development information:

Theme 1: The integration and transformation of rural service delivery – so that the outcomes are more sustainable, and better adapted to the core social and economic development challenges in rural areas

Theme 2: The role of management information and decision support systems in this process.

Case study: The introduction of the IDP Nerve Centre.

1.2 Definitions

The notion of integrated rural service delivery can be defined in terms of two dimensions: procedural and substantive.

The *procedural* dimension refers to the adequate involvement of local communities in development decision-making, and the institution of formal procedures to coordinate and align different sectoral planning and service delivery processes (i.e. in terms of an overall development vision or framework). Procedurally, the main aims are therefore to: a) strengthen participative democracy; and b) counteract the problem of technocratic and sectoral myopia (also referred to as “silo-thinking”), and c) ensure greater “developmental effectiveness” in relation to core rural development issues or problems.

The *substantive* dimension refers to the content of integrated (rural) development plans, strategies or infrastructure and service delivery programmes.

The issue of transformation also has several dimensions. The first relates to *demographic representivity* – the need to transform the staff profiles of government, parastatal, NGO and private sector organisations so as to ensure greater representation of previously disadvantaged individuals. Seen from a developmental perspective, this in itself can contribute to capacity building, greater sensitivity to development needs and the institution of a more participative, bottom-up decision making culture in government and other service delivery agencies.

Transformation, however, also relates to the general *modus operandi* and the *accepted service delivery norms, standards and priorities* (i.e. the way that we do things, the standards to which we aspire, and what we generally consider to be most important). To some extent this overlaps with the procedural and substantive dimensions of integrated service delivery, respectively. But it goes much wider than striving to do things in a more integrated, participative manner, and ensuring that we deliver more integrated, developmentally focussed outcomes. It also relates to procedural aspects such as improved transparency, equity and fairness in the appointment of service providers, and substantive aspects such improving the (local) appropriateness, sustainability and developmental effectiveness of service delivery norms, standards, and resource allocation priorities.

Seen within the context of South Africa's rural areas, we want to highlight two related questions:

- what (standards and forms of infrastructure and service delivery) are most sustainable and developmentally effective, and should therefore receive the highest priority?.
- how can we transform the accepted current standards, general practices and priorities, if there is a substantial divergence with the above?

2 South Africa's rural areas: challenges and progress since 1994

Most developing countries—including South Africa—are typically faced with the following rural development challenges:

- *Reducing access inequalities* – addressing inequalities in access to basic services, as well as overcoming the gap between the well-positioned, well-connected, mobile, highly informed and fully employed people within the economic mainstream, and the relatively poorly positioned or marginalised people - many of whom are in the “deep rural areas”;

- *Improving sustainability and promoting economic growth* – reducing unsustainable subsidies and pressures on fragile/degraded ecosystems, maintaining the existing infrastructure and services, and focussing investment in areas with inherent and under-utilised economic potential;
- *Dealing with the effects of the Aids pandemic*, natural disasters (such as floods and droughts) and other major external shocks or changes that are placing extra-ordinary, unsustainable demands on community resources, social support networks and other traditional coping mechanisms.
- Building the *governance capacities, institutions, and financial arrangements* to deal with the above in a coordinated and sustainable manner.

2.1 Diversity of types of rural areas and service delivery capacities

In South Africa, there is an especially wide diversity of rural areas, characterised by widely varying climates, rainfall levels, population densities, levels of infrastructure development and types of land tenure. Many of these differences can be ascribed to the legacies of apartheid, which are reflected by a combination of *structural* differences between the former white *platteland* and the former *homelands*.

A related issue is that *municipalities and provinces have varying service delivery capacities* - municipalities and provinces of varying sizes geographically and have varying service delivery and fiscal capacities. This affects the rollout of programs such as free basic services in rural areas.

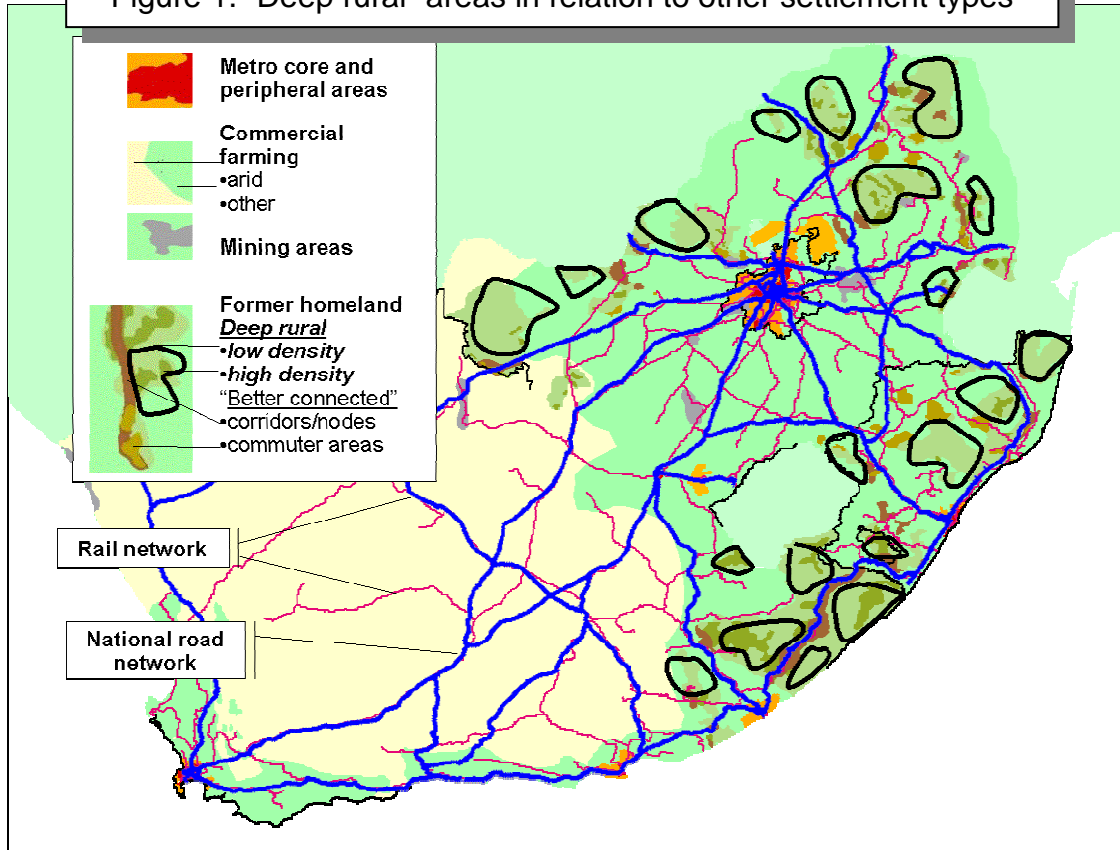
2.2 Special characteristics and problems of deep rural areas

Figure 1 provides a classification of South Africa's rural areas according to the *Rural Typology* produced for the National Department of Transport by CSIR Transportek (Mhlongo et. al., 1998), highlighting the deep rural, former homeland areas.

Given the isolation of deep rural areas, the comparative scale disadvantages *vis a vis* commercial farming areas and enterprises, the relatively high population densities and poverty levels, and the historical backlogs, three problems stand out:

- *inaccessibility* – of services and markets;
- *fragmentation* – of land holdings and economic enterprises;
- the dilemma of having to redress *historical backlogs in infrastructure provision* without *reinforcing unsustainable settlement patterns*.

Figure 1. “Deep rural” areas in relation to other settlement types



2.3 Progress since 1994

Many of the deep rural areas shown in the diagram form part of the 13 high-priority rural “nodes”, which are the focus of the government’s Integrated and Sustainable Rural Development Programme (ISRDP). Besides the infrastructure and other “anchor” projects which have been promoted in the ISRDP target areas in terms of this programme, most rural areas have – since 1994 – benefited from a major government drive to extend access to basic services to previously disadvantaged communities and areas.

Although the speed and level of service provision in rural areas are still significantly behind that of urban areas, impressive gains have been made in the overall provision of housing and housing-related infrastructure, and the extension of access to water, electricity and telecommunications. Moreover, whilst much of this was initially driven by national and provincial sector departments, the local sphere of government has been playing an increasing important role in the last number of years. This was

mainly due to the institutionalisation of integrated development planning (IDP) in terms of the Municipal Systems Act¹, 2000 (Oranje et.al., 2000).

The following are some of the important outcomes:

- Significant decentralisation of governance and service delivery responsibilities to the local sphere of government, coupled with direct fiscal transfers from the national treasury in terms of an “equitable share” formula;
- The establishment of a mandatory link between the development priorities specified in the IDP, and the allocation of a local authority’s capital investment budget;
- Introduction of special (transitional) grants for the training and appointment of local government officials.

3 Remaining challenges and concerns

Despite the progress that has been made to institute developmental local government, roll out the ISRDP and improve access to basic services in South Africa’s rural areas, there are a number of remaining challenges and concerns.

In general, there is an increasing concern that the pressure to deliver is having a negative impact on the sustainability of services and facilities, as the bulk of expenditure has been on the extension of infrastructure and services to ensure the greatest reach, with relatively little of the funds being allocated to training and capacity building of people in their use, operation and maintenance (*ref needed here*). A related concern is that the macro-scale spatial targeting of service delivery investment is being too strongly influenced by *service backlogs*, and too little by the long-term *ecological carrying capacity* and *economic potential* of different areas. If the future depopulation and other impacts of AIDS are also taken into consideration, there is the associated danger that local communities and/or government institutions may be over-investing in “normal” infrastructure and service provision, much of which may eventually not be fully used or maintainable, or which will not be suitable for providing the specific support needed by AIDS sufferers and orphans.

¹ IDP is a process through which municipalities prepare a strategic development plan for a five-year period. The Integrated Development Plan (IDP) is the written plan that results from the integrated development planning process. It is the principal strategic planning instrument guiding and informing all planning, management, investment, development, and implementation decisions and actions in the local area and supercedes all other plans that guide local development.

3.1 Underlying development philosophy

Underlying all this, there are fundamental questions that can be asked about the sustainability of a service delivery model that is essentially based on a *catch-up development philosophy* (Cook, 2001), with an urban-biased, Western conception of the “basic” set of services and standards being set as the universal norm to be achieved in all areas. One may therefore also question whether there is perhaps too much concern with bringing different *places* up to the same basic level of development, as opposed to affirmative investment in disadvantaged *people* — ‘mobile’ human capital — especially in geographic areas that are felt to lack economic potential.

3.2 Inadequate consideration of fundamental urban-rural differences

Given the influence of the catch-up development philosophy and the associated political expectations, it should not be surprising that many service delivery programmes exhibit some degree of urban bias, and that there is inadequate consideration of fundamental urban-rural differences. In essence, this means that many service delivery programmes or systems do not adequately consider typical rural conditions such as the following:

- The sheer *physical remoteness and low population densities* of many areas, and the attendant transport provision and logistical problems such as long distances, vast networks of poor, low-volume roads and low demand thresholds;
- The relative *narrowness and fragility of the economic base* (Wenzel, 2000), as well as a range of *poverty-related barriers* (e.g. the digital divide and limited levels of personal mobility) in rural areas that are likely to place severe short- and medium term restrictions on rural people’s ability to effectively access and/or pay for services;
- The importance of *access to land-related resources*, especially in relation to the ability to establish *sustainable rural livelihoods*; and
- The comparatively *limited technical and managerial capacity of municipalities and institutions responsible for service delivery in these areas (both in terms of quality and quantity)*.

3.3 Ongoing spatial dispersal

One of the consequences is poor or uncoordinated planning and the apparently haphazard spatial dispersal of investment in central place or nodal facilities (e.g. schools, clinics, multi-purpose centres), transport and telecommunications. In many instances, this only serves to aggravate the inherent *threshold problems* (inability to satisfy the minimum demand threshold for an economically viable service), and *service*

access problems (inability to access the required service within a reasonable time or distance range).

3.4 Difficulty of inter-governmental coordination

Besides the difficulties of aligning and linking local development initiatives, there is still a serious lack of co-ordinated planning and implementation within the national and provincial spheres of government, as well as between the three spheres. Part of this is due to:

- *Uncertainty about which sphere should perform which function* - the role of national departments in relation to service delivery might not be clear enough, particularly where these services create long-term costs for provinces and municipalities;
- *Multiple planning and reporting requirements in legislation* - different planning, program, reporting and compliance regimes in different sectors create reporting burdens for provincial and local government.
- A general mismatch between local development planning, management and associated information requirements, and the capacity to meet these requirements.

3.5 Financial burdens and constraints

Although it is not only a problem in predominantly rural problems and municipalities, there are many so-called unfunded or partially funded mandates that are implicitly passed on to these spheres of government because of poor national planning or under-developed inter-governmental financial transfer mechanisms.

This problem is often compounded by the comparative lack of capacity to negotiate for funding and manage capital expenditure and procurement procedures. Since majority of grants and subsidies are working on a “first come, first serve basis”, this leads to a situation where stronger municipalities have a higher probability of securing more funding than less capacitated ones.

3.6 Accumulating infrastructure maintenance and upgrading burdens

The low demand thresholds or economies of scale, coupled with the typically low levels of cost recovery and paucity of local authority tax revenues, inevitably means that there is insufficient funding for recurrent operations and maintenance, leading to the steady deterioration of infrastructure and public facility networks, and the accumulation of unsustainable rehabilitation or upgrading requirements.

3.7 Lack of information management

Information is still not seen as a vital resource that must be managed and constantly maintained to support key management functions. This impacts on timeous detection of service delivery failures for the purposes of corrective action. Most often departments and municipalities do not have the required information management practices in place nor do they consistently work off common data sets, which further contribute to fragmented decision-making.

4 Transformation and integration priorities

Given the wide range of challenges and concerns outlined above, the scope of the required corrective actions is likely to be equally wide ranging. There is also likely to be many different viewpoints about what should be done, or where the emphasis should lie. It can also be argued that much is already being done – for example, to improve inter-governmental coordination and information management (e.g. the IDP Nerve Centre project discussed in Section 6 below).

Despite these qualifications, there is – in our opinion – an urgent need to at least start debating the core arguments set out above, and exploring what might be done to address them.

4.1 The urban/residential/capital projects bias and related priorities

Following on the questions raised by Cook (2001), the first of these is that rural infrastructure and service delivery activities are *unsustainably biased* towards: a) urban norms and standards; b) residential or urban-type infrastructure; and c) new infrastructure projects (as opposed to improved infrastructure maintenance, facilities/system management, and investment in *human capital or capacity building*).

In accordance with this, we might then posit the following priorities:

1. Improved *macro-scale spatial targeting of service delivery investment* – informed not only by service backlogs and poverty levels, but also by the relative economic potential and long-term competitive advantages of different areas.
2. Greater emphasis on *infrastructure maintenance and capacity building* – implying relatively less expenditure on new infrastructure and relatively more on the training and capacity building of people in their use, operation and maintenance.

3. A stronger and more coordinated focus on *human resource development* (HRD), especially in areas without significant natural resource assets or other comparative economic advantages.

4.2 Rural inaccessibility and related priorities

As noted earlier, many of the main defining characteristics of rural areas relate to their inaccessibility which is then aggravated by spatial dispersal of investment in service facilities (Mashiri et. al., 2002), Continuing with the previous list, the derived priorities to address this are:

4. A stronger and more coordinated focus on *linkage infrastructure and services*; focussing particularly on transport and telecommunications, and the harnessing of new advances in *information and communication technologies*;
5. A refined *hierarchy of service delivery nodes and linkages*, coupled with a need for strengthened rural spatial planning and logistical coordination, and the institution of a wider variety of service delivery mechanisms (including mobile and periodic service delivery).

4.3 Cluster focussed integration and coordination

Whilst the IDP should continue to be the primary integration mechanism, provinces should be performing a stronger coordinating role. Besides improved coordination within the “linkage services cluster” (see above), there are also the following cluster-focussed priorities:

6. A *cluster -and linkage oriented LED programme*, aimed at creating competitive local enterprise clusters, improved local economic linkages and improved access to mainstream supply chains and markets.
7. Better coordination and integration of *service delivery within the social welfare, health, police and emergency services cluster*, especially to deal with the effects of the Aids pandemic, crime, and natural disasters.

4.4 Information management, training and decision support

The final general priority relates directly to the second theme of the paper:

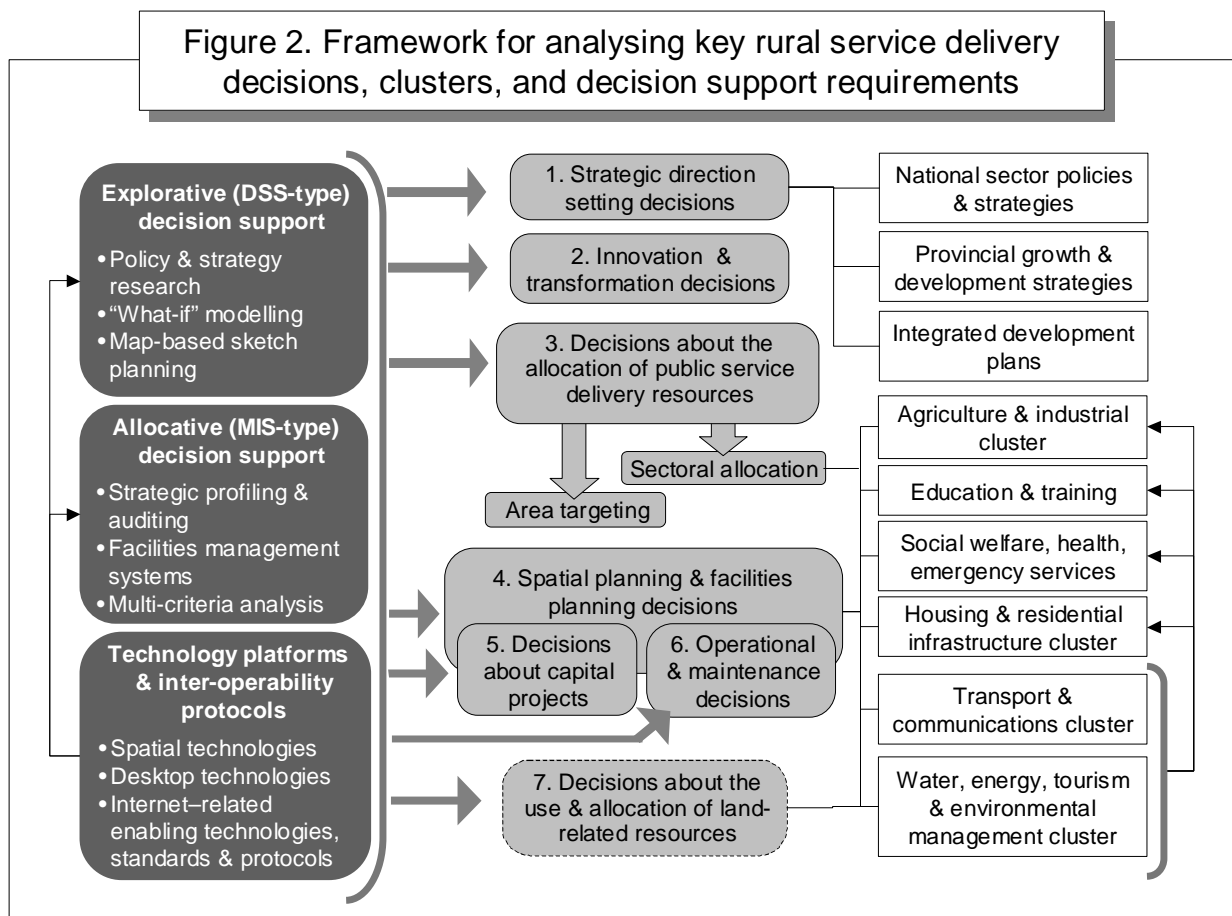
8. *Improved information management, training and decision support* – aimed at addressing inter-governmental coordination requirements and governance capacity constraints, improving the planning and management of service delivery, and generally helping to address the other priorities outlined above.

5 The role of management information and decision support systems

The second main theme of the paper is to explore the role of management information and decision support systems with respect to the integration and transformation of rural service delivery — in particular, how it can help to address the proposed set of priorities outlined above.

5.1 General analysis framework

Figure 2 provides a general framework for guiding the discussion of these issues. In essence, it outlines different types of decision support, as well the main categories of decisions that have an impact on rural service delivery. It also identifies the three principal direction-setting instruments at the national, provincial and municipal spheres of delivery, respectively. Finally, it provides a breakdown of six relevant service delivery and development clusters.



5.2 Types of information and decision support systems

At the risk of being using the term too loosely, one can define *decision support* in a broad sense as any form of systematically generated information and associated analysis and planning support that is directed at supporting key development planning and service delivery decisions.

On the other hand, it should be recognised that the term *decision support systems* (DSS) generally has more specific meaning. As indicated by Table 1, the term is often reserved for a type of system aimed at addressing non-routine, semi-structured or strategic decision-making problems. The key factor distinguishing these types of problems is a relatively high degree of uncertainty about the exact nature of the problem, the relevant guiding values and the range of alternative solutions. The associated mode of planning is indicated as “explorative” – characterised by a “what-if” exploration of potential solutions.

Table 1: Distinction between MIS- and DSS-type systems*

Type of system	MIS-TYPE	DSS-TYPE
	Systems for the retrieval, processing and presentation of decision-relevant information in terms of pre-defined filters, aggregation rules, objective functions and/or optimisation algorithms.	Systems which are, per definition, aimed at addressing semi-structured, strategic decision-making problems, and therefore facilitate the explorative search, adaptation and use of multiple models, perspectives, or problem-processing methods.
Type of problem addressed	WELL-STRUCTURED	SEMI-/UNSTRUCTURED
	Clarity about overall goals/ value systems, root problems/ causes, probabilities (of external events/possible outcomes), and the range of alternative solutions.	Significant degree of uncertainty about guiding values, causality (the root causes as opposed to the symptoms), the behaviour of inter-dependent systems and the feasible solutions
Mode of planning	ALLOCATIVE	EXPLORATIVE
	Analysis, ranking and allocation of resources among well-defined alternatives.	Search for appropriate problem representations, and “what-if” exploration of potential solutions (alternatives)
* Taken from Naudé (2001)		

DSS-type systems are often contrasted with *management support systems* – which can be defined as systems for the retrieval, processing and presentation of decision-relevant information for well-structured problems. Hence, MIS-type systems often contain pre-defined filters, aggregation rules, objective functions and/or optimisation algorithms. However, one could also include more “basic” information systems and tools under the MIS umbrella – in particular strategic area profiling or facilities auditing systems that include multi-criteria analysis tools. Defined as such, MIS-type systems are typically used in support of *allocative types of planning*, where the aim is to differentiate, prioritise, and allocate resources, land use rights, etc. among existing, pre-defined alternatives.

Although Table 1 does not include it, Figure 2 also identifies the need for appropriate enabling platforms. These refer to the information technologies (especially the internet and other types of *middleware*), architectures and inter-operability standards that are needed for deploying both the DSS and MIS-type systems, and getting different systems to “talk” to each other (i.e. ensure effective information sharing). Section 5.6 provides more detail on the need for improved information sharing mechanisms and protocols.

5.3 Types of service delivery decisions and decision support requirements

Table 2 provides further information about the hierarchy of service delivery decisions outlined in Figure 2. It also gives a selected overview of the specific forms of decision support that is often used, or that is ideally required to support each type of decision.

Without going into too much detail at this stage, the following can be highlighted as key issues:

- *Decision Type 2*: Explorative or ‘what-if’ decision support systems could play an important role, but is not often used.
- *Decision Type 3*: Many allocation decisions are based on overly simplified need profiles, indicators and allocation formulas.
- *Decision Type 4*: Improved spatial planning and integration of rural service delivery is urgently needed, but most facilities MISs are too *sector focussed*, and nor do they have sufficient *spatial intelligence* for this purpose.
- *All decision types*: Information sharing about “other decisions” is insufficient or overly cumbersome.

Table 2. Types of service delivery decisions and forms of decision support

Decision category		Forms of decision support
1. <i>Strategic direction setting decisions</i>	<ul style="list-style-type: none"> • National sector policies and strategies • Provincial growth and development strategies • Integrated development plans 	<ul style="list-style-type: none"> • Policy and strategy research • Strategic audits & profiles • Facilitation of community & other stakeholder inputs
2. <i>Innovation and transformation decisions</i>	<ul style="list-style-type: none"> • Introduction of new standards & procedures • Organisational restructuring & personnel transformation • Introduction of innovative service delivery options (e.g. multi-purpose facilities) 	<ul style="list-style-type: none"> • Explorative what-if decision support • Market/ scientific research • Technology research & development • Impact assessments
3. <i>Decisions about the allocation of public service delivery resources</i>	<ul style="list-style-type: none"> • Formula-based financial transfers to provinces and municipalities • Other resource allocation decisions among different areas and (sub) sectors 	<ul style="list-style-type: none"> • Strategic audits & profiles • Development of multi-criteria fund allocation formulas • Social accounting matrices
4. <i>Spatial decisions and facilities planning decisions</i>	<ul style="list-style-type: none"> • Decisions about new development nodes & corridors • Sector or cluster-focussed decisions about bulk infrastructure & distribution networks • Facilities management • Catchment management 	<ul style="list-style-type: none"> • Facilities audits & profiles • User / outcomes oriented surveys • GIS-based decision support • Facilities/ infrastructure management systems • River catchment DSS
5. <i>Decisions about capital projects</i>	<ul style="list-style-type: none"> • Decisions about major/ anchor projects • Initial selection of projects for design & business planning • Final prioritisation 	<ul style="list-style-type: none"> • Project MIS's • Impact assessments & cost benefit analyses • Facilities/ infrastructure management systems • Facilitation of community & other stakeholder inputs
6. <i>Operational & maintenance decisions</i>	<ul style="list-style-type: none"> • Decisions about major maintenance & upgrading works • Routine or scheduled management • Staffing and scheduling decisions 	<ul style="list-style-type: none"> • Facilities/ infrastructure management systems • Resource management and workflow information systems
7. <i>Decisions about the use & allocation of land-related resources</i>	<ul style="list-style-type: none"> • Community decisions • Land use and environmental management decisions • 	<ul style="list-style-type: none"> • Participative rural appraisal (PRA) • Strategic environmental & impact assessments • Environmental monitoring

5.4 The need for improved DSS-type decision support

Explorative decision support is particularly relevant for decisions about the spatial structuring and right sizing of rural service delivery networks, and decisions about joint ventures or integrated service delivery systems.

One of the main requirements in regard is a capability for *sketch planning*, which, according to Hopkins (1998), should not only include the capability for initial broad-brush planning, but also the means for relatively effortless elaboration and specification of options so that semi-automated calculation processes can be applied to estimate their impacts. For many rural spatial and facility planning purposes, this would require a decision support system incorporating *spatial interaction models*, which in turn, allow for accurate demarcation of *catchments or service areas*; and the modelling of the *effective demand* that may be attracted to each service outlet (Naudé, et. al., 1998).

5.5 The need for improved MIS-type decision support

As noted by Openshaw (1996):

“ large amounts of public funds are often allocated on the basis of simple minded indices used to rank areas. Simple minded technology is clearly attractive to end users, because the results are easy to understand, but they can also be wrong!”

Most of these mistakes or problems are related to the basic dilemma of having to differentiate on the basis of *between-area differences*, but then sometimes disregarding *within-area differences* (heterogeneity). This typically leads to the inadequate targeting of pockets of deprivation (or other types of minority need) in small towns or areas, which, in total, may only constitute one ward or district.

Against this background, the application of Geographic Information Science and Multi-Criteria Decision Aiding (Carver, 1991, Belton, 1999) has a potentially critical role. The specific applications include:

- Improving the geographical and statistical validity of area profiles and indicators (Openshaw 1996).
- Designing inter-governmental financial allocation formulas that are sufficiently sensitive to fundamental urban-rural differences and associated development issues.
- Improving the multi-criteria assessment and resource allocation modules that typically form part of sectoral infrastructure planning and management systems.

5.6 Need for improved information sharing mechanisms and protocols

Given the general need for improved inter-governmental and inter-sectoral alignment of service delivery decisions, improved mechanisms and protocols to share information on key decisions (e.g. about selected capital projects, budgets and priorities) – although fairly basic in terms of its conceptualisation and degree of analytical content – can actually have a very important *strategic* impact.

6 Case Study: The IDP Nerve Centre

In a country with a complex, multi-layered system of government such as South Africa, it is particularly important to have an effective system for managing and transferring key information. For the first time, the “core” of the local government system has been given responsibility for delivering municipal services in rural areas.

This section provides a brief overview of the IDP Nerve Centre, which can be seen as a medium through which rural populations and local authorities could express their needs, obtain information on what is feasible and affordable for their areas, and gain a sufficient understanding of the delivery plans and programmes of the provincial and national spheres of government. By implication, the IDP Nerve Centre could then also become a vehicle for improved inter-governmental coordination, joint venturing, etc.

6.1 Other examples

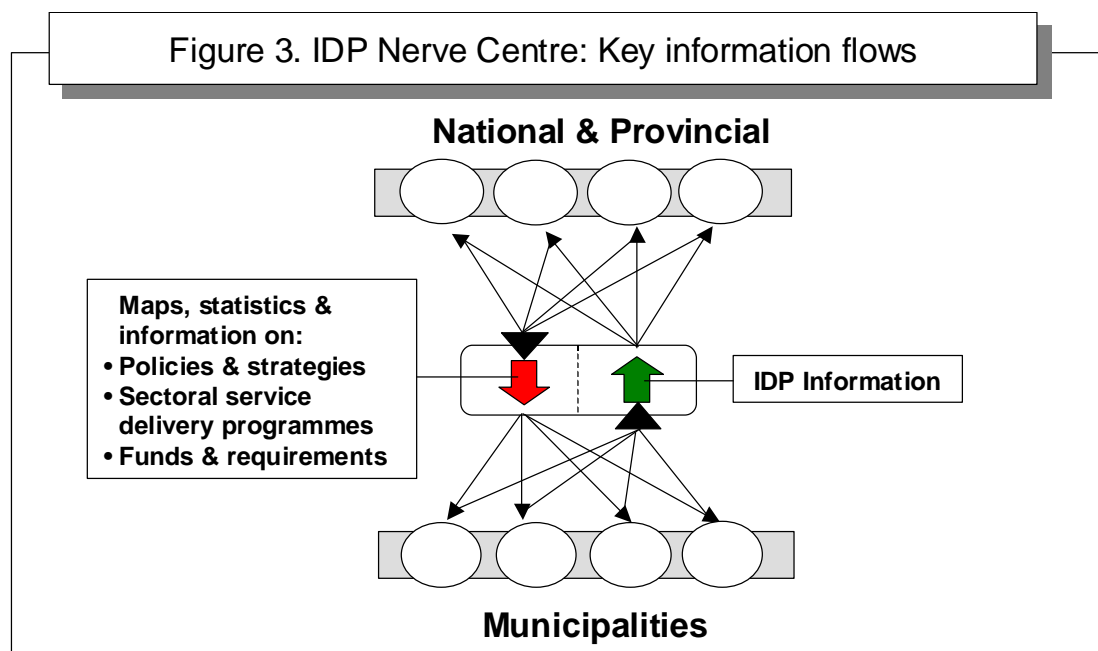
Besides the IDP Nerve Centre – which is not yet fully operational – there are a number of progressive government initiatives to promote the gathering and sharing of development information. These include:

- *The SA Explorer project*, which is a GIS-based baseline information system organised in terms of the country’s new municipal boundaries, disseminated in the form of a CD-ROM and via the Internet;
- A national “*Planning and Implementation Management Support System*” (PIMSS), which involves providing information support to a network of support Centres (PIMS-Centres) located in all district municipalities throughout South Africa (PIMSS.NET).

6.2 Rationale

In essence, the IDP Nerve Centre extends the functionality of PIMSS.NET (i.e. to provide information from national and provincial departments) by providing for a “bottom-up” information sharing mechanism on all locally-generated IDPs (see Figure 3). Much of the current information emanating from the IDP process is only available as unstructured documents (paper or variety of digital formats). This makes it

impossible for national and provincial departments or agencies to align their planning and funding intentions. At the same time municipalities require information from national and provincial departments, such as funding programmes and donor agencies to prepare more realistic IDPs.



6.3 Focus on interoperability

A cornerstone of the IDP Nerve Centre is the ability to collaborate and exchange information with numerous other systems throughout government in a mutually agreed way. Knowing that it is impossible to achieve total integration with all other systems – that is, to redesign them so that there is no duplication of the same data elements in their databases – the Nerve Centre project has paid significant attention to ensuring that there is “interoperability” between these systems. This means that there can be an exchange of information between systems in a mutually agreed way.

Seen from a technical point of view, the emerging international “XML” standard for the exchange of data was accepted as a point of departure. Since initial investigations showed that the majority of systems in government already are compatible with one or more “XML” schemas, this obviated the need for any extensive redevelopment of existing MIS or DSS type systems.

The question of *semantic standardisation* proved to be a much bigger challenge. One of the common problems encountered in achieving collaboration (even portability) between systems is that the same words are used to mean different things (e.g. different meanings for the words “Project”, “Phase” and “Status”). If one system allows

a project to consist of sub-projects while another does not, or one system regards a phase as an extension in time (typically financial year) while another regards it as an extension in space, then one would expect fundamental problems in how projects and phases are counted, aggregated and reported on.

Building on the work undertaken as part of the ActionIT initiative (Waldeck, 2003), a significant part of the work undertaken as part of the IDP Nerve Centre project involved the development of compatible conceptual data models for describing key government service delivery activities

6.4 Political mandate and implementation

High-level political buy-in and support has been obtained – in particular from the Presidential Coordinating Council (PCC). Following on a landmark decision on 14 December 2001 to “*accelerate the implementation of a system of state-wide planning wherein Integrated Development Plans (IDP) serve the basis for aligning policy, planning and budgeting processes across all spheres*”, the PCC also approved the establishment of an IDP Information and Coordination Service (“IDP Nerve Centre”).

Once fully operational, the IDP Nerve Centre will function as an internet-based Information and Coordination Service, aimed at recording, transferring, aggregating and disseminating key information from and to municipal IDP.

The operational components include an E-Library (which can be used, for example, to record IDP documents already submitted), Recording and Reporting tools, an Administration Tool, and an Implementation Management Tool. The required support processes and aspects such as training and staffing are still being attended to.

6.5 Potential rural delivery impacts and necessary extensions

The value of improved information sharing about the status, size and nature of governmental service delivery projects should not be underestimated. Seen specifically within the context of the government’s integrated rural development programme (ISRDP), as well as its’ renewed focus on infrastructure upgrading and public works programmes (much of which is ostensibly aimed at creating employment opportunities for the rural poor), the IDP Nerve Centre could therefore have a significant positive impact on the efficiency and developmental effectiveness of rural service delivery.

Much, however, will depend on how the improved project information will be supplemented and interpreted. In this regard, there are three urgent “extension priorities”:

- Development of protocols and mechanisms for the improved recording and exchange of information about *infrastructure maintenance and rehabilitation requirements* (as in the case of project information, there are widely differing interpretations of terms such as “scheduled maintenance”, periodic maintenance”, “rehabilitation”, “upgrading”, etc.)
- Deployment of common geo-referencing protocols, so as to allow effective and interoperable use of GIS-based MI’s and DSSs for:
 - the *mapping and spatial analysis* of projects, maintenance requirements, linkages between anchor projects and supporting projects, etc.,
 - the development of *improved, appropriately “spatialised” indicators* of aspects such as development potential, environmental sustainability, and service coverage (see related conference paper by Morojele et. al., 2003).
- Development of improved mechanisms to capture and integrate information on *local knowledge, user preferences, and service delivery outcomes*.

7 Conclusion

In conclusion, it should suffice to briefly revisit the two main themes of the paper.

The first is that there is an urgent need for the transformation of rural service delivery so that the outcomes are more sustainable, and better adapted to the core social and economic development challenges in rural areas.

The second is that management information and decision support systems can – and should, indeed – play a significantly positive and cost-effective role in this regard. Given that one can establish the necessary platform for effective system interoperability and information sharing – which is the main aim of the IDP Nerve Centre initiative – it is then relatively straightforward to incrementally develop or improve systems that can provide the required decision support for all the main categories of rural service delivery decisions (i.e. as outlined in Figure 2 and Table 2).

As is the case with most IT-related innovations or interventions, the core challenge is to do this in such a way that decision makers are really better empowered, and therefore not intimidated by the technologies, or forced into greater dependence on information technologists.

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