A SYNTHETIC APPROACH TO REGIONAL SPATIAL PLANNING IN LESS DEVELOPED CONTEXTS

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ABSTRACT

Large numbers of people in South Africa, and indeed globally, live in marginal regions in both rural and urban areas. While systemic problems of ecological breakdown, poverty and inequality affect all in varying ways, marginal regions are least able to cope. These problems are not self-correcting and if not addressed, the possibility of violence is high. While regional spatial planning is a potentially important tool for meeting these challenges, theoretical approaches, which largely ignore regional spatial planning issues, are inadequate as is local practice in KwaZulu-Natal, South Africa. Using the case of KwaZulu-Natal, this study proposes a more appropriate approach to regional spatial planning for marginal regions. This substantive study draws upon methodologies from a number of disciplinary fields. Through an interpretive, synthetic understanding informed by an eco-humanist ethic, the regionalist tradition, observation and precedent, a landscape-based, spatial-structural methodology is extended into regional planning. A method of regional planning, which merges thematic and geographic concepts of space, is proposed: regional spatial planning is conceived of as a counter-movement that tackles disembeddedness directly.

KEY WORDS: synthetic method, regional spatial planning, marginal regions, **s**patial development framework, KwaZulu-Natal: South Africa, methodology, embeddedness, spatial-structural, landscape character, sense of place, assessment criteria.

DECLARATION

I declare that the thesis herewith submitted for the Ph.D. in Public Administration – Peace Studies at the Durban University of Technology (DUT) is my original work and has not been previously submitted for a degree at any other university.

Julian Zygmunt Kiepiel

DEDICATION

To my family.

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ABBREVIATIONS USED

ESPD	European Spatial Development Perspective
GIS	Geographic information system
IDP	Integrated development plan
IDZ	Industrial Development Zone
KZN	KwaZulu-Natal
SDF	Spatial development framework
SDI	Spatial Development Initiative
SPLUMA	Spatial Planning and Land Use Management Act, 2013

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CHAPTER ONE

INTRODUCTION

1.1 THE ORIGINS OF THE STUDY

The origins of the study can be found in a number of observations made by the author over many years, working as a spatial planner in the province of KwaZulu-Natal (KZN), South Africa. The insights concern the nature and scale of environmental and developmental challenges facing the regions of the province.

The first is that by far the most underdeveloped regions in KwaZulu-Natal occur in areas historically under customary traditional administration: predominantly those which historically formed the 'homelands' of South Africa. The second is that the scale and depth of the environmental and developmental challenges facing these regions are huge and, in cases, seemingly intractable. The third is that the problem is not restricted to KwaZulu-Natal: there are many similar cases across South Africa and indeed, across the globe, although some of these may be somewhat different in form. The fourth is that it is becoming increasing clear that these problems are not self-correcting. They will not be solved from bottom-up alone: they need top-down assistance as well.

Finally, it is becoming increasingly clear that, despite considerable spatial planning attention being paid to these marginalised areas, there appears to be little improvement on the ground: in many cases, things are getting worse, not better. Further, related to this, it is a troubling realisation that regional spatial plans being drafted for those marginalised regions look increasingly like the plans for more resourced and better-off regions. The plans are failing to address real problems on the ground and are utilising standardized concepts that are inappropriate.

1.2 THE PURPOSE OF THE STUDY

This work seeks to address this problem. It seeks to develop a methodology and method for regional spatial planning which is appropriate in marginalised regions.

A number of points need to be emphasised about this. Firstly, the emphasis is on a methodology and method, not on developing a plan for any region of KwaZulu-Natal. This methodology is much more generic than for South Africa alone.

Secondly, the methodology draws on theoretical insights from a number of disciplinary fields related to the nature of human development and the natural condition: it seeks to integrate these insights into a coherent totality. The study concerns the substance of regional spatial planning, not planning procedure.

Thirdly, the emphasis of the study is unashamedly on spatial planning. In recent years, increasingly little attention has been paid to spatial planning in regional planning theory. It is felt that this is an important omission. While recognising that it is obviously impossible to separate spatial understanding from economic, social and political forces that shape space, the emphasis in this study is on structure and space. The study confronts aspatial reductionism that is creeping into the discipline of regional planning.

Fourthly, the study is driven by an eco-social ethic that should underpin all spatial planning. Dewar and Uytenbogaardt (1991: 13) argue that this ethic is firmly rooted on two pillars of planning consciousness: environmental (a conservation ethic) and humanist.

Fifthly, this study lies within a global groundswell of research that is confronting systemic global problems of ecological breakdown, poverty and inequality. It is intended to be a practical contribution to the discipline of peace studies: if these problems are not confronted, the prospect of it spilling over into violence is very high.

1.3 THE CASE OF KWAZULU-NATAL

Particular emphasis is placed in the study on the regions of KwaZulu-Natal, South Africa (figures A2.1 and A2.2). It is important to emphasise that this is not the focus of the study. This context has been used in a number of ways.

Firstly, the author has worked in the province for many years and the region has been important in shaping his thinking. Secondly, it has been the source of numerous field trips and conversations, particularly with rural people, that has helped understanding

the environmental and development pressures on the ground. Thirdly, it has been used as a case study to describe and, where possible, to quantify the scale of the developmental and environmental challenges facing marginalised regions of which those in KwaZulu-Natal are an example.

Finally, it has been used as a case to prove the central assumption of the work: that current regional spatial plans are failing to address the real problems on the ground. It does this by closely evaluating nine of the ten district municipal plans in KwaZulu-Natal, for which regional spatial plans have recently been drafted. The evaluation used a matrix of indicators, which are described in chapters six and seven.

1.4 AIMS AND OBJECTIVES OF THE STUDY

The aim of the research is to develop an approach to regional spatial planning in marginal areas that is appropriate to advance a significant combination of equity and wellbeing within planetary boundaries. To achieve this aim requires a substantive synthesis of diverse theoretical and codified knowledge ('embodied in the knowledge of practical experts') and observation. More specifically, the study has the following objectives.

Objective 1: To determine contextual influences that are relevant to the formulation of a regional spatial planning approach in marginal areas as in the KwaZulu-Natal case study.

The research question addressed is: What contextual influences are relevant to the identification of the spatial and physical development challenge in KwaZulu-Natal?

Objective 2: To evaluate the local practice of regional spatial planning.

The research question addressed is: Is the local practice of regional spatial planning appropriate to the KwaZulu-Natal context?

Objective 3: To evaluate the literature on regional planning theory.

The research question addressed is: Is the theory of regional spatial planning appropriate to marginal contexts?

Objective 4: To determine an appropriate methodology for regional spatial planning in marginal contexts.

The research question addressed is: What is the appropriate nature of regional spatial planning and form of the regional spatial plan?

Objective 5: To determine appropriate theory and practice relating to the elements of public spatial structure.

The research question is: What theory and practice relating to the elements of public spatial structure are appropriate to marginal contexts?

Objective 6: To synthesise the appropriate findings from theory and practice using the concept of landscape character.

The research question: How can a landscape character approach provide a foundation of a method for regional spatial planning in marginal contexts?

1.5 RESEARCH METHOD

This synthetic study draws on a number of methodologies from different disciplinary fields. It involves an interpretive approach that is suited to an art such as regional spatial planning. Context is an important point of departure in hermeneutics (Coetzee 1989: 36-38), a holistic approach which considers the mutual dependence of the whole and the parts. There a number of contextual issues that underpin this study.

One is the normative context. An interpretive understanding of planning, based on augment and not opinion, proceeds from an ethical position of eco-humanism. Another derives from countless discussions with residents of marginal regions over many years, as well community and political leaders. Also, in the new millennium, views on common issues were exchanged with a visiting delegation from a state that shares a number of similarities with South Africa.

A further contextual factor involves the tradition of regional spatial planning, in which the ecological perspective of the early regionalists is strong. In this regard, conversations were shared over the years with leading thinkers in planning and related fields, including the eminent landscape architect, Ian McHarg, on his visit to

KwaZulu-Natal in the early 1970s. Also at that time, a number of discussions were held with the ecologist John Phillips, who stressed the importance of observation that allowed accurate delimitation of bioclimatic subregions on a provincial scale by the use of indicator (indigenous and exotic) plant species.

Similarly, the researcher's observations of KwaZulu-Natal since the inception of his planning career in the early 1970s are important to the research method. From such contextual observations, assessments of need were interpreted (Kiepiel and Quinlan 2000: 52).

Also, contextual observations suggest that regional spatial planning is failing in its primary task of giving innovative direction to overcome the regional development challenges of the province. In order to prove this the 2019 district spatial development frameworks (SDFs) of KwaZulu-Natal were assessed.

Figure 1.1: Pietermaritzburg, mid-July 2021 – barricades, fuel and food queues

This study has been supervised as a doctoral exploration within a peace studies centre for the reason that the possibility of violence inherent in the contextual forces in marginal regions is high (for example, the objective conditions such as unemployment and services quality underpinning the 2021 riots in KwaZulu-Natal (Africa 2022)). At a strategic level, this thesis involves substantive issues that occur throughout a fourfold course of peacebuilding that involves establishing common intentions and norms;

sharing experiences and perceptions; exploring diversity and commonalities; and exploring possibilities for action (Schirch and Campt 2007: 36). The core of this thesis is the integration of complex knowledge from diverse fields that may subsequently be used as a concrete point of departure for deliberation on pivotal issues of regional spatial planning, which, with few exceptions, current planning has failed to do.

1.6 STRUCTURE OF THE DOCUMENT

The thesis is structured in the following way.

Chapter two identifies massive environmental and developmental challenges in KwaZulu-Natal and their relationship with the spatial challenges relating to public goods, namely, the elements of public structure and sense of place.

Chapter three tests the starting hypothesis: regional spatial planning planning is failing in its primary task of giving innovative direction to overcome regional developmental challenges in KwaZulu-Natal. Assessment criteria are formulated and applied to recent spatial development frameworks of all of the district municipalities of KwaZulu-Natal. Planning is found to be failing in its primary role in giving developmentally-positive direction to regional decision-makers.

Chapter four is a literature review of regional planning theory, particularly in the global South. It finds a number of weaknesses in theoretical positions in international practice: modernist assumptions are not entirely shed in places or regional spatial planning has been abandoned in its entirety. The chapter concludes that regional spatial planning requires a fundamental rethink.

Chapter five pursues a new way of thinking through an exploration of regional spatial planning methodology. A shift from a scientific to a normative methodology is required in order to promote the public interest in eco-social terms through sustainable development. Concepts underpinning ‘regional spatial planning’ are interrogated: the normative basis of planning and conceptions of space that should be employed in regional planning are clarified. A need-driven, design way of thinking, which merges spatial-structural and landscape approaches, is set out. Drawing on theory and precedent, a central finding is that planning must engage with global ecological breakdown and focus directly on the poorest people of the regions. This requires

spatial planning for complexity that is generated by vernacular processes. Methods are examined to pursue this.

Chapter six moves into the operationalisation of the design way of thinking. The chapter extends the previous discussion of performance qualities that planning should pursue. Directional implications for the form of a regional spatial plan are set out. The discussion concludes by drawing together the previous discussion and an overview of the nature of a regional plan.

Chapter seven extends operationalisation. Directional implications for the elements of public infrastructure and management of sense of place for regional planning are explored. A regional planning argument for the cost effective integration of the elements of public infrastructure is advanced.

Chapter eight postulates a method of regional spatial planning for marginal regions: a management tool that ensures that the proposed methodology and its operationalisation is approached efficiently.

Chapter nine concludes with some reflections on regional spatial planning. The global problems of ecological breakdown, poverty and inequality that are particularly brutal in marginal regions are not self-correcting. These seminal problems will not be improved by indirect, trickle-down actions: they need to be addressed directly. Regional spatial planning offers an opportunity in marginal regions with their weak economies to start again from the beginning.

1.7 RELEVANCE OF THE RESEARCH

From both peace studies and planning perspectives, this research is of fundamental importance for the following reasons.

First, it is clear that the scale and complexity of the emerging global tendencies and their local manifestations require an urgent and strong response. Regional spatial planning, a potentially important tool for meeting the substantial developmental challenges facing South Africa, is currently failing in its primary task of giving innovative direction to overcome these regional developmental challenges.

Assessment of recent regional spatial plans in KwaZulu-Natal reveals the inadequacy of current approaches.

Second, from a peace studies perspective, various authors have cautioned on the inherent violence in the contextual forces. Internationally, for example, the failure of climate policy will begin to impact on the nature of political economies and state functions: John Urry and Peter Christoff, for example, have argued that climate change would bring about fortress states (Gough 2017: 209), while Thomas Piketty has cautioned South Africa that if inequality is not addressed through peaceful means and peaceful democratic institutions, it would always be a potential source of violence (Motlanthe 2018: 8). For a meaningful contribution, peace building requires a strategic approach such as that offered by regional planning.

Third, draft national guidelines for the formulation and evaluation of spatial development frameworks (DRDLR 2011, DRDLR 2014, DRDLR 2017) provide insufficient substantive guidance on the manner in which plans should perform in order to give direction to budgets and controls. While the internationally-influential Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) guidelines (GIZ 2011: 164) that emphasises participatory land use planning refers to regional level planning, guidance on regional spatial planning of the elements of public structure and management of sense of place is also deficient.

Fourth, theoretical approaches to regional spatial planning are inadequate. The literature reveals that ”contemporary planning debates are too obsessed with the institutional planning frame and have become distracted from the changing content of the real-world picture” (Harrison *et al* 2021).

Fifth, planning theory in the global South is experiencing “a foundational shift toward theories which acknowledge their situatedness in time and place” (Watson 2016). Reformulation of regional spatial planning should be a necessary part of this.

Sixth, Dewar (1985) advanced a seminal regional spatial planning position in the face of underdevelopment of marginal regions of South Africa. While this spatial-structural approach has been developed extensively in urban contexts (Alexander 2005; Bacon

1974; Crane 1960; Dewar and Uytenbogaardt 1991), development of its application for regional planning is incomplete. The research seeks to addresses these gaps.

Spatial interest in mainstream regional planning peaked in the 1970s. This literary stream has since been marginalised to the extent that some consciously distance themselves from it (Bhan *et al* 2018: 13). This work argues, however, that a holistic approach to planning requires multiple conceptions of space: indeed, fundamental problems have arisen through an aspatial reductionist approach to regional planning. By contrast, recent literature on elements of public structure, fundamental to regional spatial planning, is strongly sectoral (for example, in transportation planning (Dewar and Todeschini 2004)). In contrast to Dewar and Uytenbogaardts' holistic conception of planning, the sectoral focus impedes development of an integrated approach to regional spatial planning, with severe consequences.

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CHAPTER TWO

ENVIRONMENTAL, DEVELOPMENTAL AND REGIONAL STRUCTURAL PROBLEMS FACING MARGINALIZED AREAS IN KWAZULU-NATAL: AN OVERVIEW

2.1 INTRODUCTION

This chapter outlines the enormous environmental and development challenges in KwaZulu-Natal, which is a case study of the challenges facing marginal regions. First, an overview of ecological and human development conditions of the province are portrayed. Following this, the focus is upon the spatial challenges relating to public goods (the elements of public structure and sense of place) and their environmental and developmental consequences. Finally, the importance of the KwaZulu-Natal case as a source of precedent is emphasised.

KwaZulu-Natal is a diverse and complex landscape. The province, over 90 000 km^2 in extent in the relatively well-watered summer rainfall region of South Africa, lies in a warm temperate zone between parallels 27^o and 31^o south latitude. However, the land rises rapidly from the warm Indian Ocean in the east to the Maloti-Drakensberg mountains some 160km west of the coast, with an increase in altitude of over 3000m in places.

The landscapes of the province are a product of geological build-up and geological erosion over more than 3 000 million years (McCarthy and Rubidge 2005; Norman and Whitfield 2006; Norman 2013). The physiography of KwaZulu-Natal (figure A2.3) displays a series of giant steps of relatively even land (flats, plains, benchlands, plateaux) terminated in escarpments, comprising the coastal regions; the coastal hinterland; the intermediate regions such as the midlands; uplands; the little Berg (the Maloti-Drakensberg foothills) and the high Berg (the basaltic Maloti-Drakensberg escarpment).

Geologically recent lowering of sea levels resulted in rivers cutting deep gorges into these steps: for example, the Thukela gorge at Kranskop. In the case of the Mhkomasi River, a deep gorge pushes through towards the Maloti-Drakensberg foothills. Yet

deep inland, the Thukela forms basin plainlands. As King (1972: 40) observed, it is and inverted pattern – upside down and inside out.

In contrast to Geddes' valley section, King generalises that whereas in most countries flat plains at low level are overtopped by high ridges and peaked mountains, our uplands are flat or gently rolling and our reliefs are profound valleys. This fundamentally affected the evolution of movement routes inland from the coast, which follow the knife-edged interfluves as at St. Faiths, Drummond near Assegay and on the Eshowe-Nkandla road.

Physiography is closely associated with the climatic and biological differentiation of the province. This insight was developed by Phillips (1973) on the basis of Turner's physiographic regions of the province into 11 bioclimatic groups and their subregions figure A2.4).

These features, an important key to the economic future and a range of particular lifestyles of the province, have profoundly influenced its historical development. Significantly, more than 5 million people live on communally-owned land managed by the Ingonyama Trust, which makes up almost a third of KwaZulu-Natal province (Harrisberg 2020). The Ingonyama Trust was established through legislation in 1994 with the Zulu King as sole trustee and a Board to assist with administration of the Trust. Local day-to-day administration through indigenous law is undertaken by traditional leaders (Sapsford and Vaughan 2005: 5). Trust land comprises the bulk of former KwaZulu areas (*ibid:* iii).The location of the communally owned land ranges from the metropolitan fringes to the deep rural areas (figure A2-2), where human and ecological conditions are often most severe.

Against a backdrop of the projected doubling of South Africa's population (59 million in 2020) in 51 years (United Nations, 2019), Statistics South Africa (2018: 19-20) reports the that in 2016, nearly 20% of the South African population (approximately 11 million people) resided in KwaZulu-Natal, the second most populous province in the country. The national share of population in KwaZulu-Natal between 2007 and 2016 declined by -6%. While the population showed an increase of approximately 806 thousand, the growth was much slower than that of other provinces. In 2016,

eThekwini metropolitan municipality continued to house the largest number of people in KwaZulu-Natal (3 702 231), being 34% of KZN population. The district ranking second was uMgungundlovu with a total population of 1 095 865 in 2016 (from 988 834 in 2007).

The report (*ibid*.) also indicates an increase in metro and large-city growth, with decline in the more rural districts: in terms of percentage share changes for population growth/decline between 2007 and 2016, eThekwini's provincial share declined slightly (-0,9%), although its population increased by about 6,8%. On the other hand, iLembe district (immediately north of eThekwini) indicated the fastest growth with an increase in share of 15,7%.

Prinsloo (2014: 8) cites 2011 census data that indicates a 48% urban population in Kwazulu-Natal, some 15% lower than the national figure. Entrenched forms and patterns of movement in the province, which involve out-migration, oscillating migration and commuting (Kiepiel, 1994: 12-3), are not simply unidirectional towards the cities. Historically, settlement patterns in the province have been distorted by a colonial 'reserve' system, later consolidated and extended prior to 1994 to form the current areas under traditional authority. This, together with the location of certain land reform projects in the rural periphery, has resulted in 'rural' settlements occurring from the city fringes to the deep rural areas. Therefore, whilst the commercial farming areas for the province have a developed hierarchy of central places, this is not the case in the communal areas where sprawling, low-density rural settlements dominate the landscape and the hierarchy of service centres is weakly developed.

Patterns of accessibility are complex. While the overall spatial pattern of settlement in the province reflects historical policies and economic marginalisation, at a closer level settlements have varying levels of accessibility to public transportation, social services and economic opportunities (Provincial Planning and Development Commission, 2008: 29).

2.2 HUMAN DEVELOPMENT CONDITIONS OF KWAZULU-NATAL

KwaZulu-Natal faces enormous development challenges. Province of KwaZulu-Natal (2014) provides the following overview of poverty in the province.

In 2011, KwaZulu-Natal had the third highest poverty measure of the nine provinces, with a poverty head count of 56,6%, a poverty gap of 25,5% and poverty severity incidence of 14,4%. Twenty eight percent of all KwaZulu-Natal citizens live in extreme poverty, and a further 29% of the province's people live in absolute poverty. At least 32.9% are food deprived. KwaZulu-Natal has the highest gender-based poverty incidence (45%) in South Africa: there are more females amongst the poor than in any other province.

KwaZulu-Natal also has the second highest level of rural poverty in South Africa (29%) and the second highest living in traditional settlements (54%). The province is one of the three poorest provinces in South Africa (37%) and has the largest poverty gap of all provinces: 32.9% of the population are food deprived to some extent. The following elaborates these points.

High levels of deprivation: KwaZulu-Natal Provincial Government (2017: 16) reports: "A comparison of the proportion of people living in poverty in 2011 and 2016 reveals that a lower proportion of the provincial population was poor in 2016 (7,7%) than in 2011 (10,9%). Despite the proportion of poor people declining in the province, the proportion of those who experienced severe deprivation increased slightly from 42% in 2011 to 42,5% in 2016." The problem is particularly severe in rural areas, which reflect high levels of unemployment, youth unemployment, female-headed households and dependency ratios (StatsSA No. 03-01-74, 2011: 30).

High levels of inequality: KwaZulu-Natal Provincial Government (2017: 17) concludes: "Much still needs to be done in addressing the stark reality that an estimated 47,8% of African households in KwaZulu-Natal were still categorised as low income earners in 2015, in contrast to only 21,6% Coloured, 4.3% Asian, and one percent white households being categorized as lower income. This observation is further supported by KwaZulu-Natal's Gini coefficient of 0.63, which is the second highest across all provinces after Gauteng (0.64)."

High levels of unemployment: Officially, with 33% unemployment in 2011, youth employment is very high (42%) but in many places these figures are far higher. Overall and youth unemployment (age 15-34) were above average outside the

Pietermaritzburg-Durban region. Informal employment is increasing. Calculated from 2015 Global Insight Data (KwaZulu-Natal Provincial Government, 2017: 105), while informal employment as a share of South Africa's total employment increased slightly from 16,1% (2005) to 16,6% (2015), the KwaZulu-Natal's respective shares increased from 15,5% to 19,2% (499 258 informal workers).

Aging population but high levels of young children: In 2016, a very youthful population is reported, with 71,4% of the population being 0-34 years (Statistics South Africa, 2018: 21).

High levels of tenure insecurity: Nationally, despite some urban successes the pace of restitution of rural land claims have been settled very slowly - 90 % of claimants live in rural areas, where the bulk of the land is to be restored (PLAS, 2016: 33). The debate around social tenures versus individual title (*ibid*: 81-2) is significant, given extensive communal areas in KZN. StatsSA (2011) reports an increasing trend in rental accommodation for most districts and the province as a whole (22% in 2011).

Low levels of literacy: With over 10% of people aged 20 years or older with no schooling, the provincial levels are higher than national (StatsSa, 2011, Report No. 03-01-74, 2011: 44).

Very few qualified teachers: According to an assessment conducted in 2017, teacher skills and competences are a national challenge and 'there is a consensus that KZN has the highest shortage of qualified, skilled and competent teachers in South Africa' (UKZN: undated: 4).

High levels of water-borne diseases: StatsSa (2011: 56) finds that In 2001, 26,6% of the households in KwaZulu-Natal had no access to piped water, although four rural districts reported proportions above 30%. Waterborne diarrhoeal disease typically affects people of all ages who share a common source of drinking water (KZN DOH, 2019). Such disease outbreaks are also ascribed to contaminated municipal potable water due to aging and poorly maintained water treatment and water supply infrastructure and erratic water quality monitoring. Improper treatment of sewage resulting from aging infrastructure, poor maintenance, and increasing volumes of

sewage because of population expansion without adequate sanitation planning is also a serious problem (*ibid*.).

2.3 SPATIAL PLANNING CHALLENGES RELATING TO PUBLIC GOODS

There are particular problems associated with the elements of public structure (green space, movement of all modes, social facilities and utility services, hard public open space, and settlement systems) and sense of place

2.3.1 Green space

The environmental challenge is massive. Internationally, climate change is an existential challenge that is linked to loss of biodiversity, stressed water resources and collapse of rural livelihoods in a manner in which the poor are most vulnerable. KwaZulu-Natal is no exception to this.

The province is contributing to climate change (for example, through excessive dependence on fossil fuel in electricity consumption and transportation; conversion of biodiversity-rich lands such as grasslands that are carbon sinks; and the economic base of regions with excessively large ecological footprints).

Terrestrial biodiversity losses have rapidly accelerated from the colonial era. Presently, biodiversity losses continue through conversion to agriculture, timber plantations, built development, mines and dams. The extent of change is proportionally greater in the communal areas. In 2011, loss of natural habitats of the province had passed a threshold necessary for adequate biodiversity conservation. Jewitt (2017: 190) states: “The rates of habitat loss and predicted climate change impacts in the province are moving us towards uncharted and dangerous territory for the region’s biodiversity”. Trends in land-cover change and habitat loss (major drivers of biodiversity loss) in KwaZulu-Natal unfortunately follow global trends, as Jewitt *et al* (2015: 8) highlight: 43% of land transformed in 2005, increasing to 46,4% by 2011 (*ibid*: 8), although a target of no more than 50% of habitat loss should be adopted to adequately conserve biodiversity in the province (*ibid*: 1).

Attrition of valuable agricultural land continues. Although some provincial gains in agricultural land have made through conversion of natural habitat, loss of arable and irrigable land is a particular concern. Built areas target agricultural areas: valuable land is lost though settlement sprawl on the urban fringe and in rural areas (Jewitt, 2017).

Water demand has resulted in stressed provincial water resources. Further, water quality across the province is variable, impacted by settlement runoff; mining, agricultural and industrial pollution; and sedimentation. For example, unlike a French traveller's remarks on the deep and clear uMngeni River in the 1840s (Delegorgue 1990: 101), Umgeni Water's (1997) comprehensive assessment lamented deteriorating ecological health and resource quality of the catchment: contamination from settlements, algal growth in dams, reduced water due to alien plants, afforestation and irrigation, and increased water demands with inefficient use. Water quality problems persist (Umgeni Water 2023: 112).

In two hundred years, an inequitable process of economic growth and globalisation has led to the loss of inhabited, primeval areas, together with loss of ecological resources and ecosystem services, air pollution and climate change, loss of soil, arable and grazing land (Jewitt, 2017: 14; Kings and Wild 2019: 39; Ripple *et al*., 2020; Von Bormann, 2019: 4). Insecurity in access to water and food is clear.

2.3.2 Movement

There are considerable problems associated with the movement system.

The spatial-structural significance of movement is evident. Firstly, the radial pattern of the main routes is a major spatial reason for metropolitan Durban's excessive sprawl and primacy in the province's settlement hierarchy.

Secondly, movement routes differentiate space through a zonation of economic, hence socio-economic, space in relation to the route. Historically, for example, central Zululand was peripheral to the railway network and distant from colonial markets (figure A2.5): a factor impeding agricultural development (Colenbrander 1985: 113).

Thirdly, rail, particularly where movement stops, is a powerful influence upon patterns of accessibility. Centres bypassed by rail declined or disappeared (Bulpin 1972: 245;

Prins 2017). Where rail and road are aligned, a gentle, mainly linear pattern of settlement dominated in the commercial farming areas: public and private investment supported each other. Economic growth of towns was stimulated (Lambert 1988: 132). Modal importance changed with the introduction of the car. In the early twentieth century, the close relationship between public infrastructure and settlement broke down: the car broke away from the fixed line. The earlier spatial relationship of public capital investment leading private investment was reversed.

The car's importance was compounded by the international spread of the ideology of modernism. This included a belief in technology to liberate society (such as the erroneous belief that all households would own at least one vehicle). Another was the idea of separation, particularly of work and residence. This idea accorded well with the heightened segregation of this period (Dewar and Todeschini 2004: 10-11). A process of suburban sprawl on a regional scale followed.

Further, policy issues compounded the spatial structural problems. Freight rail transport, which was protected by regulation, switched in 1977: rail faced unrestricted road competition for passengers and goods (Williams 2021). Long-distance freight transport by freeway escalated.

Figure 2.1: The N3 national road, Pietermaritzburg, February 2022.

The passenger transport system is only weakly integrated and all the major modes all try to do the same thing (Dewar and Todeschini 2004): serving long distance commuters rather than each mode doing what it is best suited to do (bus to train, taxi to bus and train stops). Physical integration of modal infrastructure is also weak, particularly in rural areas. Interchanges do not always connect as a hierarchical system (for example, bus connections with passenger rail).

Efficient public transport and local economic development are impossible in sprawling, fragmented rural areas. Further, public investment favours viable urban centres and historic destination-based patterns of movement are perpetuated.

The human, environmental and fiscal costs of this broken system are massive. Enormous amounts of vehicular movement occurs with great cost in terms of household budgets, time, infrastructure, subsidies and pollution. Freeways enable the transformation of productive agricultural land and rich biodiversity areas into sprawling, placeless, suburban, peri-urban and rural areas. Huge ongoing costs are required to maintain and restore damage to roads and freeways: these are often lacking, causing huge inconvenience and danger to passengers. Fragile just-in-time, long-distance, road-based supply chains fail in times of social unrest. Loss of rail infrastructure and in cases, rail servitudes occurs through unregulated development.

Rural poverty is perpetuated: “many rural communities lack adequate and affordable access to transport infrastructure and services. Poor access can constrain both social and economic development” (RSA: Department: Transport 2007). Movement systems are failing to deliver cheap and efficient public transport that is convenient to pedestrians. Dependence on road transport is excessive and costly while rail systems are neglected. Regional spatial structure is inadequately designed to stimulate access and economic activity. Metropolitan primacy expands unabated, together with urban-rural inequality.

2.3.3 Social facilities and utility services

Services provision is also a challenge. Spatial access to services is unequal and urban bias is evident. Rural development is challenging: thresholds (income and density) are weak in inaccessible, low density, indigent rural areas. Coordination within and

between line and point services is inadequate, compounded by different spatial approaches of sector departments. Political pressure, rather than a logical spatial rationale, drives public investment decisions.

The spatial logic of services provision is inadequate. Internationally, there is a substantial correlation between the size of settlements and the number of retail and service functions they contain (Toyne and Newby 1972: 134-5). However, throughout the province the relation between point services and settlement size is inconsistent. For example, fixed clinics occur in settlements ranging from 200 to 80 000 people (Kiepiel 1994: 127). This is symptomatic of a blurred spatial logic of all forms of services provision.

Historically, services provision related to the spatial-structural clarity of a rail-centred urban corridor that developed in regional space. Investment responded logically to the spatial clues offered by the system. Over time, an efficient and convenient linear-nodal 'beads-on-a string' pattern of corridor development arose. The contrast between this and the low density sprawl across large areas of rural space is clear. Because of a lack of a settlement hierarchy, there are no clear signals where point services should locate.

Further, there are two conceptually different but non-mutually exclusive approaches to service provision. The one is bringing people to services. In the thinly-populated commercial farmland in the colonial period, small towns were pivotal in provision of education and health services. For example, a system of public and private boarding schools was established in Pietermaritzburg and in the small towns: by the twentieth century, there were government primary schools in fifteen rural centres of Natal (Vietzen 1988: 151). Here, people were brought to the services. Historically, people in the customary areas were also brought to services, for example, to boarding facilities offered by the missions. Under apartheid, however, these functions were taken over by the state. Mission facilities closed or continued to operate under state departments (figure 2.2).

Figure 2.2: Lourdes Mission, Harry Gwala district, 2014.

Subsequently, the approach was reversed. Present provision of education services focuses on bringing services to the people. However, viability is hampered by inadequate densities (and thus thresholds): school provision for a mere 30 households in some remote areas is simply not sustainable. Appropriate use of information technology is also underutilised.

Despite an international shift to renewable energy, utility services remain heavily dependent on fossil-fuelled electricity. Utility services delivery favours large-scale centralised approaches involving monopolistic entities with few opportunities for small operators. Local resource provision is weak. Resilience of these large-scale systems is weak. The role of public infrastructure in spatial restructuring of development has broken down. Inadequate attention is devoted to project gearing, in order to mobilise other resources or elicit a range of positive responses to the highest possible degree.

Spatial provision of services, therefore, remains highly inequitable and the rural poor are the most disadvantaged. There are serious human and environmental consequences resulting from this.

Electricity generation is largely from fossil fuels. Eskom estimated, in a report to Parliament's environmental portfolio committee that in 2017-18 air pollution was responsible for the deaths of, on average, 333 people at a cost to the economy of R18-billion (Kings 2018). Water piped to settlements over hundreds of kilometres from very large dams results in enormous loss, both from evaporation and leakage. The Water Research Commission estimates that between a quarter and half of all water in

municipalities leaks out of pipelines (Kings 2018a). There are high levels of water-borne diseases: in 2011, 14% of the households in KZN had no access to piped water (StatsSa 2014: 56).

Difficult access to medical care is exemplified by hardship experienced by people with heart disease. People residing in KwaZulu-Natal districts found to be amongst the poorest in the country travelled the longest distances (Kapwata and Manda 2018: 1).

It is a long walk to school for many, particularly in rural areas. KwaZulu-Natal had the highest percentage (9,9%) of learners who walked all the way to school for more than an hour (StatsSa 2015: 45). Low levels of literacy and few qualified teaches were discussed above.

2.3.4 Hard public open space

Hard public space is important in rural areas as well as in settlements. In rural areas, they frequently accommodate periodic markets and services. In urban areas such as Pietermaritzburg with markets that serve a large hinterland, hard public open space is a significant regional element. However, this tradition of hard public space fundamentally changed in the twentieth century.

Urban planning in South Africa increasingly came under the influence of modernism since the 1930s, and this influenced most subsequent settlement-making. The ideology of modernism, also significant for regional planning, abandoned traditions of centuries of settlement making for a path without precedent. Unlike the belief in a living world of all early vernacular societies, modernism believed that all benefits are derived from a human world of science, technology and industry (Goldsmith 1992: xiii; Scott 2003: 236). A rational comprehensive model of modernist planning assumed that there was an internal logic within social relations that planning can uncover to perfect the world (Harrison 1996: 31).

Modernism included a number of key tenets: There was a deep belief in the ability of technology to overcome natural and social constraints and transform the nature of society. With the belief in industrialisation, mass production and mass housing, standardisation and environmental sterility increased (Dewar and Louw 2012: 2). The

motor car was a particularly important form of technology: the assumption that every family would own a car was relatively unchallenged (Dewar and Todeschini 2004: 11). Sprawling settlements became scaled to the car, not people.

Separation was an overriding concern of modernism. The separation of live, work and play was assumed to reduce conflict; as was separation of vehicular and pedestrian movement (Dewar and Louw 2012: 2; Dewar and Todeschini 2004: 10). Suburbia was regarded as the image of the good life, with the free-standing house on its own land parcel (Dewar 2017: 27; Dewar and Todeschini 2004: 10). Suburbia, together with the separation of urban activities, contributed to low density sprawl (Dewar and Louw 2012: 2). The individual building, not the public space, was seen as the basic building block of settlements. The structural role of the street in settlement-making, as a place for walking, playing, street trading and socialising, was consciously de-emphasised (*ibid.*).

Modernism, therefore, radically changed conceptions of hard public open space. The concept of 'street', involving public spaces that accommodate a variety of human activities including movement, was reduced to 'road' (specialist channels of movement, particularly for motor cars). Essentially, the distinction between 'street' and 'road' lies in the concept of multi-functionality: streets can accommodate a variety of human activities, albeit none of them perfectly, of which movement is but one (Dewar and Todeschini 2004: 91). Similarly, public spaces, being social spaces that can accommodate parking at particular times, became specifically designed as places for vehicle storage: the modernist concept of 'public square' was reduced to 'parking lot' (*ibid.*).

Neglect and loss of public hard space since the early twentieth century is now a regional issue. Public spaces have become parking lots or privatised as in the case of regional shopping centres. Limited access routes have negatively impacted the design and maintenance of centres of small towns. In addition to their social function, the productive functions of these spaces as market places and tourism assets have eroded.

2.3.5 Settlement system

The size and spacing of settlements is an important regional concern. Central place theory provides a comparative benchmark (Everson and FitzGerald 1971: 101-111). Walter Christaller, the father of central place theory, relates the form of the service areas of settlements to their functional structure (through the supply of goods and services) (*ibid:* 104). Based on supply and demand, it theorises the development of an efficient settlement system that minimises consumer movement for goods and services. Concepts of threshold, range and the hierarchical order of the good bear upon settlement size and spacing.

"Threshold is the minimum level of support necessary to bring a good or service into being and to sustain its viability. Range is the spatial expression of threshold. It has two limits: an upper limit defined by maximum distance people are prepared to travel in order to experience or obtain a good or service, and a lower limit defining the area within which the minimum threshold is contained. Range, therefore, operationalises the concept of hinterland. The third concept is the order of a good or service. It recognises a strong hierarchical dimension to goods and services. Higher order goods have larger thresholds, are obtained relatively infrequently and are more expensive than lower order ones. The lower limits of range for higher order goods and services are therefore much greater than lower order ones, which are cheaper and which are required more frequently" (Dewar and Kiepiel 2012: 32).

These concepts explain a strong hierarchical tendency in the spatial distribution of settlement in national and regional space: a small number of larger settlements servicing much larger hinterlands and, therefore, being spaced further apart. These larger settlements, in turn, are served by a greater number of small ones which have clusters of still smaller ones around them (Dewar and Kiepiel 2012: 32).

Based on this conception, KwaZulu-Natal has an inefficient distribution of settlements. The settlement system is dominated by its main centre, eThekwini (Durban): it shows excessive primacy.

In terms of spacing, the settlement hierarchy displays a number of anomalies: First, internationally, population distributions in urban and rural regions follow a largely

predictable pattern: as distance from a central point increases, population density tends to decline. Regionally, population density is greater in towns than in the surrounding agricultural districts (Toyne and Newby 1972: 109). By contrast, the present provincial population distribution is relatively erratic in settlement densities in comparison to international tendencies.

Second, a settlement normally qualifies as a 'town' by having an economic base (Dewar 1995: 3): in this sense, large areas of the province show no evidence of urban settlement. The relationship between population size and the functional size of settlements function is often inconsistent.

Third, there are spatial differences in functional size (rank) and spacing of settlements. In parts of the province, particularly those under customary jurisdiction, the slope of the rank-size curve is comparatively flat, reflecting a few towns on top of a hierarchy of numerous, largely undifferentiated, rural settlements: the dominant pattern is one of rural sprawl.

These distortions are fundamentally influenced by racial patterns of state land allocation and purchases in the colonial era as well as discriminatory measures restricting urbanisation. These patterns correlate with the historical divergence of agricultural development and the rise of urban economies in KwaZulu-Natal. Internationally, the common pattern is one in which the origin of towns relates to economic specialisation over a long period of time. Essentially, this involves a shift from largely self-sufficient homesteads to some specialisation and trade, in which increased productivity and incomes led to diversification of consumer demand (Haggblade *et al* 1989, cited in Dewar 1995: 3-5).

On one hand, the province's central places, based on a functional classification (Warrington 2001: 68) shows a relatively well developed hierarchy of central places in the commercial farming areas of the province. This is particularly evident in the three most productive bioregions with strong agricultural linkages with the coastal sugar and midlands mixed farming.

On the other hand, areas under customary jurisdiction display a flat settlement hierarchy associated with extensive areas of relatively low density sprawl: only two

centres in traditional areas functionally qualify as ‘small towns’. Although a system of administrative centres was established throughout the province in the colonial era, functional weakness of the towns in the customary areas is associated with a different course of agricultural development that affected their economic bases.

These issues have spatial consequences. Firstly, natural increase from a large base population drives the growth of the metropolitan population. Almost inevitably, national investment has been skewed in favour of the primate city.

Secondly, the availability of employment and quality of services tends to decease exponentially as distance from the centre and radial routes increases. For example, out of the metropolitan core, manufacturing activity concentrates along these primary routes and is relatively insignificant in remaining rural areas (Addleson 1994: 139).

Thirdly, extensive mono-culture is a particular development problem. Its negative ecological consequences are long recognised (Watt 1973: 152, 206). Further, in a context of increasing international food scarcity, the best food-producing land is monopolised. Employment is shed through increasing capital intensity of production. Where company farming internalises supply chains, urban linkages bypass small towns, tending to benefit larger urban centres, including those outside of the country’s borders.

Fourthly, the central place hierarchy is underperforming. In the communal areas where these occur at all, service centres are the smallest in the province (figure A2.6). Functions are limited to retail and government services and backward and forward linkage with agriculture are very weak (Warrington 2001: 75). There is little or no economic basis for urban settlements to arise. Over vast areas, settlement densities are too low to support viable services or public transport.

These negative patterns are not self-correcting: in cases, they are worsened by inadequate management of settled land claims, and rural informal settlements without adequate economic bases.

2.3.6 Sense of place

The province continues to experience the loss of unique and memorable characteristics of its landscapes. Since the beginning of the colonial era, the balance between primeval, rural and urban landscapes has changed continually. The original primeval landscape has largely been reduced to pockets of formally-protected areas, primarily through the impacts of agricultural and transportation network expansion, mining and settlement growth.

Agricultural intensification, utility and transport infrastructure and explosive, sprawling settlement growth have altered the character of the rural landscape. The proximate relationship between the urban and rural landscapes has broken down: earlier patterns of urban-fringe agriculture have been replaced by monoculture and peri-urban sprawl.

Regional planning approaches, involving abstract 'place-less' plans, neglect of intangible aspects of culture and neglect of the vernacular, show weak sectoral integration and reflect a loss of wholeness through neglect of the regional totality, contributing to the loss of sense of place.

Despite these problems, hints at planning for a better future can be found in KwaZulu-Natal. Lifestyles in the premodern period suggest that the vernacular precedent may inform principles that guide utility services provision (chapter seven).

Another relates to the value direction of landscape character management. Regarding perceptions of the landscape: "In every traditional cosmology, the earth is recognised as a living thing with its own spirit to which people are in some way related" (Mitchell 1982: 96). Bioregional planner Sale (1986: 220) concurs and points to the early western tradition wherein Plato referred to Gaea, the earth-mother, as: "A living creature, one and visible, containing within itself all living creatures."

The mythology of indigenous people is important, therefore, in understanding the sense of place of a landscape. As Norberg-Schulz (1980: 23) argues, mythologies arise in the manner in which people perceive a real landscape – "a concrete reality".

Moreover, its significance for planning method is seminal. Because sense of place is rooted in people's perceptions of a living earth, the erosion of sense of place of the countryside is, in the first instance, linked to the erosion of the living earth. The message of all preliterate and most early societies is the principle that it is the biophysical landscape that gives landscape character management its direction. Thus the Valley Section of Patrick Geddes (Hall 1995: 143) reflects the landscape as the primary informant, because human activities find their appropriate place in the landscape. Appropriately, they 'fit'.

The modern period also provides a source of precedent. The province's history of service delivery provides precedents relating to the gearing of service provision: investments mobilise other resources and elicit a range of responses.

Construction of the province's railways in the colonial period into the twentieth century was a massive undertaking. The railway system provided considerable employment opportunities and the electrification of the main line led to the development of a national power grid (Heydenrych and du Plooy 1994: 50).

Water supply included creative use of irrigation schemes for agricultural diversification in customary areas and commercial farm lands. A number of these remain productive and have endured to the present (Whelan 2019).

The massive public works schemes arising in the Great Depression not only aided the transformation of society but major environmental improvements resulted in addition to infrastructure projects: for example, state forest plantations in rural areas as well as urban parks and gardens were established (Owen and Sellers 1988: 129).

Based on the South African experience, Abedian *et al* (1985) identify conditions for success. They argue for skills development as well as employment creation and capital formation in public works programmes.

More recently, certain post-1994 projects involving community maintenance of local infrastructure have met with success but have discontinued for administrative reasons.

Clearly, far greater attention should be devoted to gearing in the delivery of social and utility services.

2.4 CONCLUSION

It is clear that KwaZulu-Natal faces enormous developmental challenges. The role of outside or distal forces in relation to these challenges are considerable, for example, globally important development issues such as inequality and climate change (section 6.2.1); processes of globalisation (Tonts and Horsley 2019: 122) that can erode and universalize the characteristics of a local landscape (Primdahl and Swaffield 2011); and the modernisation (section 4.2), or exogenous, model of rural development (Gkartzios and Lowe 2019: 160).

However, it is also clear that regional spatial issues, including spatial manifestation of distal forces, contribute to the environmental and human consequences posed by KwaZulu-Natal's challenges. This issue is considered further in chapter three, below, which assesses regional planning approaches by district municipalities.

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CHAPTER THREE
CRITICAL EVALUATION OF THE DISTRICT SPATIAL DEVELOPMENT FRAMEWORKS OF KWAZULU-NATAL

3.1 INTRODUCTION

Chapter two has shown that the province of KwaZulu-Natal is facing massive development challenges. Regional spatial planning is a potentially important tool for meeting these challenges, particular since 'regional' includes most of the underdeveloped rural areas of the province. This study commenced with the empirical observation that currently, regional planning appears to be ineffective and confused. However, assumptions and empirical observations are not enough. In order to prove that regional spatial planning is failing in its primary task of giving innovative direction to overcome the regional development challenges of the province, the 2019 district spatial development frameworks (SDFs) of KwaZulu-Natal were assessed. Because of their scale and complexity, these SDFs are effectively regional spatial plans.

Of the district municipality SDFs submitted to KwaZulu-Natal Department of Co-operative Governance and Traditional Affairs (KZN: COGTA) in 2019, eight of the 10 SDFs included a SDF map and discussion of this. Amajuba District omitted discussion of its SDF map (but included discussion of its capital investment framework), while uMkhanyakude offered analysis only and omitted the SDF proposals. The following discussion excludes the uMkhanyakude SDF.

Assessment criteria were constructed and applied to the individual SDFs. The criteria are explained in chapters six and seven (sections 6.3, 7.2 and 7.3). The results are summarised in the assessment schedules in Appendix 1. These show that while the SDFs are erratic, of variable quality, with strengths and weakness in different areas, they all fail to confront the major development problems on the ground. The following discusses the commonalities arising from the assessment.

3.2 COMMON FAILINGS OF THE DISTRICT SDFs

3.2.1 Issues of regional definition

The jurisdictional regions of the district municipalities are an amalgamation of local municipalities with deep historical roots.

A regional definition is useful to the extent that it serves its purpose (James and Martin 1981: 377). For the purpose of sustainable development planning, regional definition should include a range of considerations such as demographic, economic and biophysical factors. This contrasts with a limited view of a regional definition that is solely based on a district's jurisdictional area of competence. For example, in design of a hierarchy of services provision around the highest order of provision (usually an urban centre), governance is complicated if the service area of the highest-order centre falls into another jurisdictional area.

Further, different physiographic and bioclimatic types lend themselves to regionally-specific economic potentials and movement routes, which should be considered as a totality. Catchment management is a similar consideration. Water governance should be catchment-based, not simply based on jurisdictional boundaries.

The *Spatial Planning and Land Use Management Act, 2013,* (SPLUMA) in fact, makes provision for regional definition for such purposes in section 18 (Republic of South Africa 2013).

3.2.2 Working across scales

Related to the issue of regional definition is a scale issue: how a regional plan deals with issues emanating from different spatial scales. The district SDFs tend to deal with scale in two ways.

First, South African planning legislation, through SPLUMA, formulates a package of spatial development frameworks (SDFs) from the national to the local government scales of planning.

Following the National Development Plan, the Draft National Spatial Development Framework (DRDLR 2018: 89) proposes concepts of urban nodes; national

development corridors, social services provisioning, transport and communications and ecological infrastructure; and productive rural regions. Consistently, the KwaZulu-Natal Provincial Spatial Development Framework (Provincial Planning Commission 2018: 25) proposes a hierarchy of urban/service centre nodes and corridors; a provincial ecological network; and service delivery and categories of economic regions (value adding or economic support areas and agricultural service areas).

Theoretically, each higher level of planning provides informants for application at lower levels. In practice, however, the district SDFs tend simply to copy these spatial imperatives (for example, the provincial spatial framework and biodiversity conservation plans) into their plans, with insufficient contextual adaptation or consideration of implementation.

Responsible planning should explore higher level issues that may be omitted or insufficiently considered in higher level plans. In practice, issues such as climate change or catchment management are inadequately considered in the district SDFs.

Second, the statutory emphasis upon alignment requires coordination of the district SDFs with neighbouring municipalities and local municipalities within a district. In practice, corridor alignment features highly, rather than integrated planning of common regional concerns, such as a hierarchy of services provision.

3.2.3 The problem of implementation

Governance of regional spatial planning is presently a major challenge. Regional spatial planning presently rests with district municipalities that have little or no powers of implementation. The budgetary and regulatory powers of district municipalities to influence decision-making are limited. Although a district may regulate development through its by-laws, regulation is largely devolved to incapacitated local municipalities, which have a mandate to implement and manage the land-use scheme. Further, weak enforcement at the local level tends to be a problem. Budgetary powers are also severely constrained. Key elements of public investment are housed under national and provincial mandates (for example, education, transportation, health and public works).

The ability of a municipality to coordinate and integrate the functions of powerful, higher level departments and parastatals with their own internal requirements is extremely limited. For example, except for a few instances of support, planning for land reform is largely avoided by the districts. By default and through law, district issues tend to be escalated to the level of the provincial spatial framework, with its coordination and integration powers in terms of section 16 of SPLUMA.

The difficulties of the district SDFs to translate developmental values into implementable solutions undermines the coherence of the SDFs, which is a legal requirement (Republic of South Africa 2000).

A further problem arises in areas under traditional authority, a *de facto* form of development governance. Here, municipal regulation depends on persuasion. An example of this issue relates to the promotion of urban edges by district plans but without provisions to regulate rural sprawl in traditional areas where the problem is most acute.

While SPLUMA provides for national, provincial and municipal spatial development frameworks, it also provides for regional SDFs as a concurrent national and provincial competence. With this constitutional mandate for regional spatial planning by provincial government and the overwhelming inability to implement at the district level, it is apparent that presently, the regional spatial planning function is incorrectly located in the district municipality.

It would be unfair to place the blame for this at the feet of the drafters of the district plans: it is a structural, institutional problem. Nevertheless, none of the plans even confront the issue, thereby placing it forcefully on the political agenda. The choices are clear: either delegate the powers and financial resources necessary to bring about significant developmental change in the regions to the districts, or transfer the mandate for regional planning to a provincial level.

3.2.4 Excessive emphasis on land-use

The district SDFs tend to be excessively land-use based: their focus tends towards end states of land-use (programmatic plans), rather than the initiation of processes of

development. This issue has arisen despite the clear legal separation of the SDF and the land-use scheme, as well as the scheme as an implementational mechanism of the SDF in law (SPLUMA).

There are a number of reasons for this. First, the land-use emphasis arises from entrenched planning attitudes based on the legacy of modernist approaches. Second, where technical planning capacity is limited, spatial plans tend to be driven by GIS practitioners. This tendency is supported by a national drive for plan standardization under the expedient assumption of coordination. Further, the SDFs tend to spatialize sector department plans and integrated development plan (IDP) projects, rather than creating enabling structural frameworks. Third, the plans tend to be based on readily available data, which is not always appropriate for the nature of the SDF. This issue is compounded by cutbacks in planning research. Fourth, evidence of the use of appropriate provincial planning guidelines is limited. In the extreme, this requires strongly defended positions which are conceptually flawed or reflect application of high level imperatives, unworkably applied in the district context.

3.2.5 Comprehensive plans

The SDFs still seek to be comprehensive, covering a range of issues, not all of which pertain to a regional spatial plan. While the plans fail to translate appropriate values to into implementable solutions, description and analysis are excessive. This possibly relates to an expectation that solutions will drop out of analysis, which does not happen. Analysis does not automatically generate planning solutions but merely reaffirms national trends of deprivation and degeneration (Kiepiel and Quinlan 2000: 36-7). As a result, concrete solutions to issues of poverty, inequality and environmental destruction are totally inadequate in terms of the nature and scale of the problem.

3.2.6 Conceptual weaknesses

The SDFs are conceptually weak: they are not clear in their focus on and how to achieve it. They fail to focus on effective solutions to the key problems of the time. They are unrealistic in terms of the type and strength of necessary response to poverty, inequality and environmental destruction.

While poverty and inequality are rhetorically recognized in the SDFs, proposed solutions are not in scale with the nature and the magnitude of the problem. There is no indication of how poverty will be addressed in quantitative, qualitative and resource terms. For example, the plans perpetuate a system of services provision by large, centralized entities, with few positive spinoffs for most people.

Similarly, the issue of environmental destruction is neglected. For example, there seems to be no conception of the magnitude of the problem of climate change. Rather, the SDFs rely on fuzzy mitigation and adaptation measures rather than a recognition of the need to cut global greenhouse gas emissions immediately.

3.2.7 Inadequate recognition of sense of place

Sense of place receives scant attention in the plans. Where considered, the issue is linked to tourism potential. The importance of sense of place of both the townscape and landscape is underplayed.

Provincial government has provided municipal guidance on this issue. Despite this, there is even a failure to recognise the systematic landscape character assessments that were undertaken for a number of local municipalities.

3.2.8 Acontextual solutions

The SDFs frequently fail to address spatial issues of context: despite individual interpretations (for example, depicting the problem) the district SDFs have adopted a hierarchy of nodes and corridors as a standardised approach over a wide variety of contexts.

This approach is strongly influenced by the provincial spatial framework. In view of (mixed) evidence of ongoing urbanisation and in response to the post-1994 dispersion of services in accordance with local needs and demands, Provincial planning has advocated the clustering of services in nodal points, with urban centres being at the apex of the nodal hierarchy. Implicitly, urban migration and trickle-down of the benefits of development are assumed. The nodal hierarchy is paralleled by a provincial hierarchy of development corridors, adapted to the districts in varying ways. In

contexts of low density rural sprawl where there a few discernible, nodal settlements, this approach simply does not hold.

While the nodal approach may suit certain contexts, this cannot be assumed without contextual knowledge of spatial factors as suggested in the conclusion of Chapter two. For example, the basis for the provision of public transport and services in rural areas with poor accessibility and low thresholds with few urban centres is not addressed through this approach.

The problem of a single provincial approach is compounded by national framework legislation that promotes a particular spatial form of development. Section 21(d) of SPLUMA requires that the SDF map includes, inter alia, corridors, activity spines and economic nodes: effectively a national standardisation of the SDFs that facilitates GIS alignment. However, these requirements do not apply to those of a regional spatial framework (Section 19 of SPLUMA).

Further, the Provincial biodiversity and agricultural plans tend to dominate the SDF maps. Consequently, Provincial biodiversity and agricultural plans, overlain by Provincial nodes and corridors, are a common template of the SDF proposals with varying degrees of adaptation. Other than this, green space receives inadequate attention (for example, almost all the SDFs neglected the importance of a hierarchical system of connected natural habitats).

3.3 CONCLUSION

Regional spatial planning, as evidenced by the district SDFs, is failing in its task of meeting the massive development challenges of the province of KwaZulu-Natal. A new way of thinking about regional spatial planning is required. The following chapter examines the international literature related to regional planning.

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CHAPTER FOUR
THE EVOLUTION OF REGIONAL PLANNING: AN OVERVIEW

4.1 INTRODUCTION

The previous chapter identified considerable failings in the practices of regional spatial planning in KwaZulu-Natal and the need for a new way of thinking about practice. This chapter outlines shifting conceptions of regional planning internationally over time. In seeking to understand the relevance of past approaches for contemporary planning, a case for a new approach to regional spatial planning is also considered.

In order to follow the development of regional spatial planning, it is necessary to examine regional planning, which, is both spatial (involving place-bound spatial relationships and physical development) and aspatial (not primarily place-bound but with regional consequences e.g. policy). Detailed consideration of the mechanics of different positions in the twentieth century are well covered by Dewar *et al* (1986) and Todes (1997). They identify foundational shifts: the spatial implications of these are set out, below. Thereafter, more recent conceptual developments in regional planning are examined.

Central issues in the debate are established by contrasting features at the heart of early planning approaches with later developments. Further, the central assumptions of modernism, which strongly influenced certain conceptions of regional planning for over eighty years, are discussed.

4.2 REGIONAL PLANNING THOUGHT UP TO THE 1980s

Regional spatial planning has a long history. Prior to the industrial revolution, market and non-market economies operated under a long history of constraint, in which daily life occurred within constrained and immutable time-budgets (Carlstein 1982). The friction of distance in market transactions was scaled to the pedestrian and non-motorised transport. Tradition dominated socio-economic organisation: the economy was embedded in culture which, in turn, was embedded in nature.

Town building, land development and infrastructure construction were the precedents of modern planning, in that they too transformed geography (Wassenhoven 2019). For example, ancient Greek new towns were founded. In the Far East, the ancient, holistic Feng Shui approach included location and planning of cities and villages (Mak and So 2009).

Fundamental change occurred with the industrial revolution. The middle of the nineteenth century broke the rhythm of growth established in earlier times: the world had seemingly entered a new age of 'sustained growth', characterised by simultaneous rise of population, prices, Gross National Product (GNP) and wages (Braudel 1986: 617). With roots deep into the past, capitalism was in ascendance (*ibid:* 621).

Britain, which became industrialised earlier than any western other country, experienced enormous change in a relatively short period: new industrial towns arose from villages; explosive growth of existing cities took place; public health crises and urban sprawl become manifest.

Hall and Tewdwr-Jones (2020: 15) argue the parallel with the global south: urbanisation that tended to involve the poorer section of the rural population, with little or no technical skills needed by industry or the social necessities of urban life. Such rapid transformation destroyed old coping mechanisms and safety nets, creating a new set of demands, before new coping mechanisms developed (Polanyi 2001: xi).

This was a pivotal moment for planning history. Internationally, the rise of the nineteenth industrial economy 'disembedded' from social institutions and nature: 'welfare states' and 'eco-states' arose in the twentieth century in response to de facto commodification of people (labour) and nature (Gough 2017: 8-9). However, complete disembedding is not possible without the collapse of society and nature (Polanyi 2001: xxiv-xxv). In this context, regional planning arose as a protective counter-movement.

The Anglo-American tradition dominated mainstream regional planning at that time. However, Ángel Fernández de los Ríos, whose book El Futuro Madrid was published in 1868, offered a detailed vision of the future of both the city of Madrid and its greater

region, both in terms of a detailed analysis and a synthetic proposal for a regional vision (Neuman & Zonneveld 2018: 1299).

Neuman & Zonneveld (*ibid.*) argue that de los Ríos's analysis befits a contemporary regional plan based on analytical methods first proposed by Patrick Geddes as 'survey before plan' a half century later: "analysis included geologic, demographic, climatic, landscape, architectural, educational, economic, and historic elements, among others, to determine the suitability of urbanization. Infrastructure, especially transport and water, was afforded a central role." A more contemporary ecological expression occurred in Ian McHarg's (1971) landmark book *Design with Nature*, a century later (Neuman & Zonneveld 2018: 1299).

The early part of the twentieth century was dominated by the influence of the regionalist school (characterised, for example, by the work of Geddes, Odum, MacKaye and Mumford). Their central concern was with retaining regional identity and a 'natural balance' between human activities and the natural landscape, particularly in the face of rapid industrialisation and urbanisation. Central to this school of thought was the concept of a region as an empirical reality – a place in which people dwell, work, recreate and through which they move (Dewar and Kiepiel 1997: A1). Characteristics of this school, which may be contrasted with later approaches, included:

Situated plans: Plans that start with an understanding of context (for example, Patrick Geddes' method of survey-analyse-plan and the Spanish method, discussed above). The early regionalists grasped the dominant human and environmental problems of their time, such as disembeddedness with its social and spatial consequences.

Holism: A holistic approach was essential in order to synoptically capture the complexity of the issue as a totality. This stands in stark contrast to later abstract or economically reductionist plans.

Place: A concern with real places and the real people who live in those places, not merely abstract spaces.

Culture: The importance of tangible and intangible aspects of culture were affirmed. For example, Geddes emphasised the fundamental unity of culture and nature (Wahl 2017). Similarly, Geddes' follower Lewis Mumford (1981) set out the approach of the regional planning movement in his 1938 text *The Culture of Cities.*

Cultural regions: Culture and place were central. Vernacular regions, perceived to have a particular identity (Norton 2000: 126-7), was the focus of planning.

Regional balance: Benton MacKaye strongly emphasised the need for balance between the primeval or wilderness, rural and urban landscapes of society. This was not simply a restatement of picturesque aesthetic theory, but a contrast between the earlier vernacular and the metropolitan, global industrial landscapes. In his view, the task of the regional planner was to reconstruct and conserve environments of that older indigenous America, the primeval wilderness, the early village communities and 'the real city, the complement of the real village' (Hall 1995: 154).

Economic balance: Benton MacKaye formulated the central tenet of regionalism. He defined self-sufficing regions that are in economic balance but few regions exhibit in pure form; wholly specialised regions in which only a fraction of the region's people receive sufficient income to import ingredients necessary for a more rounded regional culture; and regions that are partly self-sufficing and partly specialized: culture regions need this type of economic base (Mumford, 1981). Economic diversification, therefore, is prominent in culture regions.

Design tradition: "Geddes provided an early example of a drastically expanded conception of design. As a promoter of the transdisciplinary exchange of knowledge, public education, and engaged citizen responsibility through direct participatory action, Geddes articulated the role of the designer as integrator of, and facilitator between, diverse knowledge domains, as well as theory and practice" (Wahl 2017).

However, the tendency of the early planners to see all regional problems as capable of physical, technological or spatial solutions is a limitation that carried forward (Hall and Tewdwr-Jones 2020: 57).

Static visionary blue-prints: Generally, the early planners were concerned with producing statements of the future end states of the regions they desired to see, which seldom admitted alternatives. Howard and Geddes are exceptions to most of this criticism. More so, Geddes was particularly concerned that planning should start with the world as it is and try to work with the economy and society, rather than imposition of its own arbitrary vision. (Hall and Tewdwr-Jones 2020: 56).

While this idea of regional planning gained momentum, the regional vision was not fully realised. In the American example at the time of the Great Depression, Roosevelt's New Deal gave rise to the Tennessee Valley Authority. This involved river-basin development of a poverty-stricken region the size of Britain. While it promised realisation of regionalist ideas, in practice construction of dams for large-scale power production were directed at industrialisation. Community development, health and educational services received a fraction of the total budget (Hall 1995: 161-164).

In Britain, planned urban decentralisation and the new towns movement followed Howard's principles, established nearly a half century previously: none were so broad in scope as Abercrombie's 1944 plan for Greater London (Hall and Tewdwr-Jones 2020: 70-1).

By the early 1930s, modernist beliefs were in ascendance. Although certain characteristics of the early regional approach such as the blue-print plans were modernist ideas, modernism marked a shift from the early regionalist vision. A number of precepts of modernism were discussed in Chapter 2. A number of points are emphasised below.

First, modernists viewed all benefits, therefore welfare, as a product of science, technology and industry, and of economic development that makes this possible: to maximise welfare, economic development should be maximised (Goldsmith 1992: xiii). This development notion of the continuous economic growth of a mass economy is one for which there are no precedents in human history. In the face of present global problems, it is a development approach that is not aligned with reality.

Second, the international ideology of modernism supported the tendency towards placeslessness (Fanfani and Ruiz 2020: 4).

Third, modernism introduced a planning approach based on a positivist, rational, comprehensive mind-set, in which quantification featured strongly. Scott (2003: 239) argues that this planning style as a form of knowledge and control involves a narrowing of vision, which focuses sharply on limited aspects of a complex reality. Further, by placing land-use central to planning, an institutional offshoot was the separation of planning into its constituent parts (for example, the separation of economic and environmental planning) (Dewar 2011: 242).

During the 1930s, as a result of the great depression, regional planning was concerned with the economic growth and the decline of regions (Hall and Tewdwr-Jones 2020: 59). By the early 1940s, reactive planning changed towards Keynesian policies for promotion of greater regional convergence in employment and incomes. A move towards medium- and longer-term indicative planning became significant (Dewar *et al* 1986: 12).

Post-war policies were based on Keynesian welfare economics. This entailed a commitment to full employment, state regulation of key industries and a comprehensive welfare state (Gough 2017: 10). This period reflected growing concern for national economic development in developing countries, followed by regional polices in the 1960s. Further, ideals of organised modernity were at their height (Brookes and Harrison 2012: 95).

The focus became a search for internationally-standardized approaches to regional development: central components were economic development and the organisation of regional space to stimulate this. Since that time, a number of schools have emerged about preferred models relating to the interrelated issues of stimulating economic growth, the distribution of the benefits of that growth and the ways of improving the quality of life of people in the regional landscape. Drawing heavily on Dewar *et al* (1986), the following focuses on spatial implications of these approaches.

Dewar *et al* (*ibid*: 32) argue that various theories regarding how economic development occurs, how settlement systems emerge and transform economic and

social space, and how development impulses diffuse within a nation or region, were integrated to form policy instruments. Because the focus of spatial policy was upon settlements, the spatial implications of modernisation and respondent theories are discussed by Dewar *et al* (*ibid*.) in terms of settlement policy as a mechanism for promoting industrial development and rural development, as a reaction to city size and as a means of service provision.

The modernisation paradigm involves a number of theoretical threads, which John Friedmann systematically linked to explain the development of the space economy. Modernisation defines national or regional development as the transformation of nations or regions from 'backward' to 'modern'. Implicitly, success of this top-down growth process would automatically benefit the majority of inhabitants. Urbanisation processes and urban centres in particular assumed a fundamental role in economic development as centres of innovation that expedite specialisation.

Firstly, the causes of economic growth under the modernisation paradigm in the 1950s and 1960s involved two demand-based growth theories. These theories, which significantly affected regional policy internationally, are export-base theory, derived from theory of international trade, and sector theory. Of these step-down theories of national development, the latter was more significant in regional development in many developing countries.

Sector theory assumes that economic growth occurs through discrete stages from predominantly primary to tertiary sectors, accompanied by increases in income per capita and economic output (GDP). Specialisation, division of labour and efficiency increase. Advanced sector innovation and modernisation of the dual economy are central assumptions.

Secondly, economic development and settlement theories influenced ideas on the initiation and diffusion of development. Patterns of spatial investment was a common issue in both developing and developed countries.

The notion of balanced growth, traceable to MacKaye (Mumford 1981), was largely replaced by that of unbalanced growth by the late 1950s. With balanced growth, investment diversified over a broad range of sectors and industries. However,

unbalanced growth held that investment should focus on relatively few, propulsive, sectors with the strongest backward and forward linkages. From these linkages, growth would 'trickle-down' relatively automatically. Concentrated investment, therefore, initiated self-generating growth. Into the 1960s, the 'industry first' argument, rather than agriculture, prevailed. In practice, developing countries tended towards urbanisation and industrialisation, primarily through import substitution.

Thirdly, settlement theory was fundamental. Under modernisation, rank-size and central place theories influenced views on settlement role in regional development. In sector theory the diffusion of innovation is the primary motor of development, which also defines the top-down nature of the paradigm.

Here, theoretical development of innovation theory was linked to the functional size of cities and the urban hierarchy. Inter alia, modernisation posited that pulses of change occur in a trickle-down process down the urban hierarchy if an adequate threshold or level of demand exists. Spatial limits to the spread of innovation was related to thinning out of communications and contact away from urban centres.

Rank-size theory linked the level of a country's development with the rank-size distribution of its settlements. Despite inconclusive empirical evident, a log-normal, rank-size distribution of settlements became the preferred, more developed, modern pattern.

Central place theory regarded efficiency as the organising principle of the size and spacing of settlements: resultant space is organised through a hierarchy of central places. Originally developed by Walter Christaller in the 1930s, the postulation of an interlocking and nesting hierarchy of different sized settlements became the preferred state. It was assumed that if that pattern was absent, the region was not being optimally served.

Fourthly, Friedmann's core-periphery theory, which integrated these theoretical threads, explained economic, socio-economic development and political development of the space economy and its settlement system over time. It recognised a strong localizing, or polarizing, principle in spatial organisation of economic activity. This uneven nature of economic growth in space gave rise to core-periphery theory.

Sector and social change theory were combined and spatialized in a closed region in core-periphery theory. Like sector theory, it is descriptive. Friedmann conceived four broad stages, each with a characteristic space economy and settlement hierarchy. From a preindustrial economy with largely unrelated settlements, transition occurs with manufacturing growth: a 'dualist' structure emerges with a high degree of primacy. The gap between core and periphery widens. As the benefits of industrial growth spread, the space economy becomes more integrated: the settlement hierarchy moves closer toward log-normality. In the post-industrial stage, the economy is completely integrated and urban dominated. The periphery disappears.

Once initiated, it regarded the economic growth process as relatively automatic: the primary role of regional policy is to initiate growth and remove obstructions to the transformation process.

While sector and export-based theory suggest an initial agricultural stage, policy intervention in the second, urban-industrial stage is not precluded. Rather, urban and settlement systems are central and the primary basis for the predominant use of settlement systems in regional development at that time. Urban centres were seen as central in initiating development impulses and internalizing local economic multipliers.

As the transformation process occurs, Friedmann postulated: "a political change from a highly centralised to a polycentric system of decision making; a socio-cultural shift towards a continuously modernising surface, characterised by increased inter-group action; an economic shift towards increasing decentralisation of economic activity and a reduction of inter-regional disparities; and a spatial shift from a high degree of primacy towards an integrated city-size hierarchy: a log-normal, rank-size hierarchy" (*Dewar et al*: 1986: 27).

In policy terms, definition of generic problem regions involving the core and peripheral regions are amenable to relatively standardised policy prescription. This applies to the transitional phase, when interregional disparities are strongest.

Finally, growth pole theory was central to the initiation of the growth process. Promotion of industrial development under modernisation spatialized growth pole

theory, originally developed in response to perceived excessive metropolitan size. The propulsive industry, with large firms with strong internal linkages and control over backward and forward linkages, were seen as central and not incompatible with other growth theories.

This economic theory became linked to sector theory as the spatial equivalent of polarized economic space. Innovating activity became manufacturing activity with inter-industrial linkages. Growth poles became large, innovative fast-growing manufacturing industries. Planning theory assumed diffusion of innovation occurred through the urban hierarchy. In turn, this relied on location theories such as central space theory. Growth pole potentials tended to be seen as urban: the abstract economic core became the main urban centre. This became a technically and politically appealing spatial instrument for regional development.

Because propulsive industries were difficult to attract to peripheral regions, over time growth poles became any industry. Spatially, larger urban centres were viewed as alternative core areas in the national space economy. While urban size per se was of little sector theoretical concern, balance between settlements was. Attempts to manipulate the urban size hierarchy towards log normality also involved a blurring of rank-size with population size. Similarly, communication as a precondition under the innovation concept became synonymous with transportation.

In practice, similar policy instruments were directed at very different regional problems: excessive large-city size; new towns in peripheral regions; and as growth poles in lagging regions; and satellite metropolitan fringe towns. For example, under apartheid industrial policy, Durban's regional plan proposed an urban fence to restrict excessive city size with industrial deconcentration into the metropolitan fringe (TRPC 1974).

Development policies of the 1950s and 1960s focused on industrial rather than rural development. However, small urban centres were seen as having a role in the commercialisation of peasant agriculture and modernisation of depressed areas, spatialized through central place theory. In this regard, sector theory linked modernisation to 'modern' services provision. To guide services investment, precise

Christaller geometry was uncritically assumed. In developing regions, however, services were incidentally tied to growth poles that would also provide for surrounding rural areas.

From the 1960s, shifts in thinking occurred on the meaning of development, causes of underdevelopment and means of promoting development, with considerable overlap in the different positions. Changing economic and political conditions, the influence of international lending agencies and the relative failure of regional policies influenced change. Further, major intellectual influences occurred around economic structuralism, conceptualisation of the planning process and ecology.

The dependency theorists (economic structuralists) such as A. G. Frank (Dewar *et al* 1986*:* 64) challenged the fundamental assumptions of modernism relating to the linear path of development, the dual economy and diffusion of benefits downwards and outwards. For example, while modernisation assumed the predominance of trickle-down effects, dependency theorists argued that trickle-up occurs with a systematic process of underdevelopment.

Increasingly, structuralist theories challenged the necessity of a concrete region. These theories ascribed regional development or retardation almost exclusively to over-arching macro-forces, while ascribing almost insignificant impact to local forces (Dewar and Kiepiel 1997: A2). This position was influential until the emergence of structuration theory in the mid-1980s, reaffirming the centrality of people in place (*ibid.*).

In terms of the planning process, from about 1960, a systems view of planning challenged the earlier static, blue-print approach (Hall and Tewdwr-Jones 2020: 309). In this era of positivism, conceptualization of regions shifts to more abstract, primarily economic spaces. The models, therefore, became increasingly abstract, econometric and quantitatively based (Dewar and Kiepiel 1997: A2).

From the late 1960s into the 1970s, the idea of planning process emerged as "continuous participation in conflict both through and against plans" (Hall and Tewdwr-Jones 2020: 309). With their analytical focus, structuralist theories raised issues central to planning. 'Who benefits' became the ethical starting point of

planning. Related, ‘who decides’ marked a major shift from top-down approaches to one of ‘participation’. An enduring consequence is a problem of legitimacy of who controls regional planning (Hall and Tewdwr-Jones 2020: 326).

A thread of planning thought, which had never been entirely lost, re-emerged in a groundswell of ecological thinking such as *The limits to growth* (Meadows *et al* 1974). This trajectory later consolidated into a position on sustainable development with its definition in the 1987 Brundtland Report. The focus shifted from singular, environmental concerns to a more eclectic conceptualisation of sustainability. However, Haughton and Counsell (2004: 143) argue that a feature of this integrative approach is that it is “subject to being adopted and adapted in multiple and conflicting ways”.

The following positions emerged in response to the perceived deficiencies of modernism.

Redistribution through growth, which gained momentum with International Labour Office promotion from the late sixties, accepted much of the modernisation approach (Dewar *et al* 1986: 73). It remained committed to globalisation and the central role of multinational capital in the development process. However, it recognised that many of the structural problems could not be cured simply by faster growth: the form of growth should explicitly deal with redistribution. Growth was seen necessary for redistribution and redistribution a precondition for growth to stimulate local demand. The primacy focus shifted to agriculture, with reorientation of industry towards a more decentralised pattern of industrialisation and urbanisation.

Rural development, with a focus on small-scale subsistence farmers, was central. Under the concept of ‘integrated rural development’, a mutually reinforcing package of inputs was coordinated through a system of central places or market towns. Focusing on the bottom of the urban hierarchy, the spatial distribution of settlement employed central place theory. These small urban centres were points of marketing and essential backup services: central to modernisation and commercialisation of peasant-based rural areas.

In practice, few of the ideas were applied in developing countries. Despite being widely criticised, the approach was a basis for subsequent positions.

Basic needs approaches arose in the mid-1970s in reaction, particularly by International Labour Office economists, to ongoing international poverty under the previous policies (*ibid:* 85). Poverty required direct action through the basic needs approach, founded on a minimum set of goods and services, guaranteed to the lowest-income target group. Although generally rural in focus, the concern was people and not explicitly inter-regional disparities.

There are conservative and radical approaches to basic needs. The former is effectively a social welfare adjunct to existing policies of short-term assistance: in the long term, increasing productivity of the poor was necessary to reduce absolute poverty. The radical approach argued for structural change in developing countries, through redistribution of wealth, income and effective power: in the long term, the poor satisfy their own basic needs. Here the bottom-up, participative form of growth is important (for example, knowledge and local resources in local need identification and project design and implementation). Both approaches, therefore, accept economic growth either in usual or radically altered form.

The spatial implications of the approaches were led by bias away from large-city industrial growth. This bias is more related to primacy and urban investment bias than size *per se.* Rather, the approaches emphasised rural agro-industry, with an emphasis on small settlements containing agricultural and other small-scale industries, marketing and support services to agriculture. Access, electricity, premises and materials were central.

The form of a settlement system largely resulted indirectly from specific rural development measures. They argued that rural development relies as much on appropriate stimuli as spatial ordering: land reform and a more even ownership pattern which encourages development of small centres. In this regard, efficient and viable provision of social and utility services made accessible to the poor through the central place hierarchy is central.

The approach has been criticized for its assumptions of major viability of the most marginal areas; naivety and Utopianism.

Agropolitan development and selective territorial closure, associated with J. Friedmann and C. Weaver, arose in the late 1970s as regional approaches, largely as a reaction to, and reversal of, previous spatial policies (*ibid:* 97). It calls for spatially defined development: territorial as opposed to functional integration. A development precondition is withdrawal from the global capitalist system. It attempts to fuse aspects of radical basic needs with territorially-defined, bottom up development. In this regard, it explicitly recognises contributions of the early regionalists (Weaver 1978: 407-8).

While core-periphery theory forms its conceptual base, it maintains that the periphery is underdeveloped because of its contact with the core, particularly its institutions such as multi-national corporations. The solution to underdevelopment was seen as endogenous development via regionally-defined objectives; and protection from external influences and demands through partial or selective territorial closure. Through this, regions (peripheries) functionally disengage from an integrated global capitalist system.

Spatially, the settlement system is seen as the means of spatial organisation and territorial development, particularly for marketing, decentralised administration and political organisation, rural support services and social amenities. Each level in the hierarchy is associated with a level of bottom-up control.

However, less importance was placed on 'urban' as a productive and integrative force than in the growth-centred approaches. A decentralised urban settlement pattern is envisaged: internal, rather than external, accessibility is emphasised. In this sense, the unit of production is the hinterland, not the centre: urban areas were intended to serve the hinterland. Services provision is integral to this.

In this conception, the nation is seen to be composed of a network of agropolitan districts. Each district houses twenty to a hundred thousand people, with a radius defined as a day's travel on foot or cart. The district is organised around a small settlement that supports agriculture and essential services provision. In Friedmann's

Mozambique proposals, no outlying centre is more than 60km from the district capital and two-thirds of the population within 30km. Below the level of the district capital, smaller centres of a minimum of 1000 to 2000 people provide basic services.

The approach has been criticised in terms of problem identification and naïve Utopianism. However, Dewar *et al* (1986: 106) argue that the central concerns underpinning the approach are valid in many contexts, for example, the need to uplift small agriculture; difficulties of certain rural regions in competing nationally and internationally; flooding of local markets by stronger regions; erosion of regionalisms and supportive social institutions; and skills shortages impeding diffusion of innovation.

By the early 1970s, with the failure of indicative planning, long term coordinated economic planning in Europe and North America was largely abandoned, in the face of difficult and unpredictable world conditions. Shifts from crisis management to austerity measures were extended to full monetarist policies in a number of countries. The aims was improved efficiency and international competitiveness of the domestic economy.

In the 1970s, the Keynesian mode of regulation began to be replaced by *neoliberal capitalism* or *neoliberalism*. Since the 1980s, neoliberalism, with defining beliefs in market superiority and denigration of big government and collective activity, became a distinct phase of capitalism (Gough 2017: 10-11).

Despite an increasing realisation that poverty and inequality need to be addressed directly, the historical preoccupation with economic growth never entirely disappeared. The primary form of this was accelerated growth models.

Accelerated growth approaches, promoted by the World Bank, mark a return to development through increased interconnection into a unified world capitalist system (Dewar *et al* 1986: 109). To some extent it represents continuation of modernisation but with some significant changes. It is a re-emphasis of a previous, ongoing concern for economic growth. A significant assumption was that economic activity does not necessarily have to be developed where people live: migration is implied.

By the early 1980s, a new approach, export-oriented industrialisation, was evident, although in certain countries the emphasis was on agricultural development. However, the following were widely promoted: accelerated growth as central to development; promotion of free market forces; a reduced role of the state; and an outward economic orientation.

Spatially, it was argued that promotion of industrialisation builds on the strengths of the most productive regions, maximizing investment cost-effectiveness. In large, old cities in the developed world, capital was encouraged to locate in free enterprise zones. While these efficiency approaches are theoretically compatible with large city size, in practice, curbing growth of the largest cities was sometimes advocated.

Investment in marginal regions was seen as plausible where unexploited resources can be easily developed or where investment stimulates national growth. For agricultural modernisation, small and medium-sized towns with strong communication links with export markets were emphasised. In practice, the approach used elements of settlement policy from previous positions, such as small town stimulation or promotion of a central place hierarchy: provision of state welfare or private-sector services follows logically.

Accelerated growth has attracted a number of criticisms, including the major criticisms made by the dependency theorists, such as that of relatively automatic trickle-down of economic growth.

Meshed policy approaches were more pragmatic development approaches of the early 1980s with several proponents (*ibid:* 118*)*, which featured increased economic growth with greater social justice; merging top-down and bottom-up approaches; recognising the importance of the spatial and aspatial; recognising the importance of contextual factors; and viewing the settlement system as a whole and as opposed to any one part. However, one pragmatic approach with blueprint features stresses the role of secondary cities in development.

From the 1980s, a hiatus developed in the theory and practice of regional spatial planning. Globalisation was unchallenged until the beginnings of new regionalism.

4.3 AFTER THE 1980s: THE NEW REGIONALISM

Following the 1980s, international interest in regional spatial regional issues declined rapidly. There was an increasing realisation that there was no one approach that would lead to greater regional balance. More recently, however, there has been in some quarters, a growing interest in regional space. This has taken the form of 'new regionalism' (Rogerson 2009).

The following conceptions of how economic development occurs underpin new regionalism. First is the role of agglomeration and of clustering of firms: efficiency is boosted in tightly linked and spatially concentrated clusters. While benefiting all firms, this particularly benefits the growth of small and medium enterprises. Locational clustering stimulates growth and further clustering. Agglomeration advantages and collective efficiency of clusters involve two broad effects: one is the raising the conventional economic benefits that lower unit costs; the other relates to knowledge economies and learning.

Second, places are conceived as a "complex of social relationships, norms, institutions and understandings" (Keating 2001, cited in Rogerson 2009: 117). Place itself is a factor of production as is social capital: patterns of relationships and trust that facilitate a balance between cooperation and competition. The embeddedness of such non-economic factors, the 'untradeable interdependencies', in turn plays a key role in successful endogenous development.

Third, institutions – recurrent patterns of behaviour - and institution building are seen as important in regional development. Institution building involves both the development of social and cultural relations: decentralisation of government at the regional scale is salient to bottom-up policy.

Scott (2002: 153) summarises the positive externalities and increasing return effects of agglomerations, which form a basis for policy interventions to catalyse networks and collaboration, with small forms and endogenous development as a key focus; labour training; learning and innovation, including networks and linkages those between firms and universities and research centres; institution-building; and

infrastructure and planning: for the developing world a focus is industrial parks, export zones or special economic districts (Rogerson 2009: 120).

Spatially, new regionalism argues for a drive for economic efficiency through urban-based clusters of global competitiveness. The global city region is seen as the motor of the new global economy. Scott (1998, cited in Rogerson 2009: 128) argues that the contemporary economic system includes two different kinds of economic activities, with different network relationships and location preferences.

One involves economic activities that are highly routinized: such activity can be planned with some confidence and operate over very large scales. These economic activities depend on land, labour, tax and regulatory environments rather than adjacent, functionally related firms.

The other involves typically non-routinized activities. These industries and services activities are characterised by high levels of uncertainty, innovation and flexible production systems: they are transaction intensive and highly susceptible to externalities, hence the call for agglomeration. Examples include high-technology industry, cultural-products sectors, media, business and financial services. These are regarded as the economic motors of the city regions in which they reside. Such activities are a focus of polycentric development.

Hall (2001, cited in Rogerson 2009: 130) observes the dispersal of the high-level intelligence and control functions of global cities over a wide geographic area: a polycentric geographic structure with decentralised, networked functions. Hall argues that the polycentric global mega city region is the emerging reality of 21st century urbanisation. The 1999 European Spatial Development Perspective (ESDP) illustrates a policy response in this regard.

The ESDP addresses economic competitiveness, spatial balance and social cohesion at the European scale. Perceived overconcentration in the mega-city regions in north-west Europe is addressed through the urban hierarchy, through the promotion of polycentric development and decentralised concentration. Hall and Tewdwr-Jones argue that the significance of ‘polycentric’ varies with scale and context.

The European scale of polycentricity involved diversion of some activities from global cities like London, or perhaps Paris, to sub-global centres such as Brussels, Frankfurt or Milan. A number of these are outside of the European core and serve broad but sometimes thinly populated territories (Hall and Tewdwr-Jones 2020: 268-270).

At a finer scale, polycentricity can refer to the outward diffusion from the national or provincial capitals to smaller cities within their urban field of influence. Generally, however, deconcentrated concentration could be applied widely but contextually, through clusters of development along development corridors with strong public transport. In more remote regions, polycentricity could build the potential of regional capitals and smaller country towns. The growth of such centres could involve moderate deconcentration to smaller, proximate rural towns (*ibid:* 270-1).

In essence, polycentricity distributes economic functions and activity over the urban system in such a way that the urban hierarchy is flattened in a territorially balanced manner (Meijers *et al* 2007: 17; Rogerson 2009: 125). At the regional scale, it refers to outward diffusion of development from major cities to smaller cities and towns (Pain 2005, cited in Rogerson 2009: 125).

Significantly, in 2010 "the ESDP was stripped of the maps that alone could have given it some operational force" (Hall and Tewdwr-Jones 2020: 272).

In South Africa, new regionalism is manifested mainly in the planning of the Gauteng city region (Rogerson 2009: 133).

Further, the United Nations Human Settlements Programme has developed a spatial development framework method for states with weak planning systems. Applied in Africa, it intends "to support planning and decisions regarding the location of economic activities and to enhance the understanding of the current socio-spatial relations" (Spaliviero *et al* 2019: 249).

Its references to cluster and corridor development suggest the influences of new regionalism. Application of central place theory (as opposed to simply its principles) features highly in this method that seeks to identify the spatial structure of the region: economic development areas, development corridors and nodal towns are identified.

The method claims to be flexible and adaptive, implementable in different contexts and at various scales. These characteristics, however, lean towards blueprint approaches.

While the approach helps understand the potential of new town sites, it faces the same criticisms of the KwaZulu-Natal nodes and corridors approach, discussed previously.

New regionalism has been variously criticised as a universal panacea; for failing to explain regional economic development in general; and as a poor general guide for regional policy formulation. Some regard it as an instrument of neo-liberalism that may accelerate wasteful territorial competition: an emphasis on the competitive region underplays issues of regional underdevelopment, distribution and welfare. Claims of territorially autonomous regions in the economic landscape, to the point that they are completely disembedded from their national social foundations, are viewed with suspicion by some (Rogerson 2009: 121-3).

However, new regionalism raises a number of valid issues, including the importance of sustainable development, place, culture and non-material factors in development. Specifically, the importance of knowledge and learning is affirmed as well as face-to-face exchange. Although polycentricism encompasses hierarchical diffusion through the settlement system, the approach also suggest the influence of network theory in conceptualisation of diffusion.

More recently, 'spatial targeting', which refers to the focus of investment of different types, has been used. South Africa provides an example. Although supported in South Africa's *National Development Plan 2030*, a 2009 World Bank report argued that spatial targeting should be avoided except in special circumstances. Besides apartheid's industrial decentralisation, spatial development initiatives (SDIs) and industrial Development Zones (IDZs) are regional strategies of spatial targeting. The focus of these public sector-led policies, with a few public-private partnerships, is on stimulating economic development (Todes 2013: 2-3).

Todes (*ibid:* 23) argues that SDIs in South Africa have had mixed results: their nature and successes have varied with context. These public programmes tended to be short term and lacking a holistic framework for sectoral integration.

Arguably, these initiatives should be seen as implementation mechanisms rather than regional planning approaches. As such, they should appropriately be housed in regional spatial plans. In this regard, successful SDIs have highlighted the importance in implementation of dedicated development agencies and funding sources.

IDZs were an offshoot of the SDIs, built as industrial zones linked to a port or airport for investment in export and related industries. It was intended to stimulate growth and employment creation though direct foreign investment and the export of value-added commodities. However, this public-sector led approach, that includes infrastructure development, is widely considered unsuccessful (*ibid:* 30-1).

4.4 CONCLUSION

This overview suggests that mainstream regional planning has lost many features of the early regionalist approaches. For example, since the last century, an understanding and appreciation of the real geographic distinctiveness of places has largely been shed from mainstream planning (Hall and Tewdwr-Jones 2020: 335). In contrast to the holistic position of the early regionalists, the later approaches to development have tended towards reductionist positions with the following commonalities.

Firstly, the importance of economic growth was unquestioned. There has been a strong tendency towards unbalanced growth. The OECD in 2007 cautioned on the risks of programmes that give preference to certain sectors (Rogerson 2009: 135).

Secondly, the form of growth has tended to derive from large-scale industrial enterprises. Assumption of trickle-down of the benefits of growth has been a strong tendency. However, there are some exceptions in the bottom-up approaches. Agropolitan development was concerned with regional self-reliance and small-scale economic activity, directed at meeting basic needs (Dewar *et al* 1986: 98). The basic needs approach focused on labour intensive production, using local resources and locally appropriate technology, directed at meeting local needs (*ibid*: 90). Further, new regionalism has also emphasised the importance of small firms and endogenous development (Rogerson 2009: 120).

Thirdly, despite a concern with spatial balance in regional welfare, integrated approaches to regional balance in MacKaye's sense have not been the highlight of mainstream planning. Rather, in the face mounting economic austerity, deregulation and economic growth at all costs, conflicts with environmental concerns have become inevitable (Hall and Tewdwr-Jones 2020: 328).

Finally, all approaches assumed that policy could bring greater balance - positive change - if the settlement system was brought to balance. This took a number of forms: growth poles to shift away from primacy, rural service centres, secondary cities, polycentric development and so on. Overall, a continuum of settlement sizes involving a log-normal, rank-size distribution of settlements was the preferred, more developed, modern pattern.

Since the early 2000s, planning has been weakened by a sequence of events that has affected belief in the planning process and the parameters within which it operates (Hall and Tewdwr-Jones 2020: 309). Over the last 30 years or more, there has been a greater tendency in some advanced economies to reduce or remove aspects of regional planning, perceived as an enemy of free enterprise and an unwelcome intervention to a preferred, disruptive world (*ibid*: 331).

Harrison *et al* (2020: 6) argue that contemporary planning debates have become too obsessed with the institutional planning frame and distracted from the changing content of the real-world picture. They argue that we have come to the end of regional planning as we know it (*ibid*: 9). "The proposition is simple: we need to recognize the world for what it is, not as it once was, and to plan accordingly. To do this we must direct our attention back toward the content of the picture rather than the institutional frame which we have become increasingly fixated with." This is an implicit return to Geddes' contribution. Planning was to be firmly based on the study of reality (Hall and Tewdwr-Jones 2020: 46).

Rhetorically, planning theory from the global south concurs. It is said to be experiencing "a foundational shift toward theories which acknowledge their situatedness in time and place" (Watson 2016). However, in a recent *Companion to*

Planning in the Global South (Bhan *et al* 2018), the substance of regional spatial planning is under-represented, limited to a critique of China's 'eco-civilisation'.

The global scale of social and environmental problems in this era of neoliberal globalisation has shifted regulatory responses into the supra-national arena (for example, Sustainable Development Goals; Paris Agreement on climate change; Convention on Biological Diversity). A difficulty remains: because the state and the capitalist circuit are inherently intertwined, regulatory measures for voluntary adoption by national states amounts to market self-regulation.

However, alternatives are emerging to fill the void in mainstream regional planning: environmental design and planning that goes as far as proposing principles for planning social dimensions and sense of community (Forman 2014: 312); rural development that regards integrated regional spatial planning as a new orthodoxy to address complex rural issues (Tomaney *et al* 2020; Scott 2020); vernacular design that focuses on people without high levels of technology (for example, Rapoport (1969); Hough (1990)); bioregional planning and design (for example, Fanfani and Ruiz (2020)); landscape character assessment (for example, Fairclough *et al* (2018)); and steady-state economics (for example, Daley (1996); Raworth (2018)).

It is tempting to suggest that regional planning is undergoing a paradigm shift, as some would have (for example, Cappuccio 2010). There are a number of similarities in the history of regional planning that support Kuhn's theory of paradigm shift. This is evident from consideration of conditions that precede the shift (Chalmers 1982: 92-94).

For example, crises in science develop where there are almost as many theoreticians as workers in the field; anomalies, unsolved puzzles, that are important with respect to some pressing social problems resist attempts to at their removal (inequality and ecological sustainability); pronounced professional insecurity sets in (planning legitimacy); and rules of the paradigm for problem solving become progressively loosened (new regionalism; spatial targeting).

However, the sweep of regional planning history shows shifts in emphasis from the original position rather than fundamental change: all positions have something to offer. For example (Dewar and Kiepiel 1997: A3):

- Regional planning requires both spatial and aspatial actions;
- It requires both top-down and bottom-up actions;
- It requires understanding and action at both the micro- and macro- scales: it involves the management of the interplay between macro- and micro- forces towards desirable outcomes;
- It requires both abstract and concrete definition of regions. Although the importance of real people and places is being reaffirmed, this still allows for identification of abstract structures and processes behind individuals and their places;
- It is not possible to define overarching, comprehensive and universal paradigms, or blue-prints, of regional development;
- Regional diversity demands contextually-informed plans: there is no standard form of plan or way of approaching regional development. Similarly, a variety of regional concepts are useful for different, specified purposes;
- Almost all schools of thought about regional development have contributions to make, and insights to inform, regional plan formulation;
- Despite loss of confidence in many parts of the world, regional planning is an essential dimension of the management of growth in the region;
- Regional processes are complex and involve myriad actors and forces: static, comprehensive planning is therefore neither possible nor desirable.

Differing approaches are not rival paradigms that, in Kuhn's terms, are "incommensurate" (Chalmers 1982: 97). From a town planning perspective, Taylor (2010) concurs: "there is no harm in describing these changes as 'paradigm shifts', so long as we appreciate that we are employing this term in a fairly loose or weak sense."

Nevertheless, there is clearly a crisis. Earlier, the magnitude of the failure of regional spatial planning to meet KwaZulu-Natal's massive development challenge was identified. This chapter has identified numerous weaknesses in theoretical positions relating to international practice.

The influence of erroneous assumptions of modernism have lessened but have not been entirely shed. Where these issues have been recognised, recent responses have tended to dump spatial planning in its entirety. Internationally, however, the present human and environmental condition no longer obviates planning's potential role.

Regional spatial planning needs a fundamental rethink. Here, the regional spatial implications of place-specific plans are a central consideration. To go forward, regional spatial planning it needs to go back to its roots.

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CHAPTER FIVE

AN EXPLORATION INTO REGIONAL SPATIAL PLANNING METHODOLOGY

5.1 INTRODUCTION

The previous chapter established the need for a fundamental rethink of the approach to regional spatial planning. In order to initiate this, this chapter explores the methodology of regional spatial planning.

Methodology refers to patterns of, and approaches to, reasoning. By contrast, method is of a lower order: it is a management tool to ensure that a task, which requires a particular pattern of reasoning, is approached efficiently (Dewar and Kiepiel 1997: 34). While methodology involves the study of concepts employed, the ways of thinking, presuppositions and basic principles of regional spatial planning, it also involves a high order study of its methods. In order to rethink the approach to regional planning, it is important to rethink these attributes of methodology: inappropriate methodological attributes that support inappropriate, obsolete conceptions inevitably lead to human impoverishment and ecological destruction.

The chapter is structured as follows. First, several realisations related to modernist planning are recalled, which point to the necessity for a fundamental rethink of regional spatial planning. Second, a required rethink starts with a clarification of the terms constituting 'regional spatial planning': the concepts of 'planning', region' and 'space' are explored. Third, a normative and creative design way of thinking that activates 'regional spatial planning' is advanced. The discussion is framed around five stages of a design approach: need-performance-idea-context-process. Finally, a higher-level examination of methods of regional spatial planning identifies appropriate avenues for expression of these methodological considerations.

5.2 THE NEED FOR A DIFFERENT APPROACH

By the 1990s, several realizations concerning both planning method and the nature of development arose after an increasing loss of confidence in the modernist paradigm.

Method was problematic. This had a number of dimensions. One was that it became increasingly apparent that ideas do not simply flow from analysis (Kiepiel and Quinlan 2000: 36-7). Rather, the testing of ideas is an important part of planning analysis. It was also realized that comprehensive planning was not possible nor desirable: complexity cannot be captured in static, blue plans. There was a realisation that complexity results from process: it cannot be designed but the preconditions for it to emerge can be (Dewar and Uytenbogaardt 1991: 30).

There was also the beginning of a realisation that having land use planning as the primary focus of planning was a problem. On one hand, it was realised that ideal uses cannot be ascribed to parcels of land in a world in which perceptions, land value, and thus human activities in space, change with place and through time (*ibid:* 69). On the other, land use cannot be controlled by regulation only. Larger economic forces such as agglomeration, accessibility and centrality are at play. Such forces are based on a structural logic that is too powerful to confront through an assumption that every land parcel has an ideal use or every use has an ideal location.

A third realisation was that it was much harder to change space economies than planners had believed in the 1970s. This was strongly demonstrated by South Africa's industrial decentralisation policy in the apartheid era (chapter 2).

Realizations concerning the nature of development were also taking root. It was becoming apparent that there is no single path to development. For example, the meshed policy approaches stressed the importance of contextual factors in design, which lead to a variety of strategies (Dewar *et al* 1986: 120). By contrast, the modernists believed that there was one process and that once the process was initiated, development would follow relatively automatically.

It was becoming apparent that standardization was not the way: uniqueness was fundamentally important. Dewar *et al* (1986: 158-9) argue that the consequences of the belief in the inherent superiority of certain approaches, regardless of context, is likely to be severely negative. While standardized approaches cannot be assumed *a priori*, the development problem may require combinations of elements of various

approaches (*ibid:* 160-1). Similarly, the standardization of rules in the land use approaches was criticised (Dewar and Uytenbogaardt 1991: 69).

Economic standardization was also a concern. It was realized that not every economy would follow same path: what it possible varies from place to place. For example, regarding neo-endogenous development, Gkartzios and Lowe (2020: 165) argue that a single, all-inclusive model or theory of rural development is unrequired and unrealistic: "Diverse approaches will emerge given the unique cultural and knowledge linkages emerging in different spatial contexts."

Further, it was becoming evident that development did not result from trickle-down processes: it was a two-edged sword involving both trickle-down and trickle-up. For example, in the agropolitan development approach, the problems of the peripheral regions was specifically linked to excessive 'backwash' (Dewar *et al* 1986: 101).

It was also increasingly realised that development was not simply about economies and jobs: social and cultural considerations were important. Regional planning had tended to focus on the improvement of material conditions and lost its direction by endorsing reductionist thinking (Kiepiel and Quinlan 2000: 39). The work of the anthropologists was starting to sensitise theorists and practitioners to the softer dimensions of development and the scale of loss. It was recognised that while innovation, diffusion and cultural loss all may occur through freedom of choice, frequently people had been forced to make unwilling changes. The pervasiveness of massive, forced changes gave rise to the term 'acculturation' (Haviland 1975: 426).

Finally, there was a fundamental realisation was that nature could not be ignored (Dewar *et al* 1986: 66-7). Understanding nature lay at the heart of this realisation: development had to work with nature, not against it. The idea of sustainability shifted to the centre of debates. As these realizations took root, it became increasingly apparent that another way of thinking was imperative.

5.3 'PLANNING', 'SPACE' AND 'REGION'

5.3.1 'Planning'

The significant shift from the modernist view of planning as a science involved a return a normative approach: planning is an art that is driven by values, although it uses aspects of science. This recognition calls for clarity on values that drive planning. This is vitally important. Systemic change requires, in the first instance, change in high-leverage points that drive the system (Meadows 2009).

'Planning' is a management mechanism that focuses on the societal or public good. Public good refers to decisions or actions taken in the general interest of the natural environment, upon which people also depend. It also refers to those that benefit large numbers of people (the collective) as opposed to those that benefit a limited number of people (the individual) or particular groups at the expense of others (Dewar and Todeschini 2004: xvi; 40).

Planning, therefore, is appropriately founded on environmental and humanist ethics (Dewar and Uytenbogaardt 1991: 13). A humanist ethic is concerned with wellbeing of current and future generations. The environmental ethic calls for regional spatial planning that is rooted in a recognition of the importance of, and respect for, the natural environment (Dewar and Kiepiel 1997: 27-28). This position is considered further in chapter six.

5.3.2 'Space' and 'region'

A region is conceptually both a place and a space. This is apparent in different definitions of 'region'. On one hand, regional planning is concerned with the planning of supra-urban 'space': a traditional definition of 'region'. On the other, a region is an uninterrupted area of the earth's surface: it is a place.

Because a region is both a place and a space, there are various ways of depicting regions, which 'are drawn for particular purposes, and they are judged good if they fulfil the purposes' (James and Martin 1981: 377). Various conceptions and approaches to space highlight the diverse ways in which space and place have been theorized (Hubbard et al 2004: 1).

Firstly, because there is no over-arching blue-print of regional development, neither is there any overarching regional concept that captures the totality of the phenomenon of place. To capture the complexity of contextually-informed plans and the insights of all schools of thought, it is important that planning uses diverse conceptions of space (Dewar and Kiepiel 1997: A3). Couclelis (1992) offers examples relevant to planning: The container concept founds a geometric frame for the positions of objects in physical space. Socio-economic spaces, such as economic space, are relative spaces defined by spatial relations. Lynch's cognitive maps represent behavioural space. Experiential spaces are those of perception and meaning: for example, sense of place.

The importance of this is highlighted by the loss of many intangible things of value through the development process: if absent from plans, issues like sense of place are not merely side-lined but lost. A problem of modernist planning, such as the reduction of the region to an economic space, is that in seeking scientific exactitude, many intangible things of value were destroyed.

Secondly, there is no single best conceptual scheme for discussing space (Couclelis 1992: 217). Although the importance of place is affirmed, geographers recognise that this still allows for the identification of abstract structures and processes behind individuals and their places (Dewar and Kiepiel 1997: A3). Here, thematic and the geographic regions, which embrace diverse conceptions, are a useful distinction.

Hoekveld-Meijer (1990: 177) argues that the distinguishing feature of a geographic region is that it consists of classes of regions that are contiguous, whereas the most distinctive feature of a thematic region is that it consists of classes of localized phenomena which are treated as if they were point locations. Thematic regions are abstract spaces defined by natural, political, urban or other themes of interest, whereas geographic regions are about a complex of forces that binds natural, political, urban and other thematic regions into more or less coherent regional units.

Thirdly, the thematic region is the abstract realm of spatial organisation. The concept of structure is central. Friedrichsen (1973: 2156) defines structure as: "The mutual relation of the constituent parts or elements of a whole as determining its peculiar

nature of character". Further, "elements of structure are clearly and closely associated with their functions" (Bullock and Stallybrass, 1986: 608).

Structure provides the constraints to which the vernacular responds: an environmental response that is a hallmark of an ecological approach. The spatial-structural approach to design starts with the parts, or elements of public structure. In abstract space, design orders the elements into an integrated whole.

Concerned with the relationship between the parts, this abstract space is a relative space. The elements of public structure are spatially ordered, in order to achieve 'relationships of value' (Dewar and Uytenbogaardt 1991: 24). Importantly, the desired performance that results from ordering is a property of the spatial order as a whole, rather than the individual parts. The following examples illustrate this.

If one considers a class of objects in thematic space such as health facilities, the class as a whole has certain attributes. From the viewpoint of a sector department, a class attribute may be a desirable quality that reflects the norms of the sector department. "Quality is a categorical attribute with the connotation of a value judgement" (Hoekveld-Meijer 1990: 149).

Planning, however, is concerned with multiple spatial classes involving, for example, the different dimensions of public investment such as health, education, movement, utility services and so on. Because members of different categories are linked through networks and any form of interaction, it is a spatial system (*ibid*: 153). Different classes may occur in the same or different spaces, forming a spatial class of classes. Attributes of the categorically different spatial classes are related to the attributes of a spatial super-class, which consists of these classes but is studied as one object (*ibid*: 153-4).

From a planning perspective, qualitative attributes of this superclass involve the performance qualities of a totality that planning seeks to achieve (for example, integration or resilience: qualities underpinned by the ethics of sustainable development). Planning is primarily concerned with these qualitative externalities and not the internal logic of individual sectors: a plan can never simply be a spatial assemblage of sector projects.

Fourthly, a geographic 'region' refers to a portion of the earth, a real place. When one thinks of a region by its name or toponym (for example, the Thukela region, we think of it as a whole in all its dimensions: ecological, physical, economic, social and so on that make up an indivisible totality). Unlike the thematic region, the geographic region represents the whole. Space is differentiated on the basis of its geography, involving heterogeneous subregions within a broader region.

This highlights the importance of contextually-specific plans. Composed of spatially heterogeneous elements, Ndubisi (2014: 578) argues that this invites "the need to promote diversity in all its dimensions and to formulate design and planning proposals that are specific in content, rather than overly general."

A geographic region, therefore, is a region consisting of regions (Hoekveld-Meijer 1990: 141). By definition, it is multi-scalar. A pattern of aerial differentiation is one of the main characteristics of a geographic region observed as an object (*ibid*: 169): a geographic region is a place, with places within it. Clearly, regional spatial planning cannot be conducted at one spatial scale only. A package of plans is necessary: it involves the management of the interplay between macro- and micro-forces towards desirable outcomes (Dewar and Kiepiel 1997: A2).

Like thematic regions, however, a geographic region has class attributes involving certain qualities. Sense of place is such quality of the totality of place.

A geographic region is also source of structural constraints that originate from its composite structure, which is considered thematically (for example, as biophysical structure, experiential structure and so on). The constraints are the basis to which the vernacular responds. "Space, organised by people, in and during a certain period of history, becomes place" (Hoekveld-Meijer 1990: 178).

Fifthly, the thematic and the geographic regions are two sides of a coin, which should be recognised in design methodology. Planners, like regional geographers, are faced with the complex interactions between space and place. Spatial facts fall into places, for which these spatial facts are an attribute or property (*ibid*: 161). The following examples illustrate these interactions.

First, consider an area containing one object, a road, which divides a region into 'haves' and 'have nots'. From a thematic point of view like that of the road engineer, these empty spaces have no meaning. From a regional point of view, they are as important as any other 'have' regions (*ibid*.). Effectively, the road divides the area into subregions: attributes of these geographic subregions include differences in accessibility. In turn, this influences the character of the subregions.

Second, viewed at a finer scale a road, a line in abstract space, expands to become an interconnected space (Dewar and Uytenbogaardt 1995: 27). This space metamorphoses into a place (for example, an urban system).

Third, landscapes of a particular sensitivity to tourism development may be expanded into a series of subregions, using the same rules of sensitivity assessment at a finer scale. Qualitative attributes of these subregions – their sensitivity - inform urban design. This way of thinking allows continuity of the regional concept into finer design scales in a package of plans.

Fourth, the differential sensitivity to tourism development of subregions within a tourism region may lead to a broader subregional differentiation: this occurs through aggregation of subregions of similar sensitivities. This aggregation of thematic regions of similar experiential character (experiential spaces) forms a greater subregion for which infrastructure is matched, for example, for rural tourism as opposed to wilderness tourism.

Hoekveld-Meijer (1990) argues: "It is not easy to train ours eyes and brain in such a way that we perceive and consequently describe the unrolling landscape of changing forms" (*ibid*: 160). However, like regional geography, these transformations are essential to a planning way of thinking. The interaction between the thematic and geographic conceptions of space in the design process is discussed below.

5.4 A DESIGN WAY OF THINKING

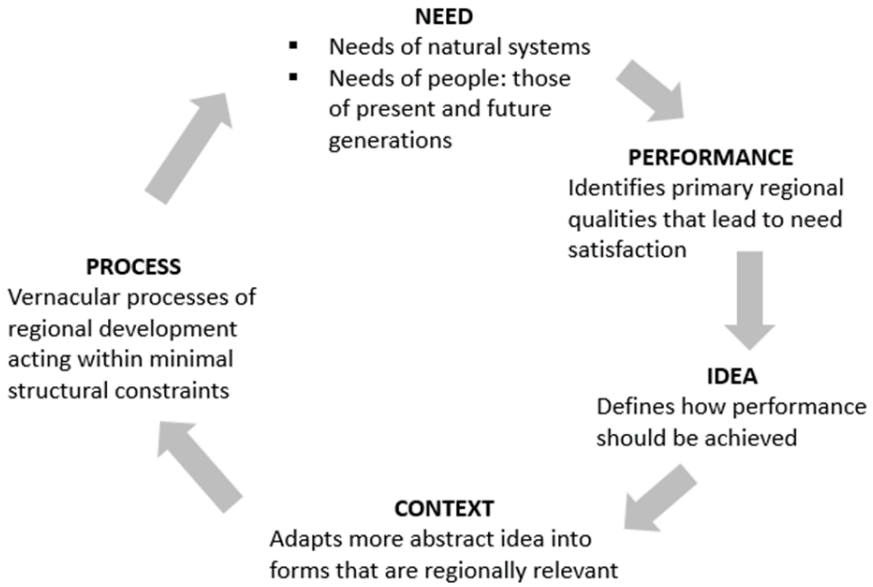
This section discusses a design way of thinking and some seminal principles, integrating threads of the previous discussion.

Planning is an art. Although it uses aspects of science, planning methodology differs from that of science. For example, the scientific methodology of falsification is essentially linear and moves through a sequence of formulation of falsifiable hypothesis; hypothesis criticism and testing of hypothesis through data collection and analysis; and falsification of the hypothesis (Chalmers 1982: 45).

Planning methodology is normative (it involves the articulation of values) and creative (it involves the generation of ideas) (Dewar and Kiepiel 1997: 35). The normative presuppositions – the eco-humanist ethic – drive design thinking. Creativity, necessary for complex adaptation in resilience theory, is essential for positive change. Creativity is a hallmark of a way of thinking that departs from the 'scientific' modernist approach to planning.

Planning utilizes a methodological sequence that is cyclical, not linear: a sequence of need-performance-idea-context-process. Dewar and Uytenbogaardt (1991: 15) argue that this methodological sequence underpins any physical design decision. Similarly, in the architectural field, Day (1990: 16), who considers that involvement in design process extends into construction, argues for performance (*ibid:* 8), appropriate qualities, and what could and should be (*ibid:* 99).

Figure 5.1: Planning's methodological sequence (Dewar and Uytenbogaardt 1991).



The sequence is cyclical in that planning engages in all these stages but not necessarily sequentially. For example, context often prioritises need or hints at idea. Understandings gained from one stage feed back into, and lead to adjustment in others (Dewar and Kiepiel 1997: 35). Planning may start at any point in the sequence but once started, the sequence must be completed. The importance of performance expectation in driving the design cycle, however, is of fundamental importance.

At each stage of the sequence, the focus of attention is on the whole: the process is concerned at each level with understanding and exploring the relationships between the parts, to obtain the best outcomes. It is a truism that, for the whole to be optimised, no part may be maximised, for compromises are required. This iterative process moves from the broad to the increasingly more specific (*ibid.).*

Although analysis is important to understand need, context and so on, solutions do not simply emerge from analysis. Lynch (1984: 42) discusses 'what is the problem'. He argues that "the consciousness of the problem is always an integrated perception, however, vague, that is simultaneously an image of the situation and its constraints, of the goals to be achieved, of who the clients are, and what kinds of resources and solutions are available". The design process is no more than a progressive clarification of this set.

One of the most important roles of analysis is to test the viability of ideas. In the process, ideas increasing shape the nature of the analysis (Dewar and Kiepiel 1997: 35). The stages of the design sequence are discussed below in greater detail.

5.5 NEED

From a planning perspective, need has two dimensions: human needs and requirements and the needs of natural systems. Present thinking on wellbeing is first examined.

There are a number of ways of theorising wellbeing in international development (Gough *et* al 2010). Gough (2017: 41) argues "only a theory of universal human need can enable us to conceive, measure and compare human wellbeing across time and space".

The argument underpinning Doyal and Gough's (1991) *A theory of human need* moves in the following stages (Gough *et* al 2010: 13-16). First, needs are potentially applicable to all people and if not satisfied, serious harm results. Wants, however, are not necessarily so and tend to reflect particular cultural environments.

Second, basic needs are universal preconditions that enable participation, without serious arbitrary limitations, in one's form of life. These are physical health and autonomy. Humans exhibit autonomy of agency as well as critical autonomy. The latter is essential for human societies to innovate and creatively adapt.

Third, these needs can be met by an infinite variety of satisfiers. These 'intermediate needs' are based on codified knowledge of the natural and social sciences. These are necessary to protect people's health and autonomy and thus maximum participation in their form of social life: eleven categories are adequate nutritional food and water; adequate protective housing; non-hazardous work and physical environments; appropriate health care; security in childhood; significant primary relationships; physical and economic security; safe birth control and childbearing; and appropriate basic and cross-cultural education.

Fourth, identification of specific needs satisfiers in particular contexts involves a 'dual strategy of social policy formulation'. This top-down/bottom-up strategy involves codified knowledge and experiential knowledge of those affected. This involves compromise, provided that it does not extend into the general character of basic human needs and rights.

Last, practically, the degree that individual needs are capable of satisfaction depends on the degree of societal success, and vice versa. For all societal forms to flourish and sustain over long periods of time, the social preconditions of production, reproduction, cultural transmission and exercise of political authority must be satisfied.

The following are of particular planning significance. Firstly, the distinction between needs and wants (or preferences) is important for conceptualisation of sustainable development. Meeting needs should be given priority if the two conflict or resources are scarce. "Human needs, present and future, trump present (and future) consumer preferences" (Gough 2017: 58).

Secondly, because the basic needs for survival applies to all forms of life, need is an integrative concept (Kiepiel and Quinlan 2000: 49). For example, the theory of zones of tolerance, below, places all within the same framework. Although theory of need is fundamentally concerned with environmental sustainability (Gough 2017), it is arguably an instrumental rather than an intrinsic concern. Lawn (2001: 66-69), however, also argues the intrinsic value of biodiversity and the obligation to preserve the evolutionary process through stewardship of natural capital.

Thirdly, the intermediate needs are satisfied through provisioning systems (Gough 2019: 5), which correlate with elements of public investment in regional spatial planning.

Fourthly, because need cannot be studied directly: contextual understanding of need and potential for its satisfaction involves an interpretive understanding, derived from local contexts (Kiepiel and Quinlan 2000: 52). For regional planning purposes, it is important that local studies are compiled in a geographic data frame (Lawn, 2001: 73), which expands over time as technical capacity permits. In this manner, 'regional survey' is reinstated as lifetime learning.

Fifthly, in addition to provisioning systems, social preconditions and their spatial implications require attention. The concept of embeddedness provides such an approach: concerned with protective social structures and institutions, it is compatible with the concept of institutional satisfiers.

The vernacular precedent provides the door to a substantive interpretation of need and ideas for regional design: a point of departure for the dual strategy of policy formulation with the regional community. For example, the homestead economy remains a repository of knowledge that is salient to agricultural systems in KwaZulu-Natal.

Finally, Gough (2017: 56) argues that the Sustainable Development Goals focus almost entirely on material needs: vital components of wellbeing like physical security and social affiliation are omitted. These needs, however, underpin a central concern - 'spatial quality' - in spatial planning (Dewar and Todeschini 2004: xvi).

In this regard, higher needs warrant attention. Birch and Sinclair (2013) argue for a framework that coalesces spirituality and place, in which a spiritual experience relates to Maslow's self-transcendence (Koltko-Rivera 2006). Birch and Sinclair (*ibid:* 84-6) offer a framework for exploring spirituality in the built environment through concepts of humanity (narrative and authenticity); sustainability (biophilia and biomimicry) and sensuality (phenomenology). Although Birch and Sinclair (*ibid*: 87) regard this as a unique framework, the similarity with that of Dewar and Uytenbogaardt is striking.

Of particular importance for to regional planning, Dewar and Uytenbogaardt (1991: 18-9) call for three orders of balance: in the relationship between people (in which the primary elements of public structure enhance settlement life); between society and nature (supporting people to be part of the total continuum of primeval, rural and urban landscapes); and between society and cosmos. The last-mentioned has been addressed in settlement making, consciously informed by spiritual concerns. More broadly, however, it reflects a concern with wholeness, of which sense of place is integral (Dewar and Uytenbogaardt (1991: 18). Norberg-Schulz (1980) argues that need for meaning is the most basic need.

Non-material needs, therefore, should also be sought in regional spatial planning through performance qualities (that integrate the disparate elements of structure); though attention to access; and through a diversity of unique and memorable places.

5.6 PERFORMANCE

Performance refers to the translation of needs into the language of spatial planning. It identifies the regional qualities that the plan should seek to achieve. It has no form but establishes some of the constraints within which idea must be developed (Dewar and Uytenbogaardt 1991: 15). As discussed, performance qualities are class attributes: a property of the totality rather than individual elements.

Performance qualities, underpinned by an eco-humanist ethic, are vitally important in driving design. Some relate specifically to particular places, since things perceived of value vary with place. Others, however, are relatively universal, although they can be captured in many forms. This chapter focuses upon three relatively universal meta-qualities: embeddedness, efficiency and balance. 'Embeddedness', a novel

performance quality for regional spatial planning with major implications for marginal regions, is discussed at some length.

5.6.1 Embeddedness

In the new millennium, a deeper understanding emerged about the systemic nature of the global problems of ecological breakdown and inequality, underpinned by economic growth (Gough 2017: 82-3; Piketty 2014 cited in Raworth 2018: 169). In the face of this, the paradigm of sustainable development was advanced by the international community through the Sustainable Development Goals, which recognise the systemic nature of these global problems.

Creative planning is strongly fuelled by theory and precedent (Dewar and Kiepiel 1997). An important source of precedent is premodern, vernacular societies that have sustained for long periods of time and responded positively to place. Such places display qualities of regionalism sought in regional planning: qualities that arose through vernacular processes acting within biophysical constraints over long periods of time. Their hallmark is an economy embedded in social institutions, and society in turn embedded in ecology.

In nineteenth-century Britain, the embeddedness of the economy in society and nature started to break down. A mere century of human life on earth resulted in the devastating global conditions of inequality and ecological breakdown: South Africa is not untouched by this (chapter two).

Polanyi (2001) presents an integrated framework for understanding this 'great transformation': a pivotal moment for sustainability. Internationally, the rise of the nineteenth century industrial economy started to become 'disembedded' from social institutions and nature, involving de facto commodification of people (labour) and nature (Gough 2017: 8-9). This involved a double movement, in which a shift towards a self-regulating market gave rise to societal counter-movements. The rise of Keynesian welfare states is seen to be part of this (*ibid.*). Although complete disembedding is not possible without the collapse of society and nature (Polanyi 2001: xxiv-xxv), the great transformation marked a fundamental break with a sustainable past.

In the face of this unsustainable global trajectory, Polanyi's concept of embeddedness is a useful approach for understanding the role of planning in a context of global social and environmental breakdown of a systemic nature. It is important for planning to adopt a position in relation to this.

Regional spatial planning must be a counter-movement with an important role in relation to the problems of poverty, inequality and ecological breakdown. The following holds important lessons for present application, based on the precedent of embedded, vernacular societies. Various dimensions of embeddedness are discussed, synthesising recent contributions from economic, social and ecological theory. Without reifying the past, important principles may be derived (Dewar and Kiepiel 2004; Galan *et al* 2020: 10).

Closely related to this, planning should appropriately align with the paradigm of sustainable development, supported by the international community through the Sustainable Development Goals. Because aspects of this paradigm are contested in practice (chapter four), it is necessary to clarify key issues from first principles. Ecology is foundational for sustainable development, as it was for the early regionalists. Because of multiple interpretations of sustainable development, it is always important to return to its basic ecological principles.

5.6.1.1 Foundations of life: An ecological economy

An environmental economy is intimately associated with vernacular societies that have sustained through time. The following explores principles underpinning an environmental economy, followed by the planning implications for embeddedness.

Following from the planning ethic, management of public goods, such as the elements of public investment, air quality and sense of place, is central to regional spatial planning. Turner (1998: 30) argues that ecology and economics provide a theoretical framework for discussion of planning implications of public goods. An exploration of the implications for planning methodology, therefore, starts with an ecological economy.

Following Rockstrom *et al* (2007), Raworth (2018) argues for an economy within a safe space for human life, contained within lower boundaries of what nature can provide (the social foundations) and an upper ceiling defined by planetary boundaries. This contribution, with ecological roots, conflates a number of issues to become a practical tool. It is important, therefore, to dig deeper into the underlying principles. While recent contributions are recognised (Shu-Yang *et al* 2004,), Watt's (1973) seminal work provides principles that essentially pertain to an ecological economy. The following, therefore, examines selected ecological principles that underpin embedded societies that have sustained over long periods of time. Three central points emerge.

Firstly, five types of resources are necessary for life: matter, energy, space, time and diversity (Watt 1973: 52). These have fundamentally different properties.

Energy is a unique and critical resource. It cannot be created or recycled (although waste heat can be captured). It is the power that drives systems. It organises space economies: 20th century development was based on energy that was then cheap (Melgar-Melgar and Hall 2020).

Matter, in combination with the other resources, is fundamental for satisfaction of needs. Space is also a limited resource. Time is a resource: for example, for hunting animals (Watt 1973); pre-industrial people's space-time budgets (Carlstein 1982); and for the time available to prevent global collapse through climate change.

Diversity is an informational resource that includes a range of sub-categories, for example: information and knowledge; learning and networking; system attributes such as diversity, sustainability, resilience, innovation, adaptability, creativity, regionalism, landscape character; and structural information such as spatial, economic, social organisation and ecological structure.

Secondly, life is bound by ecological constraints. While all of the five categories of resources are necessary for life, 'limiting factors' related to minimum and maximum levels of resource availability arise in relation to the nature of the resource.

The minimum levels are necessary adequacies of all resources necessary for life: matter, energy, space, time, diversity. For example, people require a minimum level of all resource types in order to meet the human needs of a fully functioning person.

Maximum levels, however, are defined by matter, energy, space. This is captured in the saturation or depletion principle: "*For all categories of resources except time and diversity, further increase in resource availability beyond a maximum may be harmful because of toxic effects"* (Watt 1973: 26). For humans, for example, toxic effects above this level are lethal temperature, pollution of water, and excessive use of space by human settlements that impact thresholds, food production and carbon sinks.

Further, Watt (1973: 26) points to an optimal or sufficient level of resource availability, which suggests links with resilience theory. Moving away from the optimum towards the lethal zones defined above and below the maxima and minima respectively, the species, whether people or other forms of life, is potentially vulnerable to shocks that may result from external effects: resilience is lessened as the boundaries of the zone of tolerance, a safe place for living, are approached. The zones of tolerances for all resources necessary for life defines a niche for a species, where biodiversity and wellbeing are maximised.

The spatial expression of these zones of tolerance is found in the geographic diversity of regions. This is defined by the principle: *"The parts of the earth that can be inhabited by any given species at any given time are determined by the zones of tolerance of all the factors taken together"* (Watt 1973: 56). Spatializing this at the broadest level, climatic factors define life zones (for example the latitudinal and altitudinal variation of vegetation). Bioclimatic regions are derived from this thinking.

Clearly, life occurs within ecological constraints, defined by resource scarcity and excess. These constraints are defined by the structural organisation of the ecosystem and the nature of the resources that define the boundaries. A number of recognitions arise in this regard.

At a systemic level, disregard of ecological constraints produces enormous, complex problems. For example, massive global damage has resulted from a specialised system of industrial agriculture, which involves high levels of chemical fertilisers and high

yield varieties intended to reduce the effect of variability of the soil on productivity: "no limiting factors related to nutrient availability" Bocchi (2020: 81-2).

A further recognition is that while these ecological principles also apply to people, the implications of the human condition is recognised, particularly adaptability. "The problem with much of socio-biology is that it confuses constraint with determination" (Doyal and Gough 1991: 38). Here, the importance of time and diversity is prominent: creativity, innovation, design and an ethical framework that guides systemic change. However, planning must recognise the evolutionary nature of systemic change, in which time is a precious resource.

Thirdly, in the face of these ecological constraints, the dynamics of sustainable development must be underpinned by ecological principles. The following have important implications for sustainability.

"Structures that endure through time are those most able to influence the future per unit of available energy" (Watt 1973: 69).

"The energetic efficiency of biological systems increases with increasing organizational complexity" (Watt 1973: 340).

Jointly, these principles suggest that increasing organisational complexity drives the ability of structures to endure through time. Generally, it suggests a path of sustainable development wherein matter, energy and space are increasingly substituted by time and diversity.

On the basis of these principles, Watt (1973: 304-5) argues for a rapid economic shift away from economic activities based on the consumption of matter and energy towards activities with higher information content such as services. Similarly, Hawken (1983: 4) argues that the single most important trend in the international economy is the changing ratio between mass and information in goods and services.

Spatial organisation is salient. The structure of available space as well as the amount of space per individual, is important (Watt 1973: 77). Watt (*ibid:* 73) provides a further principle: *"The distribution of individuals in space determines in part the efficiency with which energy is utilised by the individual and the population"* Enduring spatial

theories underpinning place-time geography (such as central place theory) essentially reflect this importance of energy efficiency. Issues such as accessibility and efficiency of the transportation grid are also linked to energy efficiency (Owens 1985: 35-7).

From a perspective of these ecological principles, a need for a return to embeddedness is now explored.

5.6.1.2 An economy embedded in nature

The environmental economy is defined by the relation between the five categories of resources (supply) meeting needs (demand). The following examples are significant for planning. Firstly, ecological economics (biophysical economics), a normative framework (humanist and environmental) that is modelled on an embedded economy, is appropriate. This theoretical framework follows the Polanyian notion of an economy embedded in culture and nature (Melgar-Melgar and Hall 2020: 5; Raworth 2018: 71; Tietenberg 2003: 17).

Secondly, from this framework, ecological efficiency is the true measure of economic activity, interpreted as the efficiency with which natural capital improves the wellbeing experienced when human requirements are satisfied (Lawn 2001: 86-94). This implies, for example, the circular economy (Korhonen *et al* 2018), which limits throughput flow to a level that nature can tolerate. This falls within zones of tolerance, stabilizing economic size at a sustainable scale. It also means a transition to renewable energy technologies, which Melgar-Melgar and Hall (2020: 10) argue is the most important issue facing the human population and its economy.

Thirdly, resilience theory emphasises 'complex adaptive systems' characterised by self-organisation and adaptive processes: "a system composed of a heterogeneous assemblage of types, in which structure and functioning emerge from the balance between the constant production of diversity, due to various forces, and the winnowing of that diversity through a selection process mediated by local interactions" (Levin 1999, cited in Wu and Wu, 2014: 545-6). An example is localization: place-based vernacular economic activity that uses local skills and local resources to satisfy local needs. Skills development is critical. It also involves an economy of means, in which needs take priority over wants. Local economies are as self-reliant as possible, striving

for MacKaye's regional balance. A diversity of local economies in differing contexts supports the social complexity necessary for innovative responses to change.

A further example is balanced growth, investing in a diversity of preconditions for sustained growth (in value not material terms). Braudel (1986: 591) argues that the true meaning of growth relates to its preconditions, rather than the way it happens. Arguably, an important reason why modernism failed to initiate self-sustaining growth was its fixation with the way growth happens (an end state) rather than its preconditions (starting points).

Fourthly, on the demand side, the concept of the ecological footprint relates ecological overshoot to the nature and scale of consumption (a product of population and per capital material consumption) (Wackernagel and Rees 2014). This has a number of implications.

The Bruntland Report argued that sustainability of development is intimately linked to the dynamics of population growth (Doyal and Gough 1991: 243). From a biophysical economics perspective, a sustainable population of a region or country is one where there is a balance of renewable resources compared to population needs (Melgar-Melgar and Hall 2020: 6). The influence of education on population growth has major planetary benefits (Kharas and Winthrop 2018: 38).

A second can be found in Gough's (2017) postulation that the global crisis necessitates shifts from eco-efficient production to recomposed consumption to steady-state economics. Regarding the global South, a counter movement would also address the metabolic excesses of a consumer society (Quilley 2012:20).

Clearly, embeddedness implies that the issue of degrowth replaces the 20th century premise of growth and modernisation (Quilley 2012: 223). Presently, innovation in this regard is widespread (Raworth 2018) and no-one can foresee the exact outcome for economic growth (for example, material or value growth). While it is impossible to predetermine the future, however, it is possible to recognise the lasting quality of what is done today (Dewar and Uytenbogaardt 1991: 22). Unlike the modernist concern with unachievable end states, planning should be concerned with the starting points that guide towards a better future.

5.6.1.3 An economy embedded in culture

Re-embedding an economy in social relations means an economy that is under social control (Goldsmith 1992: 307). This has considerable implications for planning.

Firstly, planning needs to focus on needs not wants, as discussed above.

Secondly, Braudel (1985: 23-25) defined the economies of capitalism in terms of three forms of social organisation that interact in complex ways: the non-market or subsistence economy; the market economy (the competitive sector comprising small or medium sized independent firms or manufacturing units); and the capitalist sector, which includes large corporations, multi- and trans-national enterprises. He argues that equity directs attention to lower economic circuits of the market and non-market economies (Braudel 1986: 632). This includes support for the household or 'core' economy (Raworth 2018: 79). In KwaZulu-Natal, for example, important social institutions of the homestead economy remain, which may be built upon. This also includes support for the commons, including support of collaborative networks (Raworth 2018: 82-4). Ferguson (2018: 9) argues that it is networks, not hierarchies, which drive change.

Thirdly, a diversity of local economies at a human scale is a spatial precondition for social control of the economy and social innovation. In rural regions, the scale of the small town and its hinterland are an important focus (Dewar 1995: 70).

Fourthly, appropriate technology is one that is appropriate to the local task in hand (Schumacher 1974: 146-7). Its essential attribute is that it is under local control (Illich 1974: 20). By contrast, the present renewables rollout in South Africa is not.

Fifthly, Quilley (2012: 223) argues that degrowth is likely to be associated with greater localisation of both economic activity and forms of social welfare and mutual support. While it is not possible to predict forms of social and ecological protection that will result from myriad forms of local innovation, information networks will be critical in the development of the cultural-institutional framework of society.

5.6.1.4 Culture embedded in nature

Cultural embeddedness in nature concerns the indivisible character of natural conditions and people's activities and cultural dispositions. An attribute of embeddedness is regionalism: the positive response of human activities to the natural environment of place.

Different places have different characteristics (for example, locations and natural conditions) that suggest appropriate forms of economic activity that sustain people. These activities make demands on place (for example, they utilise local materials) and call forth specific and appropriate technologies. These processes, operating through specific historical experiences of society of that place, create the culture of that society: the form of its social and political organisations and institutions, its settlement forms, architecture, art, music, its literature, its culinary habits and preferences, its customs, mores and folk-laws and so on (Dewar and Uytenbogaardt 1991: 13; Dewar and Kiepiel 1996: 3.6).

The complexity of regionalism, therefore, is generated though the vernacular, acting within biophysical constraints over time. Complexity cannot be planned, as the modernists attempted through comprehensive planning. However, it is possible for planning to initiate or release processes that generate complexity through 'methodological decentralisation'. For planning purposes, normatively-defined constraint structures vernacular processes of development. Minimalism is necessary: by definition, the greater the planned constraint the less the vernacular.

Because ecology involves the interrelations of organisms (including humans) to each other and to the environment (Phillips 1973), the notion of response to environment is central to ecology. The vernacular process of response to constraint, therefore, is an ecological process. Regional spatial planning should be an ecological approach that embraces this notion. It sets in place these environmental conditions – the constraints - that invite human responses. Further, because regionalism is an adaptive process of social innovation over time, it may be facilitated, for example, through the planning of networks of communication and information.

5.6.1.5 Implications of embeddedness in a marginal context

For marginal regions such as those in KwaZulu-Natal, the following two-pronged approach activates the principles articulated above.

The one prong is that planning cannot avoid engaging with global ecological breakdown. Planning must implement strong directives that halt and repair global overshoot. This involves tackling "tightly coupled" planetary boundaries related, for example, to land conversion, biodiversity loss, environmental pollution and climate change (Rockstrom *et al* 2009). Internationally-agreed Sustainable Development Goals support this position.

The second is that planning must focus directly on the poorest people in the rural areas, small towns and cities of the region. This basic methodological principle adapts regional planning methodology to marginal contexts. However, it also recognised that while such an approach is appropriate to marginal contexts, it can work at least as well, if not better in contexts with access to higher levels of resources and technology (section 6.3.7).

This focus is again consistent with Sustainable Development Goals. It requires development of local economies based on comparative advantage and support of non-market economic activities. In exceptional cases, globally competitive activities should be pursued: Wagner (2015: 198), for example, advocates 'eco-tourism'. While globalisation cannot not be acknowledged, development of marginalized areas and the reintroduction of embeddedness within them cannot be ignored. Planning must focus on the weaker parts of the economy in order to address poverty and inequality directly.

Local economies, largely-self-sustaining, are resilient. This reliance lies in reduced dependence on distant resources for life's essentials. It also lies in their high modularity: if one local economy fails, it does not automatically bring down the rest. This does not imply that such local economies are isolated or territorially-closed. Neo-endogenous development, which emphasises internal and external actors in networks of knowledge production, holds that: "disconnected 'self-help' is too crude a pathway to development in marginal rural areas" (Scott *et al:* 2020: 153).

This two-pronged approach involves two types of systemic change (Quilley 2012: 218). The first involves a socio-economic subsystem. Largely independent local economies do not circumscribe the economy as a whole. As adaptive responses, therefore, they are not potentially destabilising of the economy as a whole.

However, resilience theory implies that measures that embed the economy in nature are potentially destabilising, requiring a shift away from the present economic drivers of global environmental destruction. Because life on earth faces an existential crisis, such measures are not negotiable. Further, time is a resource and immediate action is necessary. A 'low-carbon economy by 2050' is too little, too late.

5.6.2 Efficiency

The second relatively universal meta-quality is efficiency. 'Efficient' means producing the desired result with least waste or cost and may be viewed as a ratio of benefits and costs. Broadly, efficient spatial planning should maximise positive impacts and minimise the negative: the best use must be made of all resources, including historical investments.

Lawn (2001: 86-94) advances a useful model that takes a broader, longer-term view of economic efficiency, founded on the concern about how well the stock of human-made capital (necessarily derived from natural capital) is able to improve the human condition qualitatively. Following Daly (1996), he regards *ecological economic efficiency (EEE)* as the true measure of economic activity, interpreted as the efficiency with which natural capital improves the wellbeing experienced when human requirements are satisfied. Lawn shows that *EEE* may be disaggregated into four efficiency ratios. These have significant implications for regional spatial planning.

Service efficiency increases whenever a given level of human-made capital yields greater wellbeing: Spatial quality is important for people's sense of wellbeing, with implications for the character of regional landscapes and public space; landscape capacity provides a basis for measures to address failures in market allocations of land for development; the important issue of distributive efficiency with respect to equity and social justice; efficient spatial organisation profoundly influences the ease of access to regional opportunities, affecting the convenience and quality of daily life;

and ongoing reassessment of ultimate ends through the planning process must involve a structural shift towards a more equitable and sustainable region.

Maintenance efficiency increases whenever a given physical magnitude of human-made capital can be maintained by a lessened rate of throughput of matter or energy. The implications are: reduce aggregate movement while maximising opportunity and choice; transition to renewable energy technologies (wind, water, solar) using locally abundant resources and therefore greater durability and operational efficiency than fossil fuel systems; conserve energy, primarily through economic localisation; conserve materials (for example, the multi-functional use of public buildings and spaces); recycle settlement wastes, particularly to fertilise and water small-scale agriculture; each tranche of investment should serve the largest unserved need; and plans with large embedded capacity requirements should be avoided.

Growth efficiency increases whenever a given amount of natural capital is able to yield and assimilate a greater quantity of matter or energy sustainably. Such increases require augmenting the ecosphere's life-support potential by increasing the regeneration rate and the waste assimilative capacities of natural capital, through spatial measures that involve a shift towards more diverse and complex regions.

The implications are: conserve and restore landscape character and ecosystems; recognise sense of place as an economic base of tourism, which replaces matter and energy with information (Watt, 1973: 69) (for example, the tourism image; tourism as learning); create complex and flexible regional structure through integration of hierarchies of movement, services and public places; create resilient regional systems (for example, modules of settlement-based local economies that are sustainable if decoupled from global shocks by distant economies); promote economic diversification; promote multi-functionality; and conserve space and time through settlement compaction.

Exploitative efficiency occurs when the exploitation of a given quantity of natural capital results in a reduced loss of natural capital services (for example, through better techniques of natural capital exploitation). This has a critical bearing upon the manner

in which new developments are conceived, stressing the importance of approaches to settlement formation that arrest habitat and arable-soil loss.

5.6.3 Balance

The third meta-quality is balance. Dewar and Uytenbogaardt (1991: 18-9) argue for three orders of balance, which are of particular value to regional planning:

Balance between 'society and cosmos' is the highest order, which has been addressed directly in some societies in settlement and place-making, consciously informed by spiritual concerns and symbols. A broader interpretation is a concern with wholeness: "when synoptic thought is applied to the physical form through which need is met, the results frequently transcend purely functionalist or materialist interpretations" (*ibid:* 18). 'Sense of place' is integral: "a recognition and a celebration of the natural, cultural and historical uniqueness of different places and times" (Dewar and Uytenbogaardt (*ibid:* 18).

Balance between 'society and nature' is the second dimension of balance. Recalling MacKaye's notion of regional balance (chapter four), supporting people to be part of the total continuum of primeval, rural and urban landscapes – maintaining contact with the natural context within which settlement occurs – is vital. Dewar and Uytenbogaardt (*ibid.*) stress that the importance of this contact is not defined by the ephemeral 'value' of the land or the use of unbuilt land: it rests in people being part of the totality in which they live, which is central to regionalism. They conclude that planning should maintain a significant, proximate and permanent relationship between the urban, rural and primeval over time. Similarly, Fanfani and Ruiz (2020: 8) refer to the co-evolutionary approach between the natural environment and anthropogenic action.

Balance in the relationship between people is the third dimension. Regionally, this refers the performance of the built environment: the manner in which the primary elements of public structure enhance people's lives. Certain spatial structural configurations generate greater opportunities and afford equitable access more than others (Dewar and Uytenbogaardt 1991: 19).

Detailed qualities, which fall under these meta-qualities, are discussed in chapter six.

5.7 IDEA: 'WHAT SHOULD BE'

While performance qualities show *what* can be achieved, idea shows *how.* It defines the relationships between the parts that are necessary to achieve the desired qualities of the whole. Significantly, idea at this point is abstract: it is not yet design but is the diagram that informs design. Design only occurs when idea is applied to context. Idea, therefore, involves exposing the concept, so its internal logic can be interrogated and it can be the subject of analysis and debate (Dewar and Kiepiel 1997: 37).

Thematic space - the abstract realm of spatial organisation - is central to this stage of the design process. As discussed, spatial structure provides the constraints to which the vernacular responds.

Idea is strongly informed by precedent. The regional spatial implications of the embedded vernacular are central.

5.8 CONTEXT: 'WHAT COULD BE'

Context refers to the translation of the more abstract idea into forms that are relevant to the region in question. Because the ideas must be adapted to the geographic realities of the region, the geographic dimension of space is central here.

The specific idea can be captured in many forms. It is important, therefore, to ensure that the essential relationships underpinning the idea are not lost: the rigorous abstract expression of idea becomes a checking device – a point of reference - in the design process (Dewar and Kiepiel 1997: 37).

5.9 PROCESS

The process of regional development is one of the vernacular acting within minimal, structural constraints. The complexity, spontaneity and presence of the unexpected are qualities that cannot be totally designed: they demand a freedom of response that allows many people into the process (Dewar and Uytenbogaardt 1991: 60). This is the world of 'a thousand designers' (Crane 1960).

Region building processes, however, are inextricably tied to political economy and dominant technology. Under these conditions, the process of change requires stimulation: this has five important implications.

Firstly, planning attitudes cannot avoid firm positions on environmental breakdown, poverty and inequality. Proactive, restorative processes of regeneration of nature are unavoidable. This requires a shift in present management from its overwhelming focus on application-based processes, which inevitably run down natural capital. Conscious alignment with the development of the lower circuits of the socio-economy, particularly through local development, is essential.

Secondly, change involves creativity and experimentation: policy as an adapting portfolio of experiments that shapes the evolution of the economy and society over time (Raworth 2018: 158). Adaptive local economies would test such a variety of interventions.

Thirdly, a shift towards greater self-reliance from dependence on the state requires various empowering initiatives, for example, more complex forms of land release around agricultural development and urban development; local systems of social support; and ownership of key resources and technologies related to energy, water and food (for example, grain mills).

Fourthly, these measures will require necessary institutional backup, including regional development agencies that initiate and facilitate processes of regional change; development of community leaders involving the transfer of power from organisations to community members (Nel 2018); and networks of information and learning in which tertiary institutions play a key role.

Fifthly, implementation of project selection criteria, including project gearing, are designed to facilitate desired change.

The planning process involves an interplay of analytic, synthetic and design skills. The sooner the switch in the role from analysis and viable ideas begin to drive the process, the more efficient the approach.

5.10 METHODS

Methodology includes the high order study of the methods of regional spatial planning.

Dewar (1996: 51) argues that the non-negotiable kernel of the discipline of planning is the management of the impact of human actions on the natural and cultural landscape. For this, thematic and the geographic regions and their concepts of structure, which embrace diverse conceptions of space, are complementary approaches that should lie at the core of regional spatial planning method. This has two dimensions.

The one, relating to thematic approaches, is an important distinction of the programmatic and spatial-structural (non-programmatic) method (Dewar and Todeschini 2004: 37-42). These two generic methods of settlement-making are also significant in regional spatial planning.

Programmatic method is derived from the modernist paradigm. It focuses primarily on the distribution of land uses. With 'scientifically' calculated space standards and projected growth rates, planning is seen as rational, comprehensive, highly controlled process leading to 'balanced' end states, emphasising statutory land use zoning as a logical management tool.

Dewar and Todeschini point to number of limitations of this approach: this kind of 'end-state' planning is an impossibility; the assumption that each land parcel has an 'ideal' identifiable use is erroneous; the 'science' of projection is far from precise or accurate; an inevitable outcome is environmental sterility; and since it is based on a belief in the desirability of separation, it generates vast amounts of movement.

The spatial-structural or non-programmatic method is the second approach. Centrally concerned with optimising the quality of the whole rather than maximising the operation of the parts, such plans search for lasting qualities of living environments that work well for all. They are not comprehensive but partial or frameworks. They are not dependent on particular forms or levels of technology (e.g. the car) or access to minimal levels of resources to work.

The plans are not static: they accommodate change well, informed by an understanding of need. Being framework plans, they can accommodate particular short-term requirements but are not dependent on all levels or requirements of their programme to make them work.

Being enabling not prescriptive, non-programmatic approaches do not attempt to define the 'good life' applicable to all but focus on the creation of choice; their focus is on the public good and not on promoting self-interests of a limited number of individuals or groups; they attempt to achieve identified performance qualities not idealised spatial forms.

These spatial-structural methods seek to influence spatial distributions through manipulating the logic of access rather than top-down prescriptions; and the distribution and accommodation of human activities in space is the focus, not land use. The concept of structure and place is central to this approach. This is an 'additive structure', which can accommodate change without fundamental change to its structure. Structure is preserved with change.

In spatial planning, structure is a design devise to organise human activity on the natural landscape (Dewar and Todeschini's (2004: xv). The public elements of structure are brought into association with each other in different ways to establish a geometric system, to which regional actors respond, according to their relative needs for privacy and exposure. It is this public framework that should be the focus of regional spatial planning, and not the distribution of land uses that is the focus of programmatic plans.

Dewar and Todeschini (2004 ii) refer to the geometric ordering system of point, line, crossover and grid, which underpins the logic of accessibility. Point and line are the basic elements of this system (crossover and grid being resultant networks).

To understand regional accessibility, however, this structural system must be expanded to include area (polygon): structural elements of green space such as national parks can cover large parts of regional space. Although these can be treated as a point in a broader space (the province or nation), regional application necessitates an areal expression.

The second dimension, related to the geographic approach, is two fundamentally different methods that reflect the manner in which information is aggregated. The parametric method views the landscape in terms of discrete variables such as slope, soils, settlement, accessibility and so on. The landscape unit method views landscape as a geographic region: a discrete entity, largely homogenous within.

These methods reflect the abstract concept of space and geographic conceptions of concrete place. In practice, the landscape unit provides a data frame for a range of cultural and natural variables that characterise a bounded place. This spatial transformation is possible through the multi-scaler conception of landscape (Fairclough *et al* 2020: 8): a hierarchical concept, involving landscape regions and subregions within them.

Landscape method, therefore, is important for regional spatial planning. 'Landscape' concerns the relationship between people and place: it provides the setting for people's day-to-day lives (Swanwick and Land Use Consultants (2002: 2).

Of the various landscape methods, the landscape character method supports the synthesis of disparate variables (disciplinary interests) in a concrete place: "characterisation is, at least potentially, both unifying and integrative" (Fairclough *et al* 2020: 9). Lyle (1985: 45) argues that the character of the landscape – its natural resources, features, and processes, along with its diversity of human uses – is the most fundamental consideration in shaping its future. This concern, shared with the early regionalists, re-emerged in the 1960s with Ian McHarg's (1971) *Design with Nature.* Since then, the landscape approach has advanced through a multitude of ecological planning and design methods (for example, Ndubisi 2002).

A hallmark of the landscape character method arises from the conception of landscape as a region as well as its experience. The Council of Europe (2000: Article 1a) defines landscape as "an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors".

This definition expresses a phenomenological understanding of landscape – it embraces a concrete thing perceived (land) as well its perception by people. People's perceptions turn land into the concept of landscape: "It results from the way that

different components of our environment - both natural (the influences of geology, soils, climate, flora and fauna) and cultural (the historical and current impact of land use, settlement, enclosure and other human interventions) - interact together and are perceived by us" (Swanwick and Land Use Consultants 2002: 2).

'Landscape character' makes each part of the landscape distinct, and gives each its particular sense of place (*ibid:* 9), where character is defined as "a distinct, recognisable and consistent pattern of elements in the landscape that makes one landscape different from another, rather than better or worse" (ibid: 8). The concrete basis for this perception of landscape character that occurs consistently in a particular type of landscape is: "Particular combinations of geology, landform, soils, vegetation, land use, field patterns and human settlement create character" (*ibid*: 9).

By definition, the landscape character method encompasses landscape as a concrete reality and as experienced by people. Kirchoff et al (2013: 38) argue that it is this experiential dimension of landscape that provides the totality or holism, the synthetic quality of landscape. The concept captures key qualities of the regional totality: sense of place and regionalism.

Clearly, sense of place is part of the conceptual geography of 'landscape character', where 'sense of place' refers to the essential attributes of a place that give rise to its unique and memorable qualities (Dewar and Kiepiel 1997: A67). Sense of place is an attribute of the human-environmental system as a totality. It is a scalar concept – localities, regions and the whole earth have a sense of place. Its importance relates to a deep human need for meaning.

Two further points are important to landscape character method. First, the landscape concept offers a complementary notion of structure. Leitao *et al* (2006: 5) argue that landscape structure is a description of the spatial relationships among ecosystems and that there are several principal ways to describe structure. The categorical data model is widely adopted by landscape planners: patch (relatively homogeneous non-linear area), corridor (linear areas of a particular lands cover) and matrix (dominant land cover) are three fundamental landscape elements used to describe the spatial interrelations of elements applicable to any urban, rural or natural landscape type. This

mosaic model (Forman 2014) has analogies in other disciplines such as Lynch's (1975: 46-8) typology of urban form (*ibid*: 221).

While the accessibility surface applies in thematic space, the mosaic model is grounded in geographic space: the landscape comprises subregions of patches, corridors and matrix. The geographic character of the mosaic model accommodates the implications of changing scale. An example is the changing dominance of wild lands with scale: for example, while farmland may be a patch in a regional matrix of nature, at the subregional scale, nature may be a patch or corridor in a matrix of farm land.

However, the basic elements of both models are similar in configuration: point/patch, line/corridor, area/matrix. Viewed in these terms, structure becomes and integrative tool. For example, the landscape approach, widely adopted by conservation planners, may be viewed geographically (the mosaic model) or thematically (as in corridor-configuration theory).

Second, Zube (1987: 44) has pointed to the puzzle regarding the values that drive landscape character management: "There are not, however, any systematic ways of linking values information, obtained from social science research methods, with landscape ecological data obtained from biological and physical science research methods." Landscape preference studies, for example, are studies of wants not needs. Chapter two, however, has proposed such a solution. Following Norberg-Schulz's (1980: 23) argument on the importance of mythology in understanding the sense of place of a landscape, the vernacular principle states that it is the biophysical landscape that gives landscape character management its direction: Phillips' (1973) "earlier appearance of the vegetation" in its bioclimatic subregion is significant in this.

5.11 CONCLUSION

This chapter has presented a design methodology that overcomes limitations of modernist thinking.

Exploration of the concept of 'regional spatial planning' reveals diverse conceptions of space. It is useful to distinguish the categories of thematic and geographic regions.

The former, concerned with relationships between the parts, is the realm of spatial organisation in which the notion of spatial structure is central. A geographic conception, concerned with the whole, introduces the multi-scale character of regional spatial plans. Thematic and geographic regions are logical complements: space, through history, becomes place.

'Regional spatial planning', which focuses on the public good, is then activated through a design way of thinking: a creative, normative and adaptive process which induces vernacular responses. Eco-humanist normative presuppositions have been advanced as well as five stages of a design approach that involves both these regional conceptions: need-performance-idea-context-process.

The integrative concept of need is expanded beyond basic needs to include non-material needs.

Meta-performance qualities have been introduced, including an explication of the principles underlying 'embeddedness', displayed by vernacular precedent. It was concluded that for marginal regions such as KwaZulu-Natal, regional spatial planning must taking a firm stance to activate these principles. This has a number of implications.

One is that planning must focus on the poorest people in rural areas, small towns and cities of the marginal regions, in which the development of local economies is central. A second is that measures that lead to a shift away from global environmental destruction are non-negotiable and beyond urgent. These measures of re-embeddedness, which recognise that the complex processes of region building occur through vernacular responses to constraint, call for complexity: structure and place become central to the thematic and geographic regional concepts that underpin the stages of 'idea' and 'context'. Finally, two main methods, one relating to spatial structure, the other to landscape character, were promoted as being of particular importance.

The following chapter extends operationalisation of this way of thinking into an exploration of the direction, form and nature of a regional spatial plan.

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CHAPTER SIX

DIRECTION, FORM AND NATURE OF A REGIONAL SPATIAL PLAN

6.1 INTRODUCTION

The previous chapter set out a way of thinking about regional spatial planning. This chapter extends the operationalisation of that methodology, consolidated through an exploration of the direction, form and nature of a regional spatial plan.

While the previous chapter identified meta-performance qualities of embeddedness, efficiency and balance, this discussion extends into widely accepted performance qualities that fall under the meta-qualities and which plans should be seeking to achieve. The strong linkages between these concepts is emphasised: the meta-qualities subsume further performance qualities.

Thereafter, directive implications of the form of a regional spatial plan are discussed. While the performance qualities identify what a plan should achieve, the directive implications express how the qualities should be achieved through the form of the plan.

Finally, the discussion is integrated through an overview of the generic nature of a regional spatial plan. Agreement on the nature of the plan by an inter-disciplinary planning team is an early requirement in a method of plan formulation, discussed later. The emphasis is upon minimalist thinking and the need to think in terms of spatial frameworks, made up of the primary elements of public structure, as opposed to comprehensive land-use plans.

6.2 SOURCES OF PERFORMANCE QUALITIES

Performance qualities are derived from three main sources: emerging global tendencies that need to be considered in all contexts; planning theory; and the law.

6.2.1 Emerging global tendencies

This refers to developmental issues that are important globally, albeit to different degrees. These issues need to be considered in any regional spatial plan.

6.2.1.1 Economic globalisation, increasing structural unemployment and inequality

A major tendency with the growth of information technology has been an increasing reduction of trade barriers and increasing economic globalisation. Accompanying this has been employment shifts towards high productivity employment and the shedding of low productivity jobs. The inevitable consequence has been increasing unemployment, increasing poverty and increasing inequality (Dewar and Todeschini 1999: 4).

The International Labour Office (2020: 11) reports that at a global level, for all workers (including the self-employed) income inequality is far higher than previously thought: substantial inequalities prevail in access to work, work quality and geographic location (between countries and within countries between workers in urban and rural areas, sex and age). For example, Oxfam's *Time To Care* report indicates that the combined wealth of the world's richest 22 men is more than the wealth of all the women in Africa (Coffey *et al* 2020: 8).

South Africa is no exception to this. Poverty levels are very high, unemployment (before the Covid-19 pandemic) was expected to exceed 20% (International Labour Office 2020: 43), although regionally it often exceeds 50%, and its rates of inequality are amongst the highest in the world (World Bank 2018). This is not new. In 2013, for example, the African Union Agenda 2063 sets out aspirations such as inclusive growth and sustainable development with associated goals of achieve these, a relevant framework for human and ecological wellbeing (African Union 2013).

These realities have a number of implications for regional spatial planning. Dewar and Todeschini (1999: 5) argue that the central management task is to improve the quality of life for all, particularly of the poor. Consequently, poverty, rather than employment,

needs to be centre stage - the real issue is the generation of opportunities for income production at all levels.

They further argue that, while policies to reduce poverty, correct structural imbalances and stimulate employment creation in the formal economy are essential, it is most unlikely that medium- and larger-scale enterprises within the formal economy will be able to satisfy the demand for jobs, even into the longer term. A fundamental change is necessary: it is necessary to widen the traditional concept of 'employment' to reflect the complex and diverse realities of the poor – livelihood being a more universal and useful concept for considering what best to do. There is a strong case for focusing particularly on creating conditions that promote the stimulation of small-scale economic activity, both formal and informal.

6.2.1.2 Ecological overshoot and biodiversity loss

Ndubisi (2014: 2) points out that internationally, the type, scope, magnitude, and complexity of ecological problems have expanded and intensified in response to the changing demographic, social, economic and technological forces, which are key drivers in the change of the landscape. The nature and scale of consumption that determines our ecological footprint (a product of population and per capita material consumption (Wackernagel and Rees 2014: 503)) is resulting in ecological overshoot wherein at least three quantifiable indicators have exceeded their safe space: biodiversity loss, climate change and the nitrogen and phosphorous cycles (Gough 2017: 19).

Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (2019: 5) states: "The rate of global change in nature during the past 50 years is unprecedented in human history. The direct drivers of change in nature with the largest global impact have been (starting with those with most impact): changes in land and sea use; direct exploitation of organisms; climate change; pollution; and invasion of alien species. Those five direct drivers result from an array of underlying causes – the indirect drivers of change – which are in turn underpinned by societal values and behaviours that include production and consumption patterns, human population dynamics and trends, trade, technological innovations and local through global

governance." Unfortunately, South Africa is following global trends and is experiencing a rapid rate of habitat loss and large scale land cover change (Jewitt 2017: 14).

6.2.1.3 Climate change

There is now overwhelming evidence that the globe is warming at an accelerating rate (Gough 2017: 22) and that the world is facing a climate crisis (Ripple *et al* 2020). The scientific link between this warming and certain atmospheric emissions (greenhouse gases such as methane, nitrous oxide and most significantly carbon dioxide) has been established for over a century (Gough 2017: 22). The consequences of this situation continuing include, *inter alia*, increasing temperature extremes and increasing extreme events such as flood, droughts, cyclones and fires.

Regional impacts will vary across the globe. In South Africa, Kings and Wild (2019: 39) report that, on the basis of South African Department of Environmental Affairs data, average temperature increases are double the global average (particularly in autumn); significant overall increases in hot extremes and decreases in cold extremes; similar rainfall patterns but a decrease in the number of rainfall days (meaning more rain in a shorter time-frame and more flooding); countrywide shifts in the rainfall season; and shrunken planting seasons.

The most significant implications for regional spatial planning are the need to reduce the amounts of fossil-fuel energy consumption, particularly by reducing aggregate amounts of movement, and by using non-fossil fuel based movement modes (particularly through walking and non-motorised travel); the need to keep settlement away from rivers prone to flooding and low-lying coastal zones; and the need to maximise plant cover since plants store carbon and transform carbon dioxide through the process of photo-synthesis into oxygen.

6.2.1.4 Fossil fuel dependency

Concerns about the excessive global dependency on fossil fuels were popularised half a century ago in the *Limits to growth* report in 1972. The original concern was about depletion of resources: it was estimated that the world supply of fossil fuels would be exhausted in less than 100 years (Tietenberg 2003: 5). Since then, following the

discovery of new oil, coal and gas fuels, and particularly oil-shale fracking, concerns have been less about depletion and more about costs, not only financial but, particularly, environmental costs such as air pollution, water pollution, toxic wastes and, particularly, global warming and climate change.

Ripple *et al* (2020: 11) conclude that the world must quickly implement massive energy efficiency and conservation practices and must replace fossil fuels with low-carbon renewables and other cleaner sources of energy that are safe for people and the environment. It is becoming increasingly clear that it is quite possible to do this. As long ago as 2009, Jacobson and Delucchi (2009: 65) argued that wind, water and solar technologies can provide 100% of the world's energy and can avoid the uptake of food-productive land by biofuels. Since that time, costs of renewable energy has decreased significantly.

South Africa, however, remains strongly dependent on fossil fuels. South Africa's *Integrated Resource Plan* states: "the energy sector contributes close to 80% towards the country's total greenhouse gas emissions of which 50% are from electricity generation and liquid fuel production alone" (RSA, Department: Energy, 2019: 15). In terms of electricity generation, in 2018 fossil fuels dominated installed capacity (coal: 44,6%; gas/diesel: 15,7%) with wind (15,1%) and PV (10,5%) increasing in importance (*ibid*: 10).

This continued dependence on fossil fuels cannot continue. Recent models indicate that new coal is now so uneconomic, given the fall in renewable energy prices, that each 860 megawatts of coal power will need a R23-billion subsidy from consumers (Davie 2020). Eskom estimated, in a report to Parliament's environmental portfolio committee, that in 2017-18 air pollution was responsible for the deaths of, on average, 333 people, at a cost to the economy of R18-billion (Kings 2018).

Fortunately, South Africa enjoys an abundance of renewable energy resources such as solar, wind and water, including maritime hydro-power.

The clear implication for regional spatial planning is to maximise the use of renewable resources, reduce aggregate amounts of movement and promote non-motorised transportation.

6.2.1.5 Water security and local water capture

Water is a finite and essential resource for human life. While in aggregate terms at a global scale the amount of available supply exceeds demand (Tietenberg 2003: 226), there are serious distributional issues: some regions have too much and some too little. In the latter case, water use is potentially a cause of serious regional conflicts. It is also strongly linked to the energy-food-climate nexus. As Swatuk (2017: 18) notes, the real water war is against the poor and it takes different forms in urban and rural contexts.

South Africa is, in general, a water-scarce country, although there are significant regional variations. Access to potable water, particularly by the poor, remains a serious problem in both rural and urban contexts. Although access to water has increased substantially in real terms, the percentage of households with access to water has declined since 1994 (RSA, Department: Water and Sanitation 2018). In April 2017, 14,1 million people still used sanitation facilities below the Reconstruction and Development Programme standard and only 10,3 million households (65%) had access to a reliable water supply (*ibid*: 1-2).

Water management is complex. A number of issues, however, are of particular importance for regional spatial planning. First, it is so seminal it requires both demand and supply-side interventions. Integrated Water Resource Management is essential and part of this is locating decision-making space within the river basin and catchment scales (Swatuk 2017: 110). Second, density and locational considerations are critical (*ibid*: 73). Third, water capture at all levels is required. At present, in settlements in particular, the emphasis in South Africa is on 'big-engineering' approaches – water piped to settlements over hundreds of kilometres from very large dams.

This results in enormous loss of water, both from evaporation and leakage. The Water Research Commission estimates that between a quarter and half of all water in municipalities leaks out of pipelines (Kings 2018a). On the other hand, a great deal of water entering into regions and municipalities is never captured or is only used once before being discharged. There is a strong need to engage in water capture at all scales, including local scales.

6.2.1.6 Food security

Food security is a serious global problem. The FAO (2019) global report reports that 113 million people in 53 countries face food crises and an additional 143 million people in another 42 countries are just one step away from facing acute hunger. The report also finds that climate and natural disasters pushed another 29 million people into acute food insecurity in 2018.

Poverty remains a determining factor. Tietenberg (2003: 250) concludes that poverty – an inability to afford the rising costs of food - is the root cause of serious malnutrition experienced in many parts of the world.

South Africa, which is no longer a fully independent producer of food, is no exception. Food security remains a complex issue in South Africa: while the Economist's Intelligence Unit's 2017 survey rated South Africa the most food secure on the continent, millions of South Africans face hunger daily. The 2016 South African National Health and Nutrition Examination survey estimated that in urban areas 28% of households were at risk of hunger while 26% were already experiencing hunger: in rural communities these figures reach 32% and 36% respectively (Oxford 2018).

Food supply, coupled with ecological sustainability is an increasing concern. Ranganathan *et al* (2018) argue feeding 10 billion people sustainably by 2050 requires closing three gaps: a 56 percent food gap between crop calories produced in 2010 and those needed in 2050 under "business as usual" growth; a 593 million-hectare land gap (an area nearly twice the size of India) between global agricultural land area in 2010 and expected agricultural expansion by 2050; and an 11-gigaton greenhouse gas mitigation gap between expected agricultural emissions in 2050 and the target level needed to hold global warming below 2ºC.

The WWF South Africa report (Von Bormann 2019: 4) expands on this theme. Faced with an inequitable and environmentally destructive food system, South Africa, too, will have to double production to feed as many as 73 million people in 2050. The report suggests that to transform the system that underpins our society, progress must be cross-sectoral and made on all levels more or less simultaneously, requiring a complete transformation to a system that nurtures human health and the environment.

WWF advocates that the necessary transformative change will be driven by inclusive regenerative farming, optimal water use, responsible sourcing, reduced food waste and dietary shifts - efforts should focus on those most affected by the nutritional deficit, namely women and children in low-income communities.

The FAO promotes an approach that potentially links food security, ecological sustainability and poverty alleviation. The FAO believes that small farmers will be key to the transition. Harvey (2019) reports there are more than 570m farms worldwide and more than 90% are run by an individual or family and rely primarily on family labour, producing about 80% of the world's food. Many small farmers are poor and insecure, but the FAO considers investment in smallholder production "the most urgent and secure and promising means of combating hunger and malnutrition, while minimising the ecological impact of agriculture" (*ibid*.).

Significantly, the South African agricultural sector is made up of more than two million smallholder and emerging farmers (compared to 37 000 commercial farmers) (Von Bormann 2019:14). Clearly, the issue of food security and small farmer programmes must form an important part of regional spatial planning in South Africa.

6.2.2 Planning theory

As was introduced in chapter five, regional planning must be ethically based and therefore normatively driven. It should be firmly based on the ethical pillars of humanism and environmentalism. It follows that regional spatial planning aims at ongoing improvement of the wellbeing of people, without negative impact on the environment.

The translation of these concerns into the language of spatial planning involves identification of the performance qualities that planning should seek to achieve. Chapter five introduced meta-performance qualities of embeddedness, efficiency and balance.

In addition to these, there are some identified by many planning theorists that are relatively generic (although they can be captured in many forms, depending on the regional context) and important in most regional contexts. The close ties between the

meta-qualities and the generic qualities discussed here are emphasised: effectively, the latter are encompassed by the meta-qualities.

At the broadest level, the fundamental aim of regional spatial planning – sustainable wellbeing – is operationalised through improvements in access to the opportunities, activities and experiences of the region within planetary limits. These overarching requirements are given substance through performance criteria that develop ways to improve sustainable wellbeing and the information for achieving this: for example, improved access to services requires, in part, efficiency of service delivery, which in turn is supported, in part, by the multi-functional use of facilities. In order to explore these generic qualities, it is useful to view the context of planning as one involving three interrelated domains: societies and economies founded upon the biophysical environment.

6.2.2.1 Integration

Integration lies at the heart of holistic regional spatial planning. A plan should seek to maximise integration and to strengthen linkage. Integration takes a number of forms at the regional scale. It relates to the integration between, and within, all the main dimensions of regional structure – ecological, economic, services and settlement.

Examples are the integration of spatial scales of planning in analysis and design (packages of plans); integrating implementational measures (land use management, capital investment etc.); integration within and between elements of regional investment; alignment with neighbouring plans; integration between urban, rural and wild elements of the regional landscape; integration of human activities and the landscape; and social integration.

The plan should seek to define synergistic relationships between elements. Integration does not mean patchwork plans that cobble together sector programmes, which result in dominance of the most powerful sector or sectors in the ‘integrated’ plan to the detriment of others.

‘Integration’ requires a fundamental conceptual shift. Kiepiel and Quinlan (2000: 52) argue: “the concept of need becomes necessary in order to substantiate assessments of

the quality of life in an environment and the planning ideal of sustainability". Gough (2017: 57-8) similarly emphasises the need to prioritise current and future needs over wants. In turn, this implies a regional space economy that serves local needs.

6.2.2.2 Sustainability

The literal meaning of sustainability is 'a capacity to maintain some entity, outcome or process over time" (Basiago 1999, cited in Mensah 2019: 5).

Dimensions of 'sustainability' include the ability to endure without failing and to furnish with the necessities of life. Viewing the biosphere in these terms, its life support function, which includes support of human life, is being eroded dangerously. Climate change is one current example. Lawn (2001: 45) views the importance of sustainability as a desirable human goal, first, as a categorical imperative emerging from an appeal to the higher-order moral imperative of intergenerational equity and second, as a development prerequisite because societies that lose their positive identity with posterity have a propensity to disintegrate rapidly.

The following sustainability precepts are necessary (*ibid:*60-70): maintain the source function of the ecosphere within the natural regenerative capacity of natural capital; maintain the sink function of the ecosphere within its waste assimilative capacity; maintain the human life support of natural capital (that is, the biodiversity of natural capital, which also contributes to the ecosphere's source and sink functions); and the obligation to preserve the evolutionary process through stewardship of natural capital.

Coupling 'development' with 'sustainability' means "doing things in a way that does not reduce the opportunities of future generations to meet their needs" (Marten 2001: 222). As Gough (2017: 57) argues, sustainable development means that we have duties to ensure that the global life support system is not so damaged that it threatens the capacity of future peoples to meet their basic or intermediate needs. Needs of present and future generations should be given priority over present and future wants (consumer preferences) (*ibid*: 57-8).

There are a number of dimensions of sustainability that are of particular importance to regional spatial planning:

S*ustainability of sense of place* (discussed below); e*cological sustainability,* which is concerned with the ongoing integrity of ecosystems, grounded in principles of ecology and environmental science: the ecological concept of resilience is central to this; s*ocial sustainability,* which is concerned with access to the fundamental requirements for life, that is, the needs of present and future generations, including food and water security. Gough (2017: 41) argues that environmental issues (particularly referring to mitigating climate change) must be confronted simultaneously with addressing poverty and inequality; and that the language of needs is central to the question of sustainable development; *fiscal sustainability,* which is concerned with a balance between capital and recurrent costs: for example, delivery of services through systems using locally abundant resources, with operational and maintenances costs that are low and are within the technical and management capacities of local communities supplied; and *spatial sustainability*, which is concerned with people's relationship with their biophysical world.

It follows that these considerations should be included in a regional spatial plan:

The use of regional and local geographical land and water resource units (Lawn 2001: 73) as an analytical and design framework (for example, landscape character areas; catchments); regard for environmental hazards and limitations (for example, geotechnical dangers and cost limitations, areas prone to flooding, rising sea level and limitations of arable soils); management of natural capital as an ongoing stock of resources for human use (for example, mineral deposits, local water and energy resources, building materials and local food supplies); a view of the environment as an appropriate setting for human activity, which is informed by, and responds positively to, the nature of the place in which it occurs. Central to this process of place-making is a balance between urban, rural and wild lands in regional space, in which wild lands take priority – regional design starts by defining where physical development should not go; understanding the metabolism of the region as an energy-driven process of inputs (resources), throughputs and outputs (wastes). The ecological footprint is central to this; and conservation and regeneration of biodiversity of the region, including habitat selection, continuity and buffering.

6.2.2.3 Resilience

Resilience-alliance (2010: 51) defines resilience as: "The capacity of a system to absorb disturbances and reorganize while undergoing change so as to retain essentially the same function, structure, identity, and feedbacks." Wu and Wu (2014: 541-556) argue that ecological resilience is a foundation of urban design and sustainability. They make a number of important points.

Firstly, resilience discourse hinges on 'ecological resilience' (based on multiple alternative states), which emphasises persistence, change and unpredictability. In contrast, 'engineering resilience' (the rapidity with which a system returns to a presumed single equilibrium state) focuses on efficiency, constancy and predictability.

Secondly, a critical assumption is multiple stable states (equilibria or regimes) with thresholds (tipping points) that if crossed, leads the system to a different regime. Regime shifts in system structure and function may be abrupt and dramatic changes or continuous and gradual ones. The interplay of 'slow' and 'fast' variables in social-ecological systems implies tipping points and regime shifts that "can result in a substantial element of surprise" (for example: climate change or gradually increasing inequality).

Thirdly, the distinction between 'specified resilience' (the resilience of a specified system response variable to a known disturbance) and 'general resilience' (overall resilience of a system to withstand unforeseen disturbances that do not specify any particular shock or system response variable) is important. However, excessive focus on optimising specified resilience tends to undermine general resilience by making the whole system less diverse, flexible or responsive to cross-sector actions (Walker and Salt 2006, cited in Wu and Wu, 2014: 545).

Fourthly, chapter five described social-ecological systems as 'complex adaptive systems' (e.g. cities), characterised by self-organisation (in which local interactions at small scales result in emergent patterns at larger scales); and adaptive processes in which structure and functioning arise from a balance between the production of diversity and its winnowing through a selection process mediated by local interactions (Levin 1999, cited in Wu and Wu, 2014: 545-6).

Fifthly, complex adaptive systems move through adaptive cycles in four phases: growth/exploitation; conservation/consolidation; release/collapse; reorganisation/renewal. Resilience varies through the cycle, being high in the renewal phase when potential or connectedness (or controllability) are low, and low in the collapse phase when potential and connectedness are high.

Resilience underpins sustainability and the ability to self-organise and preserve system integrity is crucial. The management task is not to get stuck in the conservation phase but to manage all four phases as well as harmonic linkages between adjacent cycles across scales in space, time and organisation - a conceptual shift from orientation around stability, optimality and predictability to one focused on inherent uncertainty.

This understanding has some central implications for regional spatial planning (Barnes and Nel 2017).

One it that diversity is central. This involves the enhancement of biodiversity; socio-economic diversity that includes spatial requirements of informal, subsistence and core economies; diversification of the space economy and of service provision. Further aspects include multi-functionality; minimalism that is necessary to generate complexity (Dewar and Todeschini, 2004: 44); and modularity (Walker and Salt 2006, cited in Wu and Wu, 2014: 552) that reduces over-connectedness and increases self-reliance with far less dependence on distant locations for essentials: for example, through localisation of economic activity, recognition of local ecosystem services (e.g. local food, water and energy), vernacular construction and urban agriculture.

Another is that communication is critical and the power of technology should be exploited and made easily accessible to facilitate this (for example, for education and training, health services, small business (e.g. small tourism), job-seeking, agricultural extension and so on). Walker and Salt (*ibid:* 552) ascribe a pivotal role to information technology in monitoring and feedback, development of social capital through networks and leadership development, governance and innovation.

A third is a focus on specified resilience to known disturbances such as geotechnical and climate hazards requires balancing with general resilience: for example, climate change responses (particularly adaptation measures) frequently anticipate

disturbances (for example, sea level rise). These should be balanced with flexible spatial frameworks to accommodate uncertainties.

A fourth is that the concept of the capital web (Crane, 1960: 285) is central to the spatial planning promotion of general resilience. In a manner that fulfils the regional vision and growth trajectory, the web of public capital investment considers desirable relationships between the elements of public structure that creates complex, hierarchical networks of access which gather activities, events and urban or regional elements according to their relative need in terms of exposure and privacy (Dewar and Todeschini, 2004: 44).

Two points require emphasis: The capital web involves an additive structure, such as a grid, to accommodate growth and decline (Lynch, cited in Spirn, 2014: 566) and the web of natural capital is an inextricable part of the regional capital web, which has implications for accessibility and inaccessibility. The natural capital web is also dynamic and additive: for example, in the face of the uncertainties involved in climate change mitigation, the survival of habitats that, *inter alia*, capture carbon, depends on availability of diverse environmental conditions at various scales (Forman 2014: 302).

Fifthly, biodiversity conservation is essential but insufficient. For resilient ecosystems to come about, it is necessary to claw back degraded and lost habitats. Regeneration, linked to public works programmes, is necessary.

Resilience theory calls for creativity. The aims of landscape character management involve not only conservation and restoration of landscape character but also enhancement (Swanwick and Land Use Consultants 2002: 63), whereby creative landscape change occurs without change to the essential structure, function and identity of the landscape for example, enhancement of a rural landscape towards one that accommodates tourism (rather than one that becomes a tourism landscape).

Finally, Ndubisi (2014: 578) underlines the importance of resilience theory with his call for a reformulated ecological design and planning goal focussed on creating and maintaining *adaptive regenerative* landscapes.

6.2.2.4 Sense of place

A sense of place concerns the essential attributes of a place that give rise to its unique and memorable qualities. Its importance relates to a deep human need for meaning, hence a basic need for humans to experience their life situation as meaningful (Norberg-Schulz, 1980: 23).

Sense of place is an attribute of the human-environmental system as a totality. It is a scalar concept – localities, regions and the whole earth have a sense of place. At the regional scale, chapter five defined landscape character: "a distinct, recognisable and consistent pattern of elements in the landscape that makes one landscape different from another, rather than better or worse" (Swanwick and Land Use Consultants, 2002: 8). This is a useful concept for the management of sense of place and of place-making.

Regional spatial planning is concerned with the nature, scale and location of development in terms of the landscape's capacity to accommodate change, in a manner that conserves, restores or enhances landscape character. The management task is informed by the following important considerations:

Regionalism, which involves the positive response of human activities (lifestyles, livelihoods, culture) to the natural environment of a place: using local skills and local resources to meet local needs is seminal; s*patial structuring* (the creation of desirable relationships between the elements of public structure in a manner that responds positively to the uniqueness of place) is an authentic response that underpins a landscape aesthetic; *accessibility* fundamentally affects the character of urban, rural or wilderness landscapes of a region; *cultural heritage:* Boulding (cited in Lawn, 2001: 45) argues that there is a great deal of evidence to suggest that a society which loses its identity with posterity, and which loses its positive image of the future, loses also its capacity to deal with present problems and soon falls apart; *special places*, involving special biophysical or cultural features of the landscape, which are of great social import; and *minimalism*, an approach to planning that advocates least necessary intervention – doing as little as is necessary. As Hough (1990: 190-1) argues, the

greatest diversity and identity in a place often comes from minimum, not maximum, interference.

6.2.2.5 Equity and social justice

Equity, a concern with what is fair and right, is closely associated with distributive justice. Gough (2017: 60) argues that what is important from the point of view of morality is not that everyone should have the same but that each should have enough. While this may seem uncontentious, Gough points to differing views on the distribution of resources above the sufficiency level.

If one is concerned with sustainable improvements in quality of life, particularly of poorer people, then the spatial preconditions for sufficiency are the least that is required. However, by considering the needs of those most disadvantaged, regional spatial planning sets up preconditions for the benefit of all (for example, cheap, efficient and convenient public transport). This has a number of implications.

Firstly, regional spatial planning is concerned with the generation of opportunities, activities and experiences of the region. This has a number of interrelated dimensions.

One is environmental: this includes conservation and regeneration of ecosystems and ecosystem services. It is widely recognised that where environmental integrity is compromised, those most harmed are the poor. Regional balance between the range of wild, rural and urban landscapes is central to this concern. Although geographically manifest, these landscapes should be underpinned by a structural concept about the manner in which the elements of public infrastructure are coordinated. This, in turn, influences landscape character.

A second is a regional economy that is inclusive and works for poorer people as well as others with greater means. Economic localisation is a central concern, involving in the first instance local skills and resources to meet local needs. In terms of support to help people meet basic needs, the best situation pertains when people have choices and can chose to opt-in or opt-out of initiatives.

A third is the coordination of appropriate and affordable social facilities and utility services that underpin economic generation and settlement formation. Since there are

hierarchical tendencies in the development of commercial and social services in response to public support and patronage, the coordination of hierarchies of movement, public space, infrastructure, services and therefore settlement (densities) are fundamental concerns.

Finally, there is a hierarchical network of regional settlements based on these structural considerations. Regional hierarchies of public places that support hierarchies of periodic or permanent commercial and social facilities need to be similarly coordinated.

A second implication, associated with the distribution of resources in relation to regional spatial planning, is centrally concerned with equitable access to the opportunities of the region. There are a number of barriers to access, both physical (convenience) and aspatial (primarily affordability), that planning must recognise and address – in particular, barriers that most affect the most disadvantaged people who, by definition are least equipped to influence them.

A primary means of improving access is technology. The first aspect is the movement system: the most equitable system pertains when people have access to most daily activities on foot, by non-motorised transport and public transportation. The second pertains to public access to information technology. This should be a central consideration in delivering social services and monitoring community wellbeing. Both these issues have strong implications for the distribution of density.

6.2.2.6 Sociability, privacy and dignity

Gough (2017: 42) argues that participation in some form of social life without serious systemic limitations is our most basic human interest. Notwithstanding the importance of digital social networks, face-to-face social interactions (both formal and informal) remain of fundamental importance. It is evident and desirable that access to public digital networks and public places (with new facilities such as libraries, resource centres and job centres) emerge in association.

Gough (*ibid:* 42) notes that social participation will manifest itself in a very wide variety of ways and with widely different levels of intensity (and, it may be added, for

a variety of age groups, income groups, cultural groups and common or universal interest groups). In planning terms, the range of urban, rural of wild conditions across the region offers a variety of ways for promoting social participation: the intensity will be greatest within urban life where large numbers of people congregate.

However, the degree of face-to-face participation is profoundly influenced by the way areas are structured. Dewar and Uytenbogaardt (1991) argue that regional spatial plans must show, firstly, approaches to agglomeration (urban compaction) and secondly, to the urban design of urban centres, as it is the network of these centres that hold together regional social (and urban economic) life – what Mumford refers to as the culture of cities. Particularly in the context of widespread poverty, the design of dignified public places is a central concern.

Privacy – the need to escape from the intensity of settlement life and human interaction – also has regional significance. While public access to pristine wilderness areas is a regional requirement, differing degrees of privacy for recreational and cultural purposes on wild land and in rural areas must also be considered. Thus privacy is both a hierarchical and a zonal concept.

6.2.2.7 Safety and security

While safety refers to freedom from danger or risks, security relates to the degree of uncertainty about the future. Security has both objective and subjective dimensions (Wood 2010: 111). He argues that apart from general conditions of uncertainty that afflict the total population and threaten a general sense of well-being, the poor experience an exaggerated sense of uncertainty that derives from the paucity of effective resources under their control; their perceived inferior position in relation to other, superior, power-holders in society; and their resulting vulnerability to hazards and shocks.

Clearly, safety and security have broad ramifications for regional spatial planning. These include ease of access to emergency and health services, also necessitating cheap and efficient public transportation; safety from attack and security in terms of crime prevention; security of energy, food and water; security of tenure; and safety

from environmental hazards such as floods, fire, geological instability and climate change (requiring mitigation and adaptation responses).

6.2.3 The law and regional spatial planning

The third source of performance qualities in regional spatial planning is the law, particularly constitutional, planning, environmental and administrative law. In the case of South Africa, key framework legislation governing spatial development planning include the Constitution of the Republic of South Africa Act, 1996 (RSA, President's Office, 1996) and the following acts: National Environmental Management Act, 1998 (NEMA) (RSA, Office of the President, 1998); Local Government: Municipal Systems Act, 2000 (MSA) (RSA, The Presidency, 2000); and Spatial Planning and Land Use Management Act, 2013 (SPLUMA) (RSA, The Presidency, 2013).

This legislation has a number of implications for regional spatial planning. For example, it sets out the development aims of planning from an eco-humanist perspective. Spatial development frameworks, which are central to the planning system, are a legal requirement and integration is emphasised. Legislation clearly separates the spatial framework and land use scheme.

Further, principles are found in the legislation that give rise to performance qualities that apply to spatial planning. Normative principles are found in the Constitution and in definitions of development in the MSA and NEMA, which in turn give rise to principles that apply to spatial planning as set out in section 7 of SPLUMA. The law requires that regional spatial plans demonstrate the spatial logic underpinning the contextual application of the following SPLUMA principles:

The principle of spatial justice involves redress (access and use of land); inclusion; redress mechanisms (access to land); flexible and appropriate land use management mechanisms; provisions regarding secure tenure and upgrade; and economic value of land (as opposed to monetary value).

The principle of spatial sustainability is concerned with sustainable development. Essentially it means that developments must be viable to last in the long term from an environmental, social and economic point of view. The principle involves capacity

concerns; protection of agricultural land; consistency with environmental management that effectively links SPLUMA principles with NEMA; promotion; stimulation of the effective and equitable functioning of land markets; economic services provision; land development in sustainable locations and limitation of sprawl; and viable communities.

The principle of efficiency involves optimal resource use; minimisation of negative impacts; and efficient procedures.

The principle of spatial resilience: "Whereby flexibility in spatial plans, policies and land use management systems are accommodated to ensure sustainable livelihoods in communities most likely to suffer the impacts of economic and environmental shocks" (section 7(d) of SPLUMA).

The principle of good administration involves integrated approach; sector compliance; timeous compliance; transparent participation; and empowering policies and procedures (for example, National Development Plan 2030 requires explicit indication of how spatial development would meet the requirements of normative principles).

6.3 DIRECTIONAL CRITERIA: FORM OF A REGIONAL SPATIAL PLAN

This section discusses directional implications of the form of a regional spatial plan. While the performance qualities identify what a plan should achieve, the directional implications express how the qualities should be achieved through the form of the plan. This expression, which is consistent with the normative context, is an interpretive understanding of what a plan should achieve: criteria are required that show that some plans are better than others. Major points are summarised in the table and are discussed further below.

Table 6.1: Directional criteria for the form of a regional spatial plan.

Criterion	The negative	The positive
1.	Unclear and blurred values	Clear & appropriate values (environmentalism & humanism)
2.	A weak concept entrenching status quo	A strong concept promoting positive change
3.	An incoherent spatial logic	A coherent spatial logic
4.	Inappropriate focus	A clear regional focus
5.	Focus within regional boundaries only	Part of a 'package of plans' approach
6.	Inappropriate in terms of contextual constraints	Viable in terms of contextual constraints
7.	Based on assumptions about access to technology	Based on, and scaled to, the lowest common denominator
8.	Programmatically driven	Focus on structure and space
9.	A focus on land use	Focus on the elements of public structure
10.	Comprehensive plans	Frameworks should be minimalist
11.	Hierarchically confused	Hierarchical integration of the different elements of public structure
12.	Blurred patterns of accessibility	A clear hierarchy of accessibility from very public (exposed) to very private (embedded)
13.	Weak budgetary direction	Clear budgetary direction
14.	Inadequate regulatory direction	Clear and appropriate regulatory direction

6.3.1 Plans should be based on clear & appropriate values: environmentalism and humanism

Plans are forged through an interaction of values, which Norton (2000: 336) defines as "ideas held by an individual or group concerning what is good, bad, appropriate, and inappropriate." Individual values, which may include personal opinion or even whim, may be distinguished from shared values of importance for planning. As Randolph (2004: 7) argues, society's values are manifested in ethics, where an ethic is a set of moral principles of conduct (Sykes 1982: 331).

Regional spatial planning, which is concerned with the 'public good' (Dewar and Todeschini 2004: xvi), is appropriately founded on humanist and environmental ethics (chapter five).

A humanist ethic is concerned with wellbeing of current and future generations. As the anthropologist Richards (1972: 160) notes, certain things seem to be valued in all societies: wellbeing theory (Gough *el al* 2010: 9) highlights the developmental importance of an understanding of universal human needs (Doyal and Gough 1991) with their contextually-specific manifestations. In regional spatial planning terms, the concept of need is operationalised through the central issue of maximising choices and opportunities for people (Dewar and Kiepiel 2004: 47).

The environmental ethic grounds planning in the importance of, and respect for, the natural environment. There is a broad consensus that people are intricately interdependent on their biological and physical environments and disturbance in one component of the system affects the rest (Ndubisi 2014: 95). This suggests specific ethical positions on how people ought to behave toward the land. While an ethic, philosophically, is a differentiation of social from anti-social conduct, an ethic, ecologically, is a limitation on freedom of action in the struggle for existence (Leopold 1974: 238).

Because there are variations even within similar positions, however, Ndubisi (*ibid*.) concludes that it is the responsibility of regional planners to make explicit the

differences in our ethical positions when they occur. A regional spatial plan should be clear about what its environmental position means and how it should be operationalised in the context to hand.

6.3.2 Plans should generate a strong concept promoting positive change

Positive change seeks sustainable and equitable development. Problems of deteriorating quality of life and quality of the environment frequently involve deeply-entrenched structural problems. Therefore, a strong concept confronts most of the root causes of the structural problems. This requires a way of thinking based on the realisation that the "needs of present and future generations should be given priority over present and future wants or consumer preferences" (Gough 2017: 57-8).

This requires in a regional plan actions that confront poverty, inequality and ecological breakdown directly, such as access to well-located land, environmental regeneration, a shift to an inclusive solar economy and local food and water security.

By way of contrast, a weak concept offers timid, cosmetic palliatives and pays lip-service to the performance required in law and in international agreements such as the Millennium Goals.

6.3.3 Plans should reflect a coherent spatial logic

Coherence concerns the logical relationship of statements (propositions) made in the plan (Hospers 1987: 116-7). The direction, measures and implementational mechanisms of the plan must be mutually supportive, as the following examples relating to the conservation and humanist ethics illustrate.

If a plan recognises that statutory compliance with the aims of sustainable development is necessary, then statements regarding the direction of the plan, its measures and implementation actions must support those aims for the spatial logic to be coherent. On the other hand, if the plan reiterates performance required by environmental law and then excludes environmental issues through a singular focus on economic growth, the plan is incoherent.

Another example concerns the logic of access (6.3.12 below). In order to maximise opportunity and choice for people, it is recognised that all activities in regional space have their own requirements in terms of access, along a continuum ranging from very public or exposed to very private or embedded. Therefore, in order to be coherent, it is necessary for the regional plan to create complex patterns of access, enabling all activities, large and small, formal and informal, to find a place in the system. 'Marrying' hierarchies of elements of public structure is part of this.

Further, maps and diagrams convey meanings (Hospers 1987: 78-9). However, these non-linguistic substitutes for sentences should be supported by language that makes clear what the illustrations state. For coherence, the statements, maps and diagrams of a plan should be mutually supportive.

6.3.4 Plans should have a clear regional focus

The focus of any regional spatial plan must be on regional issues. Appropriate regional issues are issues that cannot be handled more efficiently at lower or higher levels than the region. This involves the principle of subsidiary (Wilson and Piper 2010: 93) with respect to decisions in the public interest. In South Africa, for example, regional issues include those affecting large parts of a province; those that can only be understood or managed at this level of totality; those that transcend district or metropolitan boundaries; and resources the value of which exceeds the value to the locality in which they are primarily found.

Such issues include systems (e.g. settlement systems; economic systems), networks (e.g. transportation; infrastructure); hierarchies (e.g. social facilities hierarchies; 'families' of public open spaces; ecosystem hierarchies; hierarchies of landscape character facets); uninterrupted biophysical systems or subsystems (e.g. sub-catchments; bioclimatic subregions); widely-valuable resources and assets (e.g. high order social services; important natural and cultural heritage sites); and widespread impacts (e.g. demonstration projects; land restoration projects; areas of carbon sequestration).

By way of contrast, an inappropriate regional focus involves decisions more appropriately made at scales other than regional (for example, the mechanical

application of provincial spatial policy without regard for regional contextual realities or a focus on local projects).

6.3.5 Plans should be part of a 'package of plans' approach

Regional spatial planning must have regard for multiple time and spatial scales in analysis and concept. Seen in time, planning is not simply concerned with the present and immediate future. Each generation has a responsibility to future generations and, in turn, is the inheritor of past legacies and the custodian of things of value from the past.

In a similar way, the region must be viewed in its multiple spatial dimensions. The overall entity simultaneously comprises places within the region and the region is also part of larger places and the world. As discussed (chapter five), there is no single best conceptual scheme for discussing space (Couclelis 1992). There are various ways of depicting regions, which "are drawn for particular purposes, and they are judged good if they fulfil the purposes" (James and Martin 1981: 377).

For analytical purposes, therefore, the regions that portray different factors (for example, ecological, social, economic, institutional) may cover different spatial areas and will often not have co-incidental boundaries. A plan that restricts analysis to a set regional boundary may be, and often is, inadequate. As an open system, a region needs to be depicted at various scales and should never be portrayed simply as an island in a sea of undifferentiated space.

Similarly, the regional spatial plan must be seen as one contribution to a 'package of plans' approach. This approach involves creation of concepts at a number of scales, with each higher-order scale providing the first level of fixes for the scales below. This ensures consistency of thinking across scales and ensures that short-term actions contribute to sustainable, longer-term outcomes.

For successful implementation, it is vital that the implications of the regional spatial concept are expressed in a manner that clearly informs implementation. This may involve design principles or conceptual diagrams to convey the concept to finer scales of design. Depending on the size of the region or complexity of the plan, finer-grain

depictions (e.g. sub-regional scales) may be necessary to ensure that the intention of the plan is successfully expressed.

6.3.6 Plans should be viable in terms of contextual constraints

Dewar *et al* (1986: 159-160) discuss the importance of context for how the development problem is defined and the nature of appropriate policies and programmes. Applied to regional spatial planning, with an approach that understands the environmental, social and economic processes that underlie the development problem, the question arises whether physical and spatial issues are contributory factors in the development problem. If so, it asks what are viable goals and strategies in relation to the development problem in that context.

Chapter five provided this example in relation to settlement planning: tools should be used in relation to the development problem at hand and not simply as part of a standardised, pre-packaged settlement 'model': standardised settlement approaches may be useful but this cannot be assumed *a priori* – the nature of the development problem may call for *elements* of various settlement packages used in combination (*ibid*: 160).

6.3.7 Plans should be based on, and scaled to, the lowest common denominator

This issue concerns access to resources and technology by the majority of the regional population, which is influenced by physical and spatial (e.g. type, scale, threshold and range of technology) and aspatial factors (e.g. income, education, skills, culture factors). Adapting Dewar and Todeschini's (2004: 53) example of movement in regional spatial planning, movement on foot and efficient public transport are non-negotiable because these describe the reality of a very large (if not the majority) number of people; it is the most equitable mode (available to the vast majority of people); and it is scalable: that is, it represents the lowest common denominator in regional systems. This implies that if the system works well for poorer people on foot, then additional means and access to higher orders of resources and technology represent a bonus.

Generalising from these concerns, majority usage, availability and scalability may be applied to assess planning attitudes to technologies associated with, for example, construction; social services; water and energy supply; technical planning; movement; agriculture; tourism; communication; and economic infrastructure. For example, while cell phone technology is widely used in South Africa, its ongoing availability may be impeded by data costs and access to basic electricity.

In contrast, plans that are based on assumptions about technology are inappropriate. For example, the case of modernism was premised on the assumptions that all households would own a car and would be increasingly well-off, which made a mockery of many plans in developing contexts (Dewar and Todeschini 2004: 11).

6.3.8 Plans should focus on structure and space

Chapter five discussed two generic approaches to settlement making that are also applicable to regional spatial planning (Dewar and Todeschini 2004: 37-42).

The first, derived from the modernist paradigm, may be termed a programmatic approach. Focusing primarily on the distribution of land uses with 'scientifically' calculated space standards and projected growth rates, it is seen as a rational, comprehensive, highly controlled process lead to 'balanced' end states, emphasising statutory land use zoning. This approach has a number of limitations.

The second approach is non-programmatic or spatial-structural. These partial plans or frameworks are centrally concerned with optimising the quality of the whole rather than maximising the operation of the parts, searching for lasting qualities of living environments that work well for all.

The plans are not static: they accommodate change well, informed by an understanding of need. Being framework plans, they can accommodate particular short-term requirements but are not dependent on all levels or requirements of their programme to make them work. The plans seek to influence spatial distributions through manipulating the logic of access rather than top-down prescriptions: the distribution and accommodation of human activities in space is the focus. Interrelated concepts of structure and space are central to this approach (*ibid*.).

Chapter five also discussed the concept of geographic space, including the notion of place as a way of thinking about the region as a totality. In turn, the concept of geographic region extends into that of landscape. This is important for management of sense of place, which is an attribute of the landscape as a totality. This concern also ensures that development programmes of a structural nature, as embodied in regional plans, inject a concern for spatial quality (Dewar and Todeschini 2004: xv) into such plans, ensuring it is not lost in more detailed plans.

6.3.9 Plans should focus on the elements of public structure

While programmatic plans focus on land use and its statutory controls, framework plans focus on the elements of public structure. The spatial organisation of the public elements of structure – the manner in which they are ordered - may be employed to achieve desired performance or 'relationships of value'.

This enabling framework sets up opportunities and constraints. In contrast to statutory controls that primarily restrict physical development, structural measures both release opportunities and constrain development: it is a form of control without coercion – it creates an underlying logic to which actors respond in their own interests (Dewar and Uytenbogaardt 1991: 23)

Dewar and Uytenbogaardt (*ibid*: 30) argue: "An important – and relatively more easily controllable – part of this enabling structure is elements of public sector investment or control". In terms of the regional spatial planning, the elements of public structure are green space, movement of all modes, public institutions and facilities, hard public open space, utility services and human settlements. At this scale, these are viewed as regional systems or networks (e.g. settlement systems, services and transportation networks, regional open space systems) rather than as individual elements.

6.3.10 Frameworks should be minimalist

Framework plans are partial, not comprehensive, plans. They require judgement about the minimum public actions necessary to give strong direction towards desired public outcomes. These public actions are necessary to maintain desirable relationships, give positive direction to public and private sector investment, and in turn, to generate

meaningful opportunities and to release ingenuity, and hence complexity, through the constraints of an enabling structure (Dewar and Todeschini 2004: 44, Dewar and Uytenbogaardt 1991: 26).

6.3.11 Plans should reflect hierarchical integration of the different elements of public structure

All elements of public structure have strong hierarchical attributes.

The built system involves movement, public institutions and facilities, hard public open space, utilities and human settlements. The concepts of threshold, range and the hierarchical order of services, all drawn from central place theory, should govern the provision of social and utility services and are important and relatively constant factors explaining the size and spacing of settlements in regional space (Dewar and Kiepiel 2012: 32).

There is a strong hierarchical dimension to social service provision, with higher order services requiring larger thresholds. The levels of hierarchy are vertically linked. Thus, for example, in the case of health, medicines are transferred down the hierarchy, while patients are transferred up. Further, different social facilities appropriately should seek a relationship with other facilities. The principle of clustering (as opposed to scattering) facilities is of fundamental importance for it promotes multi-purpose trips and ease of access (*ibid*: 33).

Hard public open spaces "represent the primary, and arguable the most important, form of social infrastructure" (Dewar and Todeschini 2004: 69). Together with social facilities and movement, these hard public spaces form the backbone of the regional enabling framework. Because there is a strong hierarchical dimension to these spaces, hierarchies of hard public open space and social facilities should be integrated.

Clearly, public institutions and facilities and their associated settlements are dependent on, and, in turn, support the demand for, utility services, which again should be hierarchically aligned. Movement routes should be seen as regional investment routes that also suggest a pattern for the provision of linear bulk services that are coordinated

(for example, water and electricity set up possibilities for forms of economic activity that are not possible if water is provided in isolation) (Dewar and Kiepiel 2004: 48-9).

The green system also has nodes and corridors with hierarchical dimensions and should be structurally integrated with the built system: Dewar and Kiepiel (2004: 51) discuss an approach in which nodes and corridors of wild lands, buffered by agricultural land, are structurally the photo-reversal of the linear-nodal configuration of the investment routes.

6.3.12 Plans should reflect a clear hierarchy of accessibility from very public (exposed) to very private (embedded)

Dewar and Todeschini (2004: 42-4) argue that the key to understanding the spatial logic of structure lies in the concept of access. All human activities have requirements in terms of the need for publicness or privacy (e.g. rural tourism exposed to the regional routes or embedded in remote rural areas). The creation of complex, hierarchical networks of access that gather activities, events and regional elements according to their relative need in terms of exposure and privacy should be central to regional spatial plans. The geometry of point, line, area and grid, created through the coordination of the public elements of structure, generates an 'accessibility surface' across landscapes – it creates a reference system of points, lines and areas of greater or lesser accessibility.

As a differentiated system, it creates different levels of access to different types of opportunities. This thinking is consistent with a concern for the needs of nature, which has its own requirements in a regional accessibility surface.

6.3.13 Plans should provide clear budgetary direction

The primary means of implementation of the regional spatial plan is through public expenditure and regulatory measures or controls (below). An emphasis in any plan should be upon public expenditure on the elements of public structure. With this emphasis on public spending, the public challenge is making this investment as accessible as possible. Hence, there is a process of action and reaction: the provision of public facilities involves both services delivery as well as the re-creation and

reinforcement of the accessibility framework – budgetary direction follows from the desired accessibility framework.

6.3.14 Plans should provide clear and appropriate regulatory direction

Regulatory measures such as land use zoning are mechanisms that constrain physical development. These measures have an important role in preventing human activities from occurring in hazardous areas such as flood plains; protecting regional resources (for example, agricultural land, conservation areas, landscape character) from detrimental physical development; and reserving land for restoration or for future development (holding areas). Moreover, these controls should consciously reinforce the accessibility framework.

6.4 NATURE OF A REGIONAL SPATIAL PLAN

The discussion thus far has focused on the issues and concerns which should inform, and give direction to, the design of a regional spatial plan. This concluding section explores the generic nature of a regional spatial plan.

Successful regions are complex: they are continually changing in the face of changing dynamics impacting on them and it is this complexity that opens up new opportunities. Complexity, however, cannot be designed: it results from process – from myriad decision-makers responding to changing circumstances in their own self-interests. Freedom of decision-making, however, cannot exist without constraint. It is the role of the regional plan to provide that constraint. It is the public framework that is the focus of regional planning, not land-use (although the framework has strong implications for land-use).

Regional spatial plans cannot and should not be comprehensive. What is required is not comprehensive plans but enabling frameworks. These frameworks should be minimalist. They should be made up of the minimum top-down actions necessary to give strong direction, while maximising opportunities for people. The spatial organisation thus created is about establishing desirable spatial relationships that best capture the performance qualities.

The starting point for a regional spatial plan begins with nature: with understanding ecological requirements and constraints and respecting these; with seeking to establish a dynamic balance between the three landscapes of society (primeval lands, rural and urban), so that each benefits the other – access to all of these by all people should be seen as a basic human right; with identifying, protecting and restoring those elements that collectively create a sense of place; and with identifying the web of natural capital upon which life depends – the design of a web of natural capital should be initiated as a mirror-image of the web of investment in movement, infrastructure and community facilities, coordinated with settlement patterns. The starting point for decision-making is not where human activity should go, but where it should not.

In designing the web of public capital investment from first principles, the starting point is the lowest common denominator: people on foot and without access to large amounts of personal resources. It is essential not to repeat the mistakes of the modernists, where all spatial planning was based on the assumption that the lot of people will materially improve over time and, particularly, that all families will own a motor car. If the plan works well for the lowest common denominator, it will work at least as well, if not better, for people with greater resources.

Central to framework thinking is the need to think across scales. The regional spatial plan cannot be viewed within its own boundaries: it must be seen as one contribution to a 'package of plans'. This approach involves creation of concepts at a number of scales, with each higher order scale providing the first level of fixes for the scales below. This ensures consistency of thinking across scales and ensures that short-term actions contribute to sustainable, longer-term outcomes.

Related to this is the fact that regional plans cannot be circumscribed by jurisdictional boundaries: to ensure integrity, they need to relate to geographic areas with distinguishing characteristics (such as a catchment area; a landscape character region; or a bioclimatic region). In South Africa, where regional spatial planning is a (concurrent) Provincial competence, the following are examples of regional issues:

First, issues affecting large parts of the province: economic diversification; regional transportation and bulk infrastructure networks. Second, issues that can only be

understood or managed at this level of totality: economic localisation involving towns and their hinterlands; capital investment planning for the full hierarchy of social facilities; tourism circuits; settlement networks and their growth. Third, issues which transcend district municipal or metropolitan boundaries: air and water management; land restoration; demonstration projects; ecological networks. Fourth, resources the value of which exceeds the value to the locality in which they are primarily found: high order social services; wilderness areas; important natural and cultural heritage sites.

Contained in the concept of 'plan' are two generic types of actions: controlling actions and structural actions. Controlling actions conserve relationships or reserve options for the future (holding actions), and usually take regulatory form. Structural actions release opportunities for people. The primary form of structural action is shaping public capital investment.

Finally, the approach recognises that regions display different kinds of planning problems: growth, involving the physical expansion of settlement into previously unbuilt areas, stagnation or decline. All cases may be present simultaneously, particularly in rural regions.

6.5 CONCLUSION

This chapter has identified a range of factors that should give direction to regional spatial planning as well as the generic form of a regional spatial plan. These factors provide a framework through which regional spatial plans can be evaluated. In the following chapter, this discussion is extended into a theoretical exploration of the planning of the public goods, namely the elements of public structure and sense of place, from a regional spatial planning perspective.

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CHAPTER SEVEN

ELEMENTS OF STRUCTURE AND SENSE OF PLACE

7.1 INTRODUCTION

This chapter extends the operationalisation of the methodology. The notion of two complementary conceptions of spatial structure for regional spatial planning are expanded into directive implications for the spatial design of the elements of public structure and management of sense of place.

Following the ecological approach of the eco-humanist school of planning of the early regionalists, holism is central: the elements of public structure are discussed in a manner in which they contribute to an integrated regional totality, rather than as sectoral parts. The concern that drives this way of thinking is optimizing the performance of the whole as opposed to maximizing the performance of any one part. Central to this is a systematic way of thinking, which involves understanding the relationships between parts and how these can be integrated so that each benefits the other (Dewar and Kiepiel 1997: 7-8).

Finally, in section 7.4, a regional spatial planning argument, which explores this holistic way of thinking in abstract space, is postulated. It illustrates how the elements of structure are optimally ordered in regional space, in order to release qualities of sustainability, access and sense of place.

7.2 DIRECTIONAL CRITERIA: THE ELEMENTS OF PUBLIC STRUCTURE

This section sets out the spatial implications of the methodology for integrated design of the elements of public structure: green space, movement, social facilities, hard public space, utility services and settlement systems. Each element is introduced with a brief discussion of its function in the regional totality, which is followed by directional criteria for a regional spatial plan.

7.2.1 Green space

Taylor and Hochuli (2017) identify multiple meanings of 'green space' involving two interpretations: green space as nature; and green space as urban vegetated space. ISIK (2017) argues for a broader definition: all space left open for the purposes of furthering human survival and well-being (*ibid*: 3) and for the intrinsic (and instrumental) value of biodiversity (Lawn 2001: 70). This definition does not exclude buildings in open space provided they are directly related to the open space experience (ISIK 2017: 3).

Green space comprises the primeval and rural landscapes of the region (recognising their penetration into settlements). These natural lands and farm lands (Forman 2019: 500-1) comprise the 'countryside', which is the primary ordering element of regional space.

Table 7.1: Directional criteria for green space.

Criterion	**The negative**	**The positive**
1	Weak green concept	Strong, regenerative green concept
2	Ignore ecological principles	Put nature first
3	Hierarchical simplification & fragmentation of natural habitats	Promote the dominance of a hierarchical system of connected natural habitats
4	Promote urban sprawl	Maintain a dynamic balance between primeval, rural and urban landscapes
5	Ignore local resources	Maximise natural capital & conserve all resources of local value
6	Deterioration of water resources and importation of water	Protect water resources & promote local water capture
7	Ignore hazards	Prevent settlement from occurring on hazards (for example, sea level rise, areas

		prone to flooding, fault lines, unstable soils and slopes
8	Ignore food security; loss of agricultural land; and large-scale mono-cultivation	Protect agricultural land, address food security & greater opportunities for small farmers

7.2.1.1 A strong, regenerative green concept

Positive change requires sustainable and equitable development. Problems of deteriorating quality of life and quality of the environment involve deeply-entrenched structural problems such as ecological overshoot and biodiversity loss (Gough 2017: 19), climate change (Ripple *et al* 2020), fossil fuel dependency (*ibid.*), water security (Swatuk 2017) and food security (FAO 2019), together with increasing poverty and inequality (Dewar and Todeschini 1999: 4). A strong concept involves a position that confronts the root causes of the structural problems. The challenge is not only to arrest but to reverse these trends through means that include rewilding, environmental restoration and ecological regeneration (Jepson and Blythe 2020; Perino *et al* 2019).

7.2.1.2 Put nature first

Regional spatial planning should begin with understanding ecological requirements and constraints and respecting these. Broadly, this concerns the instrumental source, sink and life support functions of natural capital, as well as its intrinsic value (Lawn 2001: 70).

A literature review of ecologically-based planning in relation to urbanisation (Heymans *et al* 2019) shows the emergence of an integrated and holistic paradigm involving the following themes: ecosystem services, socio-ecological systems, resilience, biodiversity, landscape and green infrastructure. These themes are associated with important concepts and principles for sustainable development (de Groot *et al* 2002, Leitao *et al* 2006, Marten 2001, Ndubisi 2002, Randolph 2004, Watt 1973). A regional planning approach that puts nature first must take cognizance of these principles.

7.2.1.3 Promote the dominance of a hierarchical system of connected natural habitats

Habitat loss and fragmentation are amongst the greatest threats to global biodiversity (Leitao *et al* 2006: 17) and to the earth's life support functions (for example, climate regulation). KwaZulu-Natal is not an unusual example wherein rapid loss of natural habitat approached a critical 50% threshold in 2011, despite its conservation strategy (Jewitt *et al* 2015: 8). In order to put nature first, design of the region's green space must start with biodiversity planning.

The specialised field of biodiversity planning calls for planners with an appropriate level of understanding of the fundamental principles of landscape ecology to provide a conceptual basis for holistic, transdisciplinary planning of multifunctional landscapes (Leitao *et al* 2006: xxi). Planners should recognise that there are different biodiversity strategies (Ahern *et al* 2014: 321-328) and should gain an understanding of the strategies applied by ecologists to the planning region. Conversely, "ecologists need to understand the goals of planners and design ecological research to produce both data and findings that are directly relevant to planning" (Leitao *et al* 2006: xxi).

Particularly of relevance is an emerging ecological paradigm in spatial planning, based on a holistic view of integrated human-nature systems (Heymans *et al* 2019: 14). This realisation has a number of implications including a holistic, integrated approach, in which compromises and trade-offs are an essential part of the planning process. This implies multi-functionality, wherein, for example, biodiversity planning supports ecosystem services.

A holistic and integrative approach sheds light on appropriate responses to habitat loss and fragmentation in quantitative, qualitative and scalar terms. Leitao *et al* (2006: 17-20) discuss the stages of land transformation in this process that hold consequences for many aspects of environment and human culture. From a biodiversity perspective, Jewitt *et al* (2015: 8) point to changes that depart from protection of the entire landscape (that Jalkanen *et al* (2020: 355) assume to be the best situation for biodiversity protection). They argue that where more than 50% of the total landscape is transformed, the probability of landscapes supporting viable populations of

organisms and habitat connectivity declines rapidly. They point to a further threshold: once only 20–30% of natural habitat remains, the spatial configuration of habitat patches becomes important for maintaining population persistence (Randolph 2004: 557-561).

In the case of fragmented landscapes, Opdam *et al* (2006) argue for the ecological network concept as a basis for biodiversity conservation with sustainable landscape development - networks that can be delineated at any spatial scale and secure the ecological structure of the region. Jalkanen *et al* (2020: 369) conclude that different aspects of biodiversity conservation in general land-use planning are covered through attention to core areas of conservation, regional connectivity and impact avoidance. At all scales, spatial design of primeval areas for increased habitat areas and connectivity requires preserving, linking and buffering high value core areas (USDA, NRS 1999: 5-1).

Also important are ecological networks at different scales (Lyle 1985: 102, Forman 2014: 302). Driver *et al* (2003) argue for "planning at a range of scales that aims to identify priority areas for biodiversity conservation, taking into account patterns of biodiversity (the principle of representation) and the ecological and evolutionary processes that sustain them (the principles of persistence)".

Consequently, appropriate design of regional green space must take a position on the spatial extent of the regional biodiversity to be protected and restored, and an appropriate spatial configuration at varying scales that identifies areas for restoration and network completion, with associated public works programmes.

Inappropriate approaches that ignore these issues prolong hierarchical simplification and fragmentation.

7.2.1.4 Maintain a dynamic balance between primeval, rural and urban landscapes

Regional spatial planning should seek to establish a dynamic balance between the three landscapes of society (wild lands, rural and urban), so that each benefits the others. This is necessary for two fundamental reasons. Design of the ecological

structure is necessary to secure the life support functions of the biosphere for all life forms; and access to all of these landscapes by all people is of vital importance in order that people may be part of the totality of the place in which they live (Dewar and Uytenbogaardt 1991: 18).

An appropriate structural relationship between these landscapes of the region recognises the implicit zonation of accessibility that arises around a regional investment route. The route is the most accessible part of the region and accessibility declines with distance away from the route, through the rural landscape towards remote wild lands of the region. Seen in this light, the most basic structural arrangement of the region involves the ecological network as the mirror image of the web of public capital investment, regionally buffered by rural landscapes (Dewar and Kiepiel 2004: 51). This basic structural relationship should be reinforced by aligning it with other spatial and aspatial factors that influence access.

Impact avoidance is a central concern. In addition to the regional buffering of the ecological network, local buffering with compatible land uses is desirable (for example, indigenous range lands adjacent to protected areas).

However, the starting point for impact avoidance is not where human activity should go, but where it should not. The green space comprising rural and primeval landscapes must take precedence and urban sprawl must be arrested. As Jalkanen *et al* (2020: 368-9) state with regard to impact management of biodiversity: "new developments should be concentrated into those parts of the landscape where overall habitat quality is already so low that only limited biodiversity is supported (highly-urbanized areas, areas of intense agriculture or forestry, etc.)".

Regional balance is not static. Its dynamism involves an ongoing process of adjustment as well as the creation of a resilient ecological network and capital web. For example, ecological networks might change in area, shape and location without losing their conservation potential (Opdam *et al* 2006: 329).

7.2.1.5 Maximise natural capital and conserve all resources of local value

Marten (2001: 220) defines natural capital as all the resources on which civilisation depends to create economic prosperity. In order to maximise natural capital, it must be used wisely. Its instrumental source, sink and life support functions must be restored, maintained and enhanced.

Lawn (2001: 73) argues that continued depletion of non-renewable natural capital must increase long-run reliance on renewable natural capital. Therefore, rates of use of renewables must not exceed the rate at which the resources renew themselves. This, in turn, calls for efficient exploitation and use as well as new sources of renewables.

The sink function concerns the ability of the ecosphere to absorb wastes. The sink function can be improved and the stock of natural capital can be expanded. Its waste assimilative capacity and efficiency can be improved; techniques of waste disposal may be improved; the qualitative nature of wastes generated may be changed; and recycling of matter (but not energy) may be undertaken (*ibid*: 59-60).

The biodiversity of natural capital gives rise to the life support function of the earth. As Lawn (*ibid*: 73) concludes, to maintain biodiversity, natural capital exploitation must be conducted on the basis of respecting the holistic integrity of geographic land and water resource units.

Conservation and sustainable use of all resources of local value gives rise to a number of benefits, which include reduction of the ecological footprints of settlements (Wackernagel and Rees 2014: 503); local economic diversification; increased regional energy efficiency and hence regional resilience (Watt 1973: 69); a strengthened sense of place arising from creative use of local resources; and support of vernacular lifestyles from resources of local importance.

7.2.1.6 Protect water resources and promote local water capture

Water is a finite and essential resource for all life forms. It is a critical issue in South Africa, where the insurance firm Swiss Re Institute's (2020) global biodiversity and ecosystem services survey finds that, among G20 countries, South Africa tops the rankings with 40% share of fragile ecosystems in danger of collapse. Water security

is key. Although water management is complex, a number of issues are of particular importance for regional spatial planning (chapter 6).

Firstly, it is so seminal it requires both demand and supply-side interventions. Integrated Water Resource Management is essential and part of this is locating decision-making space within the river basin and catchment scales (Swatuk 2017: 110). For an example of integrative planning from a landscape ecology perspective, Leitao *et al* (2006: 32-42) provide some simple and common management guidelines to manage abiotic (water), biotic (wildlife and biodiversity) and cultural (housing and recreation) resources sustainably.

These involve maintenance of large patches of native vegetation (that supports the most important water functions of interception and infiltration of rainfall and runoff, and filtration and cleansing by soil); wide riparian corridors (supporting major flows across the landscape of energy, water, nutrients and wildlife species); connectivity between important resource patches (allowing water to flow freely and continuously across the landscape); and heterogeneous bits of nature throughout human-developed areas (the need for smaller, isolated water features for ecological and aesthetic diversity throughout production landscapes: for example, farmland).

Secondly, density and locational considerations are critical (Swatuk 2017: 73). Servicing of remote rural settlements with small populations requires careful planning of utility services provision (below).

Thirdly, water capture at all levels is required. At present, in settlements, in particular, the emphasis in South Africa is on 'big-engineering' approaches – water piped to settlements over hundreds of kilometres from very large dams. This results in enormous loss of water, both from evaporation and leakage. The Water Research Commission estimates that between a quarter and half of all water in municipalities leaks out of pipelines (Kings 2018). On the other hand, a great deal of water entering into regions and municipalities is never captured or is only used once before being discharged. There is a strong need to engage in water capture at all scales, including local scales. For example, Umgeni Water (1991: 259-261) identifies multiple

advantages (for example, cost, water quality and health, and the employment creation potential of ferro-cement tanks) of household rainwater capture and storage.

7.2.1.7 Prevent settlement from occurring on hazards

Randolph (2004: 43) defines 'hazard' as the inherent danger associated with a potential problem and notes that natural hazards include weather-related problems, geological hazards and ecological hazards.

Avoiding negative impacts (by moving away altogether) is the first in a hierarchy of environmental impact management strategies (*ibid*: 202) and therefore in regional spatial planning. In South Africa, an important source of information for proactive settlement planning is the coastal management guidelines (Breetzke *et al* 2008) regarding rising sea levels and storm surges, and the need for setbacks.

Another relates to engineering geological mapping. Richards *et al* (2006: 5-6) distinguish environmental and cost risk factors with development implications (for example, in the Pietermaritzburg area, critical geotechnical factors involve inundation (flooding); slope instability; excavatibility of ground; active, expansive or swelling soil; erodible soil; and shallow water table).

Clearly, climate change will significantly affect the risk and magnitude of harm caused by many of these hazards, calling for climate change mitigation and adaptation measures.

7.2.1.8 Protect agricultural land, address food security and greater opportunities for small farmers

Food security is a serious global problem that is underpinned by poverty (Tietenberg 2003: 250). Food supply, coupled with ecological sustainability, is an increasing concern. Chapter six discussed South Africa's inequitable and environmentally destructive food system, which will have to double production by 2050. Progress must be cross-sectional, simultaneously on all levels: a complete transformation to a system that nurtures human health and the environment is necessary. The necessary transformative change will be driven by inclusive regenerative farming, optimal water use, responsible sourcing, reduced food waste and dietary shifts. Further, these efforts

should focus on those most affected by the nutritional deficit, namely women and children in low-income communities (Von Bormann, 2019: 4).

Regional spatial planning has an important role in this regard, as the following issues illustrate. First, in order to increase food production without expanding agricultural land, it is essential that protection of agricultural land is far more than simply the protection of prime and unique agricultural land. Restoration of land is also required for agricultural or biodiversity purposes.

Second, agriculture is historically the key to local economic development (Dewar 1995: 4) and needs to be taken seriously in regional development.

Third, agricultural development in and near urban areas has multiple advantages such as proximity to markets and transport energy and cost reduction; use of recycled urban wastes; reduction of food loss and wastes in transport and storage; and use of urban renewable energy mini-grids.

Fourth, agricultural transformation requires information dissemination, training, monitoring and feedback, which urban proximity should support.

Fifth, the FAO promotes an approach that potentially links food security, ecological sustainability and poverty alleviation, in which small farmers will be key to the transition (Harvey 2019). Clearly, the issue of food security and small farmer programmes must form an important part of regional spatial planning in South Africa. Therefore, linking urban agricultural development with land reform, development of small-holder agriculture, the household economy and the role of women is a necessary synergy.

7.2.2 Movement of all modes

The regional movement system is highly significant for sustainable development. An efficient system and the reduction of unnecessary movement profoundly benefits regional ecology. For people, increasing convenience and choice – the ease of movement - is a central issue that underpins spatial marginalisation. An appropriate movement system supports both the generation and the ease of access to the range of opportunities, activities and experiences of the region.

Access to public goods (material goods as well as qualities such as centrality, agglomeration and sense of place; and 'access to access') is central. Access to a continuum of wild, rural and urban is an important part of this. The composition and structure of the regional movement system, therefore, is of seminal importance. The movement system must be used structurally to create new patterns of access as appropriate. The primary point is that the route should be viewed, and used, as a regional structuring or organising element and not simply as a movement channel. It is the issue of access and not infrastructure that is central (Dewar and Kiepiel 1997: A33-6).

Table 7.2: Directional criteria for movement of all modes.

Criterion	**The negative**	**The positive**
1	Inappropriate use of modes	Different movement modes should play a role to which they are best suited
2	Fragmentation of the modal system	Integrate all modes of transportation
3	Promotion of private motor vehicles	Prioritise non-motorised transport & public transportation
4	Fragmented network	Create a permeable movement network
5	Destination-based system	The movement network should create a neutral (grid-like) system to encourage the spread of opportunities
6	Blurred and confused hierarchy	The movement system should reflect a clear and logical hierarchy
7	Prioritise mobility	The movement system should encourage accessibility
8	Reinforce existing demand patterns	The movement network should be used structurally to encourage change, where necessary

9	Expand aggregate movement	Reduce aggregate movement

7.2.2.1 Different movement modes should play a role to which they are best suited

The use of different transportation modes to play the role that they are best equipped to play and integrating these is an important role of regional planning (Dewar and Todeschini 2004: 56). Of particular importance in South Africa, where levels of poverty are high, is non-motorised transport (NMT) and public transport.

Walking is a highly flexible mode which is able to surmount difficult terrain and which is suitable for shorter distance and for direct feeder trips to public transport, where available. In certain places walking forms the primary regional movement mode of people and their goods. Walking routes also have an important role in the development of small tourism systems in wild areas (for example, Kiepiel and Quinlan 1997: 159-162).

Where cycle paths or roads are available bicycle usage may play a regional role where comfortable walking distances are exceeded. Turner (1998: 335-341) refers to the importance of good design of a cycleway, differing for leisure or commuter purposes, as inconvenience promotes mechanised transport (*ibid*: 351). Separating cycle tracks from vehicles and walking becomes necessary with heavy motor vehicle flows (Khanna 2001: 18/128). As with walking routes, leisure cycling routes should have a role in tourism development.

StatsSA (2015: 59) correctly concludes that government should ensure that efforts and resources are increased in order to consider NMT as an actual mode of transport. In the case of India, for example, NMT is an entrenched public works function and the civil engineers' handbook provides design specifications for animal traction and bridal, cycle and pedestrian paths (Khanna 2001).

7.2.2.2 A plan should integrate all modes of transportation

In South Africa, a hierarchy of modes for regional planning purposes may be generalised as rail/bus/taxi/NMT (bicycle/pedestrian). All of these should be

integrated. Once the cycle of NMT is broken, the most equitable regional system is ‘access to access’ - a public transport system that allows people to switch direction and mode of movement easily and frequently (Dewar and Todeschini 2004: 57). Transport interchange points are important points of opportunity because of their ability to generate large numbers of people and their accessibility, which varies hierarchically. Regionally, the lowest order of interchanges (taxi ranks) should be accessible to NMT.

As StatsSA (2015: 59) concludes, efforts and resources should be increased in order to consider NMT as an actual mode of transport and integrate it into the mainstream public transport system, as complementary to public transport.

7.2.2.3 Plans should prioritise non-motorised transport and public transportation

Prioritisation of non-motorised transport and public transportation is important for environmental and health reasons (including air quality) and reduction of land uptake and sprawl. Dewar and Todeschini (2004: 53) argue for the promotion of movement on foot and public transport for reasons of equity (it is the lowest common denominator).

For example, the current modes of movement in South Africa reflect the importance of public transport and NMT (especially walking), which are vital for people with lesser means. Taxi and bus usage as well as NMT increase with decreasing household income: for most households in the lowest income quintile, public transport is the main mode and these households are more likely to depend on non-motorised transport. Walking is the main mode for workers of lowest income quintile and for informal workers. Walking all the way is the major mode of travel for all learners except those in higher education and walking to an educational institution increases with decreasing income (StatsSA 2015).

7.2.2.4 Plans should create a permeable movement network

A regional system of ‘access to access’ implies an interconnected system of (particularly) public transportation routes. This involves a number of considerations.

Overall, the form of the network in regional space should promote the permeability of a grid-like structure as opposed to a dendritic or radial system of regional routes.

The nature of the transportation route condition is also an important influence on regional network permeability. First, the physical nature of the route affects movement (for example, public transportation requires all-weather routes or it may not function under adverse weather conditions). Second, permeability is affected by the mobility or accessibility functions of the routes. Dewar and Todeschini (2004: 59-63) distinguish between 'space bridgers' (which are limited access routes with widely spaced access and egress points) and 'space-integrators', the arterial routes, which are the more continuous routes that that allow stop-start movement along their length and carry road-based public transport. The latter routes, with their lateral connections, knit together local areas and increase regional interconnectivity. While the space bridgers provide necessary mobility and are often important freight routes in national and regional space economies, the role of the space integrators is far more important from a regional development perspective, since they support a range and choice of services along the route.

While the principle of continuity is critical, the principle of discontinuity also applies (Dewar and Todeschini 2004: 51). Because fragmentation of wild or protected areas by routes is undesirable, routes in these areas may take the form of destination-based systems and terminate, for example, at Park entrances. However, the overall geometry of the grid may be preserved through connections with walking trails (for example, Kiepiel and Quinlan 1997: 161). Further, because of their structural power to stimulate development, higher-order routes should not be located parallel to the alignment of protected areas and corridors.

A major difficulty arises in South Africa in ascribing 'corridor' status to national or regional mobility routes without specifying the meaning of the concept or how, where and when it should apply (PPDC 2008: 63-4), with rural sprawl and compromised mobility an inevitable consequence. "If more decentralised, agglomerated, intensive activity is to be pursued, at places the function of the route must change over small sections." (Dewar and Todeschini 2004: 62-63). A similar conceptual confusion may

arise where space bridgers intersect with small towns or emerging rural villages, where it is impossible to maintain the limited access, mobility function of the route and desired qualities of urbanity simultaneously.

7.2.2.5 The movement network should create a neutral (grid-like) system to encourage the spread of opportunities

Dewar and Uytenbogaardt (1995: 37-8) explain the power of the grid as a spatial ordering system. It has the following characteristics. First, it is a highly ordered system which provides strong constraint that, in turn, enables considerable freedom of action within it. Second, it is able to accommodate a wide range of activities and demands.

The grid (frequently distorted) is therefore the basis of an equitable regional system of 'access to access' - a public transport system that allows people to switch direction and mode of movement easily and frequently, and where the transport interchanges are important points of opportunity.

Dewar (1985: 52-3) refers to the importance of recognising that space is a relative concept: there is a sense in which a point 'contains' all other points. At the household level, this issue of relative location is additionally important where multiple livelihoods, hence multiple destinations, often prevail.

Consequently, destination based systems such as dendritic or radial patterns of regional movement should be avoided wherever possible.

7.2.2.6 The movement system should reflect a clear and logical hierarchy

Central to non-programmatic approaches to settlement making is the creation of complex, hierarchical networks of access. Movement routes are major informants of the accessibility surface in regional space: places close to regionally significant routes are more accessible than those further away (Dewar and Kiepiel 2012: 32).

As a general rule, the more continuous (and higher order) the route – the more local communities and, therefore, the greater number of people it integrates and serves – the greater its structural power, defined in terms of its ability to attract more intensive activities requiring public support (Dewar and Todeschini 2004: 49). Other factors are

the size, income and density of the communities along the route; activity routes, particularly public transport routes as opposed to limited access routes (*ibid.*); and links to generators of movement and investment (Dewar 1985: 53).

Accessibility is not only expressed in lines. Where regional routes meet or cross over, a hierarchical pattern of points of accessibility is created, with the intersections of higher order routes generating higher order points of accessibility than intersections with more local ones (Dewar and Kiepiel 2012: 33). Contextual analyses of patterns of accessibility, therefore, are important and actual patterns must not be conceptually blurred with hierarchies intended for other purposes (for example, the geographer's or traffic engineer's classifications of towns or routes). Normally, the accessibility surface does not simply correspond with the hierarchies of existing urban centres and the traffic engineering classification of routes – a confusion that involves the assumption of simplistic nodes-and-corridors hierarchies that are caricatures of regional accessibility; and when applied, reinforce the status quo.

7.2.2.7 The movement system should encourage accessibility

While mobility is important, particularly for freight movement, the real issue for the majority of the people is increasing accessibility (Dewar and Todeschini 2004: 55). Improved road infrastructure does not necessarily result in significantly improved accessibility for the majority of rural dwellers. Generally, the positivity of road infrastructural improvements relates to the degree that the infrastructure element is coordinated with the major generators of rural movement and is specifically targeted at the rural poor (which centres on improving NMT and access to public transportation) (Dewar 1985: 43-44). In this view, accessibility should be encouraged through measures that tackle spatial and aspatial barriers to access.

7.2.2.8 The movement network should be used structurally to encourage change, where necessary

Spatially, the most significant linear service is movement (Dewar and Kiepiel 2012: 33). Because the movement network is fundamental to the region's accessibility surface, the network of routes and its points of cross-over and interchanges is a powerful tool for spatial restructuring. Dewar and Kiepiel (2004: 48-51) explain a way

of thinking that focuses on line (the transport routes which tie a number of agglomerated nodes together), as opposed to points or nodes as a logical focus of an ordered strategy of rural investment. These routes should be seen as 'activity or investment lines': "the problem of regional and rural spatial organisation becomes one of promoting an hierarchical form of interlocking activity routes over time which systematically reduces spatial marginalisation, increases accessibility to all levels of service provision and provides a framework for reinforcing investment over time" (Dewar 1985: 53).

Regional route alignment is critical since, once established, it is usually irreversible, particularly because the network usually outlives statutory controls. Where the objectives of statutory controls are contrary to the accessibility surface (for example, prevention of development along a highly accessible arterial route), the power of the route usually prevails.

7.2.2.9 A plan should reduce aggregate movement

Excessive movement has enormous societal and environmental costs. These include: significant portions of the household budgets of poorer households being used for transport; the time costs of travel; infrastructural costs; and the environmental impact of unnecessary land uptake and fossil fuel emissions.

Regionally, aggregate movement may be reduced in a number of ways, including promoting efficient regional movement networks such as grid-like systems; settlement compaction and densification, whereby the aggregate length of journeys decreases; promotion of public transport through measures such as densification along regional activity routes; improvement of accessibility, for example, planning for multi-purpose trips for regional activities and services at public transport interchanges; and stimulation of local economies.

7.2.3 Public institutions and facilities

Dewar and Uytenbogaardt (1995: 20) identify and discuss the major institutions that have been valued by society in the making of settlements (for example, institutions of learning, worship, exchange) and the public facilities through which they were

historically given form (universities, colleges, schools, churches, mosques, markets and so on). While some have remained relatively constant over time, the form of some of these institutions has evolved in response to contextual requirements (for example, institutions of learning). They point out that traditionally, the structural relationships between these has always been central in settlement-making.

The composition of public facilities is broad: functional categories of these services are education, health, recreation, culture and administration, within which the range of functions may be wide as in administrative services (CSIR 2005: Chapter 5.5). However, because they are governed by common principles relating to threshold, range, hierarchical order of the service and clustering, understanding the requirements of a few key facilities offers insight into a framework for other facilities, as well as utilities and hard public space.

Table 7.3: Directional criteria for public institutions and facilities.

Criterion	**The negative**	**The positive**
1	Inappropriate in form and type	Appropriate in form and type to local need
2	Inaccessible	Located in places of high accessibility
3	Skewed distribution	Equitably distributed
4	Inefficient	Efficient: each tranche of investment should reduce the largest amount of unserved demand
5	Hierarchically non-aligned	Hierarchically aligned with movement, infrastructure and hard public space
6	Isolated events	Clustering of facilities to encourage multi-purpose trips and to create special places
7	Embedded locations	Exposed locations
8	Single use	Multi-functional

9	Little use of available technologies	Maximum use of available technologies
10	Non-viable facilities	Viable facilities in terms of range and threshold

7.2.3.1 Appropriate in form and type to local need

Context has important bearing on the form and type of facilities that best meet the needs of the communities. Dewar and Uytenbogaardt (1995: 48) argue that rather than predetermining the form of all facilities, it is important to determine the most important form and structural positioning of social institutions – to make provision at significant structural places for important community facilities.

Alternative methods of service delivery (because of fiscal constraints in the face of accelerating demand) and innovative forms of assistance should be considered in this process (Dewar and Kiepiel 1997: A15-7). Rethinking the conventional model of the school as a self-contained entity (many of which have inadequate or no libraries, computer facilities, science laboratories and workshops etc.) is an example. One solution may lie in disaggregating these more public dimensions of the school into educational hubs and sharing these between schools and the broader community. Another lies in greater use of electronic teaching aids, particularly in rural areas (*ibid:* A17).

Innovative, non-conventional forms of assistance should not be viewed in isolation but should combine with each other and with other functions (such as school resource centres), depending on locational requirements. Examples of these include regional life skills centres, agricultural support centres, building materials depots, conservation-tourism centres, land restoration centres and communication centres (*ibid:* A15).

7.2.3.2 Located in places of high accessibility

In the provision of public facilities, the consistent hierarchical principle is that the higher order facilities should locate at the highest points of accessibility (for these need

to serve the largest area) and lower order levels of facilities should find their own appropriate level of access (Dewar and Kiepiel 2004: 49).

Because the regional accessibility framework comprises both points and lines of higher accessibility, it is emphasised that this approach does not equate to the conventional approach that concentrates only on nodal settlement.

7.2.3.3 Equitably distributed

Although all people should have access to a full range of facilities, Dewar (1994: 5) finds that in South Africa, regional disparities in provision of public facilities remains strongly associated with grossly distorted settlement patterns that formed through historic neglect and land allocation processes in areas under customary jurisdiction. On one hand, regional settlement patterns in the commercial farming areas tend to display a well-defined hierarchy of central places supplying regional services.

On the other, areas under customary jurisdiction have no urban settlement system in the conventional sense: "There is simply unremitting rural sprawl, at densities which are too low to promote intensification occurring at particular points and which make the viable provision of conventional forms of services almost impossible" (Dewar and Kiepiel 2012: 32). Services are inequitably distributed and the central issue of spatial organisation in rural areas is reducing conditions of spatial marginalisation – the inaccessibility and immobility of many communities contributes to their material impoverishment.

In this light, Dewar (1985: 48-52) criticises conventional approaches to spatial organisation of the peripheral areas, which focus on a widely standardised form of settlement planning, strongly informed by central place theory and particularly, the rigid geometry of the Christallerian model. Rural service centres are an example (Dewar *et al* 1986: 153). While elements of such packages may be used to bring about the desired result (*ibid*: 160), Dewar (1985: 51-2) concludes that, generally, the possibility of success of conventional approaches are highest in areas already containing an established settlement hierarchy and where rural densities and incomes (and thus thresholds) are relatively high, which is not usually the case in the peripheral regions of South Africa.

Therefore, instead of emphasising static points (nodes) that define access in terms of radial service areas, Dewar (1985: 53) argues that the transport routes (activity or investment lines) that link a number of local areas become the logical focus of ordered rural investment, forming a hierarchical form of interlocking activity routes. Further, this involves non-mutually exclusive approaches of both bringing people to the services and taking the services to the people through periodic service delivery (Dewar and Kiepiel 2012: 32).

7.2.3.4 Efficient: each tranche of investment should reduce the largest amount of unserved demand

Dewar and Kiepiel (2004: 50) discuss the principle of using each tranche of investment to serve the largest number of people, whereby greatest improvements in accessibility are gained with each tranche. It is the principle of closing down space over time, to achieve ever-increasing levels of choice and convenience.

It is important that this approach rolls out a *system* of institutional provision rather than focusing upon single facilities. Dewar and Kiepiel (*ibid*: 50-1) argue that vertical integration of services is important. The principle is that each hierarchical level of services should provide support to lower levels. For example, in the case of health services, breaking down space involves locating a hierarchical package of all levels of service (e.g. hospital-clinic-mobile services) according to the hierarchical needs of accessibility of the different levels of service levels.

7.2.3.5 Hierarchically aligned with movement, infrastructure and hard public space

Hard public space, such as squares, should be located at highly accessible places and attract major public activities, both formal and informal (Dewar and Uytenbogaardt 1995: 23). Because public facilities, used to define and thus make the public space, must be accessible, alignment with appropriate hierarchies of movement is essential. Similarly, utility services are a precondition for the effective provision of social services (Dewar and Kiepiel 2012: 33). This is a mutually-reinforcing system involving alignment of the hierarchies of movement, utility services, hard public space and public institutions.

Alignment of different types of public services in regional space requires mention, since there are two variants in this approach. First, Dewar and Kiepiel (2004: 49) discuss the hierarchical alignment of packages of sectorally-different services, for example, clustering of a hospital and training college at the most accessible point, clustering of a clinic and school at a point of lower accessibility, and so on, with possibilities of mutually-beneficial relationships.

Second, Dewar (1985: 55) argues that depending on local conditions and needs, more specialised nodes such as an education node (a campus of high schools with boarding facilities) may occur in association with health services, marketing outlets and so on, but would not necessarily correspond with the main health node or economic node. A spatially discrete node is not suggested by Dewar but an entire system of such centres that makes up a 'linear settlement', interconnected by efficient rural transport. Clearly, in either case, the precise composition of the spatial investment would need to correspond to the level of accessibility that the services require.

In KwaZulu-Natal, Kiepiel's (1994: 21, 131) findings on historic patterns of services provision in informal settlements were that there was no clear correspondence between line services such as electricity and water, and point services such as schools and clinics. This is largely because different bodies and organisations make decisions about different elements of regional and rural infrastructure in almost total isolation of actions and decisions in what should be related, co-ordinated, fields.

Consequently, inappropriate approaches do not address the need for compromises and trade-offs in decision making. They tend to perpetuate historic tendencies of hierarchically non-aligned public capital investment, a problem which lies at the heart of the issue of spatial restructuring.

7.2.3.6 Clustering of facilities to encourage multi-purpose trips and to create special places

Clustering of facilities expands choice and reduces transport costs as it allows access to a number of services on a single trip (Dewar 1985: 56). It supports the interactions and linkages between services, economies of agglomeration and therefore the level of service (*ibid: 30).* It promotes multifunctional use and sharing of facilities (Dewar and

Todeschini 2004: 58). With good design, this concentration of public investment increases the attractive power at these places and investor confidence (*ibid.).* Dewar and Todeschini conclude that over time, such places may transform into a high activity urban 'centre', which is a 'special place' environmentally and which becomes a social centre (*ibid*.).

7.2.3.7 Exposed locations

Dewar (1985: 43) observes the impact of spatial isolation on many rural communities, who must satisfy community needs from the extremely limited resources generated and controlled by the community. He argues that where investment (such as public facilities) is embedded in such communities, access of rural dwellers outside of the community to the investment is restricted and difficult (*ibid*: 45-6) and because the limited spill-over effect of the benefits is extremely weak, large amounts of scarce investment benefit relatively few people: large numbers of people are effectively trapped in space (*ibid:* 52).

Public facilities, therefore, need to be exposed by locating at points of higher accessibility. Dewar (*ibid*: 53-4) argues that the objective of each investment project is to maximise its impact and therefore the total accessibility to it, by locating facilities on the major routes.

7.2.3.8 Multi-functional

Resource scarcity demands that buildings and spaces be multifunctional with the greatest degree of sharing possible between user groups. They should be made in a manner that allows them to accommodate a range of demands.

7.2.3.9 Makes maximum use of available technologies

It is important that maximum use should be made of technological developments such as communication and information technologies, and integrating these into the spatial framework of regional facilities provision. In rural areas, communication may be a fundamental bottleneck. For example, in a Wild Coast study, Kiepiel and Quinlan (1997: 149) found that poor communication systems were one of the greatest problems for the revival of tourism and the development of micro-tourism systems.

However, communications technology must also be aligned with socio-economic development requirements and not merely the advancement of economic development goals: it is a critical requirement for embeddedness (chapter five). To this end, U.S. Congress: Office for Technology Assessment (1991: 17) emphasises that, in order to bring about changes, government should promote cooperation and commitment between three parties in rural development: rural institutions (schools, libraries, medical and health providers, development agencies); communications providers; and catalysts for change (e.g. universities serving rural areas, local educational or community leaders, government and private entrepreneurs).

7.2.3.10 Ensure facilities are viable in terms of range and threshold

Dewar and Kiepiel (2012: 32-3) explain these important concepts, drawn from central place theory, in the viable provision of public facilities. The provision of public services (both public facilities and utility services) are governed by the concepts of threshold, range and the hierarchical order of services, with higher order services requiring greater levels of support than lower ones. Threshold is the minimum level of support necessary to bring a good or service into being and to sustain its viability. Range is the spatial expression of threshold. It has two limits: an upper limit defined by maximum distance people are prepared to travel in order to experience or obtain a good or service, and a lower limit defining the area within which the minimum threshold is contained. Range, therefore, operationalises the concept of hinterland.

Appropriate planning recognises the requirements of threshold and range, in order to ensure equity, resource efficiency and ongoing viability in services provision. However, these conditions are not always met. For example, Kiepiel's (1994: 127) analysis of services provision in KwaZulu-Natal informal settlements found wide variability of the threshold values calculated for social services: some larger settlements of over 10000 people had no high school or clinic provision.

The conclusions were, firstly, that the number of small settlements with higher order facilities implies that either thresholds are inadequate for their sustainability or that they reply on a wider population for threshold support (effectively functioning as towns in a wider settlement system of integrated services provision). Secondly, low

thresholds were a cause of lack of facilities in certain settlements (partly due to threshold capture of settlements in urban areas) as well as under-provision.

Range, however, cannot simply be reduced to time or distance. Dewar (1985) identifies various sociological, infrastructure and geographical factors that affect complex patterns of range; for example, the clustering of facilities that gives rise to the tendency to combine shopping with social trips (*ibid:* 25-6); lesser mobility of the young, the poor, the aged and the infirm (*ibid*: 29); people's perceptions of the quality of the health service (*ibid*:29) or education (ibid: 34) offered; condition of roads and tracks (*ibid*: 31-2); topography and climate (*ibid*: 49); and movement technology (*ibid*: 49).

It is clear that a system of services provision requires careful design based on an analysis of local conditions. However, this does not require exhaustive knowledge of an ever-changing socio-economic and geographic context. Rather, a non-programmatic planning method is required that includes principles such as those relating to clustering of facilities; the equity of a movement system centred on foot and public transportation; the physical quality of the public transport routes; the establishment of facilities that emphasises better quality; routes as channels of people and money, hence thresholds that are released at stops (interchanges, cross-over routes); and an interconnected system of services routes wherein each additional investment serves the greatest amount of unserved need and reinforces accessibility.

7.2.4 Hard public open space

In spatial-structural approaches to planning and design, all public space is seen as social space, not residual or left-over space (Dewar and Todeschini 2004: 69). Reasons for inclusion of hard public space in regional-scale planning include the following:

First, in South Africa, positively-made hard spaces have been neglected in the modernist period and their wide-spread promotion should occur at a higher, regional level of governance as well as smaller urban spaces. Second, these spaces are central to positively-made settlements. In low-density rural areas where service provision is inadequate, hard public spaces offer a basis around which development of permanent service centres may be stimulated. Third, as essential social infrastructure (Dewar and

Uytenbogaardt 1991: 56), hard public space is integral to regional services provision. Fourth, well-made hard spaces contribute powerfully to sense of place and therefore the tourism image of a region. Fifth, linear public spaces may take regional form, for example, in rural areas, arterial roads accommodate considerable pedestrian traffic that, at times, may be dominated by scholars walking to and from schools.

Table 7.4: Directional criteria for hard public open space.

Criterion	**The negative**	**The positive**
1	Poor quality spaces	Create qualitatively-fine spaces
2	Embedded and inaccessible locations	Accessibly located
3	Ignore periodicity	Accommodate periodicity

7.2.4.1 Create qualitatively-fine spaces

Whether in small towns and cities of the region or in the creation of special places in rural areas, the following characteristics should be included in the design of qualitatively-fine hard public open spaces (Dewar and Todeschini 2004: 107-119, Dewar *et al:* 2012: Appendix B, Dewar and Uytenbogaardt 1991: 55-7, Dewar and Uytenbogaardt 1995: 18-26).

They must be viewed holistically, in relation to other elements of structure, and as part of a hierarchical 'family' of hard public spaces, adopting similar structural positions with similar roles to create a structural rhythm that contributes to legibility; they must be accessible as opposed to embedded; they must be seen as the social hearts of settlements, being special places of gathering, formal and informal social interaction and community life; and they should act as extensions of private dwellings, offering that which cannot be provided privately.

In their design, they should be multi-functional: they should be able to accommodate a variety of activities, albeit none perfectly. They should be humanly-scaled in terms of the relationship of the base plane to the surrounding structures and visual and verbal communication (for example, a scale at which two people with normal vision can

communicate comfortably across the scale of the square (Alexander et al 1977: 311-3)).

They should be comfortable, offering both some protection from the natural elements as well as enjoyment of those elements (sun, wind, rain); landscaped with attention to surface, canopy, floor (appropriate to functions) and furnishing (appropriate to the size and role of the space in the hierarchical family of hard public space); comfortable for pedestrians (for example, plantings, street furniture); not impacted by vehicular traffic; and should be designed for physical comfort concerning climate, orientation, the ways that the edges are made and the nature of planting.

They should have defined public and private realms: public space does not 'bleed out'; they should be at least partially enclosed: clearly defined spaces have a sense of enclosure without a sense of confinement, significantly achieved by the way the edges are made; they should provide orientation and identity, for example, by means of landmarks, cardinal, topographic and axial alignment, a sense of history and heritage of symbolic significance and relationship with green spaces; they should be safe: surveillance (human eyes over space) is central to this end and lighting is an important consideration; and the infrastructure provided should be appropriate to the role and scale of the space.

7.2.4.2 They must be accessibly located

The location of hard public space should correlate with the exposed locations of public facilities (that is, locations of higher accessibility). This implies a hierarchy of hard public spaces: since they must be accessible, alignment with the hierarchy of movement is essential. In most positive environments, there is generally a hierarchical correlation between elements of public structure and spaces, particularly with higher order spaces (Dewar and Todeschini 2004: 75). In this regard, the regional routes and the settlements they tie together are important.

However, it is not a matter of exposing all facilities as much as possible but providing the requisite degree of accessibility without embedding them in a discrete community. Clearly, there is a correlation between location and scale of public space, whereby the larger spaces are associated with the most exposed or accessible conditions (Dewar

and Todeschini: 2004: 70). In the family of public hard space of rural regions, the larger spaces are those that define market towns: their legibility enhances regional identity that is a regional tourism asset in its own right.

7.2.4.3 They must accommodate periodicity

Settlements provide thresholds for goods and services that fluctuate contextually over time. This has implications for public hard space. For example, the thresholds of small towns in commercial farming areas may fluctuate seasonally (seasonal migrant workers); with monthly stock sales; or with mid-month, month-end or weekly pay days. Planned tourism attractions or weekend visitors also contribute. Moreover, periodic availability of adequate thresholds is the essence of periodic markets and services in low-density rural areas. Some implications for public hard space are:

Firstly, periodicity, which varies with local conditions, should be accommodated in the course of the design of the regional system of periodic markets, in which public hard space is central to the marketing and service provision as well as a range of other functions such as social interaction. An appropriate approach to the design of a ring of periodic markets considers their location on interconnected marketing routes, where the rhythm of market infrastructure responds to local patterns of accessibility: at crossroads, bus termini, pension pay-out points, schools and other social facilities and so on (Dewar 1985: 56-60). The ring of periodic markets should be centred on, and initiated in, the principal small town that has the highest thresholds. Dewar cautions against excessively long marketing rings (*ibid*: 58).

Secondly, because of the fluctuating thresholds and functions associated with these public spaces, their design requires a high level of generosity and generality that allows the flexible accommodation of the periodically changing circumstances: the design of hard public space that can easily accommodate, with dignity, unexpected events and demands. In terms of their social role, “the best spaces are those that are made with a generosity and generality that allows a variety of activities to occur within them…”, where ‘generality’ implies that they are not made for a specific activity (Dewar and Todeschini 2004: 107). While these spaces are built to accommodate

immediate direct needs, they are flexible: their generosity does not impose the final outcome (Dewar and Uytenbogaardt 1995: 29).

7.2.5 Utility services

Utility services refer to essential resource inputs (potable water and energy) and outputs (sewage disposal, stormwater and waste water disposal, and garbage disposal), as well as telecommunications infrastructure. An essential collective service involves the economic infrastructure required for urban or rural (periodic) markets. A function of collective utility points, in association with hard public space, supports public markets: depending on context, they may include public standpipes, public telephones, post collection points, sold waste collection points, metered electricity dispensers and public toilets (CSIR 2005: Chapter 5.7).

Utility services take the form of grid-tied or off-grid services: as with movement, their form and configuration are an important influence on regional patterns of accessibility.

Table 7.5: Directional criteria for utility services.

Criterion	The negative	The positive
1	Little use of historical investments in infrastructure	Maximum use of historical investments in infrastructure
2	Isolated event	Network expansion
3	Non-aligned, isolated form of line service	Align different forms of line services so that they reinforce one another
4	Non-aligned hierarchies of utility services and facilities	Hierarchy of utility services aligned with hierarchy of facilities
5	Excessive use of non-renewable resources	Maximum use of renewable resources in terms of inputs
6	Inefficient use of throughputs	Efficient use of throughputs
7	No recycling	Maximum recycling of wastes

8	Irresponsible disposal of wastes	Ecologically-responsible disposal of wastes
9	Inappropriate and unaffordable forms of utility services	Forms of utility services must be appropriate and affordable
10	No economic spin-offs	Contribute to pre-conditions for income generation
11	Information technology that is inaccessible and inappropriate to needs	Information technology easily accessible and appropriate to people's needs

7.2.5.1 Make maximum use of historical investments in infrastructure

Regional spatial development is a process that occurs over time, in which coordinated investment in infrastructure builds upon, and reinforces, past investments. In resource-scarce regions in particular, it is necessary to make maximum use of historical investment in infrastructure, provided assessment proves economic (as opposed to financial) cost effectiveness in comparison to new investments: for example, when historical investments are found to be serviceable and ecologically appropriate.

7.2.5.2 Network expansion

Internationally, the failure of many investment programmes in rural areas has resulted from the fact that investments have occurred as single, isolated events (for example, school or hospital provision without adequate power or water; the creation of water supplies without power backups that would massively increase the impact of the original investment) (Dewar 1994: 8).

The most highly geared investments are those that reinforce previous investments: that is, investments that are set-extending. It may also mean that if important parts of the set are missing, these should be included in project design (Dewar and Kiepiel 1997: A50).

7.2.5.3 Align different forms of line services so that they reinforce one another

Linear services should also be, but are often not, strongly informed by the principle of reinforcement (Dewar and Kiepiel 2012: 33). Thus, for example, the developmental potential of water provision is far greater when it is associated with power and movement that it is on its own. For this reason, linear services tend to cluster together: they form potential investment lines in regional space and the association of these lines makes up a regional network (Dewar 1985: 53).The geometry of the network is informed by the pattern of settlement and new settlement, in turn, responds to the network.

7.2.5.4 Hierarchy of utility services aligned with hierarchy of facilities

Regional 'activity or investment lines', founded around investments in utility services and movement (particularly public transportation) form the basis of accessibility in regional space. However they are not all equal: they assume hierarchical dimensions (Dewar and Kiepiel 2004: 49).

7.2.5.5 Make maximum use of renewable resources in terms of inputs

Renewable and non-renewable natural capital forms the basis of ecosystem services on which people depend. "Renewable resources are resources that are continually replaced by material cycling and energy flow in an ecosystem" (Marten 2001: 221). This implies that they should be managed sustainably and their regenerative capacity should not be exceeded. These resources include clean air, the soil, ground and surface water, the photosynthetic biomass (both land and water), and the herbivores and carnivores that are at the apex of the various food chains (Lawn 2001: 55). Any continued harvesting and depletion of non-renewable resources must increase people's long-run reliance on renewable natural capital. Clearly, therefore, maximum use must be made of renewable resources.

Energy is a unique resource that powers resource cycles such as the hydrological cycle and key economic sectors such as energy, transport and industry. Unlike material resources, energy cannot be recycled (although waste heat can be captured). However, renewable energy resources, particularly solar, wind and hydro, are sufficient and

locally abundant in South Africa. Their cost as well as their environmental and health advantages justify the transition to renewable energy resources in South Africa, away from relatively expensive and polluting fossil fuels.

Maximising use of renewables should occur throughout the input chain. For example, while water is a renewable resource, its transfer may involve gravity flow without non-renewable energy input or pumping, through the use of either renewable or non-renewable energy resources.

7.2.5.6 Efficient use of throughputs

Throughputs include land, water, energy and finance. Efficient use of throughputs occurs when either a greater stock of human-made capital is produced through a given level of throughputs, or when a given stock of human-made capital is produced through a lesser level of throughputs (Lawn 2001: 86).

It follows that regional spatial planning should promote the efficient use of throughputs through measures such as reducing aggregate movement while maximising opportunity and choice; transitioning to renewable energy technologies using locally abundant resources such as wind, water and solar power, which have greater durability and operational efficiency than fossil-fuel systems; conserving energy, primarily through economic localisation and settlement compaction; conserving materials (for example, the multi-functional use of public buildings); conserving land, through settlement compaction and multi-functional use of public spaces; ensuring that each tranche of investment serves the largest unserved need; and avoiding actions with large embedded capacity requirements.

7.2.5.7 Maximum recycling of wastes

Regional spatial planning has an important role to play in maintaining the sink function of nature through ensuring that wastes do not exceed the assimilative capacity (Lawn 2001: 61). While the nature and scale of consumption is central, recycling of wastes is important. Tietenberg (2003: 205) argues that market mechanisms automatically create opportunities for recycling and reuse, generally in the right direction but not

always of the correct intensity: justifiably, government has a role to play in ensuring this.

South Africa's waste management strategy involves a hierarchy of actions, initially founded on avoidance and reduction, then followed by recovery, re-use and recycling (South Africa, Department: Environment, Forestry and Fisheries 2019). Their generic process for waste management with recycling includes projects such as construction of waste transfer and buy-back/recycling centres, materials recovery facilities and composting facilities.

Use of settlement wastes are particularly important to fertilise and water small-scale agriculture in proximity to the settlements of the region. This importance is demonstrated in the United Kingdom, which calls for 52% of sewage sludge to be absorbed by agricultural land.

7.2.5.8 Ecologically-responsible disposal of wastes

It is appropriate to view the metabolism of the region as an energy-driven process of inputs (resources), throughputs and outputs (wastes). The ecological footprint is central to this; for example, Wackernagel and Rees (2014: 505) calculated from 1991 data that the average Canadian lifestyle requires 2,34 hectares of land to absorb the carbon dioxide released by *per capita* fossil-fuel consumption.

Following international waste management practices, South Africa, Department: Environment, Forestry and Fisheries (2019) promotes reduction, recycling and reuse of waste. Integrated waste management plans are promoted which, the Department stresses, are not stand-alone projects but should be integrated with planning. Clearly, all spatial implications should be explored (for example, alignment of bulk sanitation with investment lines; and design of open space on settlement fringes for waste processing and subsequent use in agriculture and in the irrigation of sports fields).

7.2.5.9 Forms of utility services must be appropriate and affordable

Given high levels of poverty, the issue of access to services is not just a physical one – the issue of affordability is central.

Under such conditions, the best situations pertain when people have choices in relation to alternative forms (and costs) of service delivery and can choose to 'opt-in' to higher technologies if they can afford it (for example, a hierarchical system in relation to water may include untreated surface water such as dams or streams, springs, hand pumps, boreholes and wind pumps, collective piped water points from bulk boreholes or surface sources, household rain-water tanks, small-bore water systems that may gravitate into household storage tanks, and on-site reticulation).

An important principle is that service delivery should recognise that in many cases the most accessible (hence most basic) service option is one that is modelled on traditional institutions: communal tenure is accompanied by a stream of benefits involving free access (for example, to available sources of water and fuel). This suggests that since capital costs of service provision are covered by state subsidies, the entry level of services should be delivered through technologies with little or no running and maintenance costs. This not only suggests natural sources (for example, surface water sources) but importantly, it also suggests the use of soft technologies with minor running costs (for example, bore-hole water supply) (Dewar and Kiepiel 2004: 52).

Furthermore, depending on context, collective utilities for domestic (such as bath houses) or economic use (for example, serviced market stalls) may be necessary. If provided, the principles of clustering with other utilities and alignment with the accessibility framework also apply.

7.2.5.10 Contribute to pre-conditions for income generation

Investment in jobs, assets and infrastructures is a key component of a new macroeconomics for sustainability (Jackson 2009: 104). Examples of significance for regional spatial planning include: public sector jobs in building and maintaining public assets; investments in renewable energy, public transport infrastructure, and public spaces; retrofitting the existing building stock with energy- and carbon-saving measures; investing in ecosystem maintenance and protection; and providing fiscal support and training for green businesses, clean technologies and resource efficiency (*ibid.*).

The following concerns are particularly important in the South African context.

First, a targeted approach is necessary that focuses on infrastructure support for the generation of opportunities in subsistence and small-commercial operations. While the infrastructural requirements of the internationally-competitive economic circuit can potentially be used by all (for example, the telecommunications system, regional and national road routes), planning cannot overlook the specific requirements of small economic operators and individuals such as micro-tourism requirements (Kiepiel and Quinlan 1997: 159-162).

Second, the investment line and network framework of accessibility creates the pre-conditions for future economic development and its logic accommodates the needs of both large and small enterprises. Within this framework, more sectorally based policies may be pursued. (Dewar and Kiepiel 2012: 35). Locational positions with easy access to both inputs and markets favour small operators (for example, urban fringe agriculture, small-scale manufacturing).

Third, a call for redefinition of essential infrastructure that includes small-scale economic infrastructure everywhere that significant concentrations of people occur periodically or permanently; and decentralised wholesale systems, particularly food wholesaling, building materials and firewood (e.g. linked to eradication of alien vegetation) is required (Dewar and Uytenbogaardt 1991: 108-112).

Fourth, capital expenditure should recognise that the following project types are highly geared (in that investments mobilise other resources or elicit a range of responses): capacity-building projects where skills are developed for future projects; income spreading investments, widely spread over smaller operators; and labour intensive processes of employment generation.

Finally, income generation opportunities in waste management should be exhaustively pursued (for example, Dewar and Uytenbogaardt 1995: 55).

7.2.5.11 Information technology easily accessible and appropriate to people's needs

Information technology presents unique opportunities for improvement of wellbeing. On one hand, it may be harnessed for diverse purposes such as social networking,

work-seeking, political participation, entertainment, social services, agricultural extension, education, training and health provision, management of public works, environmental restoration and tourism and infrastructure management and maintenance.

On the other hand, it is important that such technology is easily accessible and appropriate to people's needs. As Castells (2001: 33) argues, differential timing in access to the power of technology for people and places is a critical source of inequality. In this regard, Human Rights Centre (2017) have identified access issues that include connectivity, skills required to use the technology and content appropriate to people's needs, which should be unlocked to avoid heightened social and economic disparities. Hlatshwayo (2021: 124), for example, points to public access to Wi-Fi as a central issue.

Physical and spatial design has an important role in confronting these emerging inequalities. For example, Dewar and Uytenbogaardt (1991: 108) suggest the following may form part of the regional infrastructure programme: the establishment of reception centres in small towns, where people can access various types of information appropriate to their needs; and the use of community-based, publically-controlled television, which may be located in the larger settlements or periodic markets of the region.

Kiepiel and Quinlan (1997: 162) suggest ghillie centres on the Wild Coast, South Africa, for multiple purposes that include communication hubs, local resident management of marine resources, management of programmes for the construction and maintenance of micro-tourism trails and micro-tourism management including ghillie and porter services. In this vein, gateways to regional parks and conservation areas may also develop as venues that allow local communities to access developmental information, as well as technical nodes that drive local area networks that connect nearby state programmes such as schools, clinics and public works.

Whatever the form of provision, it must be recognised that the contextual interpretation of the developmental needs for communication should be a creative response, not simply the rollout of telecommunications hardware.

7.2.6 Settlement systems

Settlement – the permanent human occupation of the landscape – has long been an important dimension of regional planning (Dewar and Kiepiel 2012: 32). Although not the only vehicle for delivery of services and infrastructure in regional space, settlements as central places are clearly important.

At the regional scale the emphasis is primarily on the relationships between the size and spacing of settlements: it involves regional settlement systems and their relationships with other spatial-structural systems (movement, social and utility infrastructure, ecosystems and so on), rather than individual settlements, although generic qualities of the latter (for example, urban performance) are a regional concern.

Table 7.6: Directional criteria for settlement systems.

Criterion	**The negative**	**The positive**
1	Create wasteful and expensive new settlements	As far as possible, make use of existing settlements to absorb growth
2	Encourage sprawl	Infill new development to improve existing urban performance
3	Embedding new settlements in inaccessible places	If new settlements are necessary to deliver social and local economic services, locate them in highly accessible places
4	Housing-led growth	Ensure that new settlements have viable economic bases
5	Settlements considered in isolation from movement infrastructure	Use new transport links to reinforce, and increase the range of, new and existing settlements
6	Non-aligned elements of public structure	Align settlement with hierarchies of movement, public facilities, utilities and hard public spaces

7.2.6.1 As far as possible, make use of existing settlements to absorb growth

There are a number of reasons why this is important. Firstly, land uptake through new settlements erodes targets for ecosystem services, including water and food production, as well as countryside character, biodiversity protection and regeneration. Secondly, use of existing settlements to absorb growth is efficient, particularly in contexts of financial and other resource limitations, in that it minimises land costs and makes the best possible use of historic public investments such as social facilities and utility services. Thirdly, it improves urban performance. This is discussed below.

Application of this approach requires judgement: some settlements are so distorted that their expansion will only worsen the conditions of new dwellers - in these cases, new settlement-formation may be necessary.

7.2.6.2 Infill new development to improve existing urban performance

Urban sprawl refers to low density and lateral spread. This settlement form means that people have to spend considerable time and money travelling long distances to work, shops, schools and social facilities. It also means that local authorities must spend large amounts on providing and maintaining excessive amounts of infrastructure, which is increasingly unaffordable.

Urban sprawl does not use existing infrastructure efficiently because new developments take place on the edge of the urban areas. It also reduces biodiversity, agricultural land and countryside character. For example, a Cape Town case study (Behrens and Watson 1992: 68-70) found that the city's environmentally and fiscally unsustainable growth resulted in the aggravation of the fiscal crisis, restriction of small and informal businesses, increased travel costs and deterioration of travel conditions and loss of both tourist potential and productive agricultural land.

Infilling is important, since the only resources available to correct historical settlement distortions are those generated through new growth. From a regional perspective, this requires measures such as the delineation of urban edges, densification and compaction.

Compaction of development involves actions to reduce lateral sprawl such as clearly defining growth paths; and the intensification of development. This intensification, if well-designed, improves urban performance in the following ways (Dewar and Louw 2012: 54 - 55): it makes better use of historical investments in infrastructure; it reduces the aggregate amount of infrastructure provided; it increases levels of support for social and commercial services and hence convenience; it promotes efficient and viable public transportation; and it creates preconditions for viable urban markets for small-scale, self-generated, economic enterprises.

In South Africa, densification of rural settlements presents a particular conceptual problem: management of these settlements requires deciding whether the settlement cluster is shifting from a mono-functional, land-based (resource-based) local economy (or a displaced urban dormitory) towards an urban economy in which the settlement functions multiply and centralized services provision such as bulk water supply becomes possible.

7.2.6.3 If new settlements are necessary to deliver social and local economic services, locate them in highly accessible places

The concepts of threshold, range and the hierarchical order of goods and services appropriately governs both the provision of the hierarchy of services (the pre-conditions for both economic development and settlement formation) as well as the hierarchical tendency in the spatial distribution of settlements in national and regional space – central to both is access (Dewar and Kiepiel 2012: 32). “People and organizations will pay a premium to be in locations with higher access to the things (people, opportunities) they care about, to save time and money on travel, and to be more productive and earn more, all else equal. The general theory of access makes the claim that access, properly and completely measured, explains location-related decisions.” (Levinson and Wu 2020: 149).

With sensitive urban design, hierarchical clusters of services can be used to create ‘special places’ in areas of thin rural sprawl: incipient town centres organised around fine public spaces (Dewar *et al* 2012: Appendix B). However, in spatial-structural approaches to planning, the issue of the growth of viable settlements cannot be forced:

the focus of planning is on infrastructure and services investment. With the investment of similar level services at points along investment lines in rural areas, these points do not necessarily result in settlements: however, if well located in terms of thresholds and other (particularly economic) activities, they may become permanent nodes over time (Dewar 1985: 54). Dewar and Todeschini's (2004: 64) argument promoting investment in higher-accessibility urban points and corridors applies similarly in the rural context.

7.2.6.4 Ensure that new settlements have viable economic bases

Resilience requires that all settlements need an economic base. The development of new settlement, where necessary, should be viewed holistically and not sectorally (as with a singular focus on housing development). It is essential that new settlements show a propensity to grow economically.

Dewar (1995: 31) advances spatial and aspatial criteria that underpin the propensity for towns to grow economically, which may be applied to new settlements. This propensity is defined particularly by "the prosperity of the surrounding hinterland, the availability of local resources to which value can be added, the availability of skills, the emergence of entrepreneurial initiative, leadership and organisation, and location".

Population (and thus income) growth, which expands demand for goods and services, also contributes to growth potential. More accessible settlements have a greater propensity to grow, since they are accessible to larger hinterlands (Dewar and Kiepiel 2012: 32).

A further issue is the resilience (Kharrazi *et al* 2020; Wu and Wu 2014: 552) of the settlement's economic base, involving concerns for economic diversity, redundancy (the replication of pathways, functions, or components which enhances a system's fault tolerance ability (Kharrazi *et al* 2020: 3)) and modularity (the property of a system whose components can be separated or integrated without any change within their properties or within those of the rest of the system (*ibid.*)).

In regional spatial planning, resilient systems may be founded upon diverse ecological surpluses and diverse local skills catering for local needs; redundant supply chains

offering choice instead of monopoly or monopsony; and self-sufficiency with far less connectedness and dependence on distant locations for essentials (for example, through localisation of economic activity, recognition of local ecosystem services (e.g. local food, water and energy), vernacular construction and urban agriculture). Development of vibrant local economies, with their spatial and physical preconditions, is central (see, for example, Dewar (1995) and Dyosi (2016) on the Sutterheim, Eastern Cape, experience).

7.2.6.5 Use new transport links to reinforce, and increase the range of, new and existing settlements

By definition, new transport routes that connect new and existing settlements into the grid of regional accessibility reinforce the accessibility of those settlements (as well as the accessibility of other connected settlements in the system). Facilities should be exposed to the greatest degree in order to maximise the potential of available thresholds, because the transport links effectively increase the range of facilities (and the range of settlements delivering facilities). A precondition for this is public transportation on all-weather routes (Dewar 1985: 54-5).

7.2.6.6 Align settlement with hierarchies of movement, public facilities, utilities and hard public spaces

Because the alignment of public structural hierarchies is ultimately intended to serve people's needs, by definition, the alignment should include the settlement system of the region. Part of the regional challenge is co-ordinating the investment line and network with major settlement patterns (Dewar and Kiepiel (2012: 35). This creates a framework for future investment in both urban and rural regions as opposed to reactive response to (often distorted) historical patterns of settlement. This framework should guide future settlement formation and is likely to lead to voluntary adjustments over time to existing (and frequently distorted) settlement patterns, as demand to gain proximity to the framework increases.

7.3 DIRECTIONAL CRITERIA: SENSE OF PLACE

An important role of regional spatial planning is the positive management of the sense of place of the region. Central to this are the related concepts of landscape and landscape character.

Swanwick (2004: 112) refers to the different scales of landscape characterisation that range from the national to the site level - the regional scale is included in the 'landscape scale' of character assessments. At the regional scale, landscape character is a useful concept for the management of sense of place and of place-making. Regional spatial planning is concerned with the nature, scale and location of development in terms of the landscape's capacity to accommodate change, in a manner that conserves, restores or enhances landscape character.

Table 7.7: Directional criteria for sense of place.

Criterion	The negative	The positive
1	Ignoring landscape character	Working with landscape character
2	Encouraging standardisation	Promoting and protecting uniqueness & sense of place
3	Ignoring special places	Promoting and protecting valuable elements of the biophysical and cultural landscape

7.3.1 Working with landscape character

A fundamental concern of regional spatial planning is the accommodation of change without fundamental change in the character of the landscape: for example, in the accommodation of tourism development, the direction of change should be toward a landscape that supports tourism, rather than a 'tourism landscape' - the latter involves a fundamental change (Kiepiel and Escott 2017: 9). This requires working with the essential attributes that give rise to its unique and memorable character. These attributes include the properties of the landscape as well as the collection of cultural experiences that should not get lost but remain possibilities for future use (Norberg-Schulz 1980: 180).

Therefore, landscapes of differing character should be delineated and described as a basis for making judgements based on their character, in order to inform a range of decisions, as in the example of tourism development.

At the regional level, a fundamental concern is the dynamic balance between the three basic landscapes of society – primeval, rural and urban. A major problem in many parts of South Africa is that sprawl is riding roughshod over primeval and rural landscapes. This basic taxonomy of regional landscapes should be refined through systematic landscape characterisation, for example, by means of the method advanced by Swanwick and Land Use Consultants (2002) and applied in KwaZulu-Natal by Escott and Kiepiel (2010).

7.3.2 Promoting and protecting uniqueness and a sense of place

Landscape character assessment is an important tool that provides a basis for the protection, restoration and enhancement of sense of place, as opposed to uniformity, standardisation and loss of uniqueness and memorability. It embraces a number of recognitions.

Regional identity is the regional expression of uniqueness and difference (Dewar and Kiepiel 1997: A67). Irrespective of cultural tradition, the native landscape is the primary determinant of regional identity (Hough 1990: 19). Fundamentally, it involves natural and social processes: what people have put there in their adaptation to, and of, the living environment to meet needs (*ibid*: 180). An example is the appropriateness of settlement form to natural process.

This adaptation, termed *regionalism,* reflects the holism – the interconnections – of a place (Dewar and Kiepiel 1997: A67): Patrick Geddes' valley section (Hall 1995: 140-143) expresses the insight that the primary reference in regional planning is the structure of the landscape, because human activities find their appropriate place in the landscape in response to its structure. 'Endogenous development', bringing together local skills, local resources and local needs (Dewar and Todeschini 1999: 7), is seminal. "Landscape is the undeniable piece of artistic and cultural property and the foundation of any nation", underscoring that "the aesthetic aspect of the environment

is the result and not the precondition or cause of good policy, a good economy and a good administration of the environment." (Isman 2002, cited in Wascher 2005: 3).

Minimalism is an approach to planning that advocates least necessary intervention – doing as little as is necessary. The greatest diversity and identity in a place often comes from minimum, not maximum, interference (Hough 1990: 190-1).

Spatial structuring (the creation of desirable relationships between the elements of public structure in a manner that responds positively to the uniqueness of place) is an authentic response that underpins a sense of place. The quality of the public spatial environment is important.

Accessibility is fundamental to the character of urban, rural or wilderness landscapes of a region. Manipulation of accessibility may positively reinforce the character of these landscapes or if inappropriately planned, undermine them.

Image maps are a useful tool in planning work on regional landscape character. Lynch classified city images into five types of elements – paths, edges, districts, nodes and landmarks (Lynch 1975: 46-7).

7.3.3 Promoting and protecting valuable elements of the biophysical and cultural landscape

There is a great deal of evidence to suggest that a society which loses its identity with posterity, and which loses its positive image of the future, loses also its capacity to deal with present problems and soon falls apart (Boulding 1966, cited in Lawn 2001: 45). The protection of natural and cultural history through the reuse and integration of the old into the new lies at the heart of maintaining a continuing link with the past and with a place's identity (Hough 1990: 186).

Also important is the identification, protection and creation of special places that are elevated in human consciousness (ISIK 2017: 5). These may include special biophysical or cultural features of the landscape that are of great social importance.

7.4 SYNTHESIS IN ABSTRACT SPACE

This chapter thus far has focused on appropriate ways of thinking about individual elements of public structure, where the central concern is optimising the performance of the regional totality, as opposed to the performance of any one part. The underlying argument is that for the whole to work well, no part can be maximised for compromises are required.

The question raised by this concerns how the parts can be synthesised to create a regional structural totality. The following section outlines an approach to achieving this. For clarity, the argument is pursued on an isotropic plain with ecological limits. A further simplifying assumption is that the economy is embedded in society, which in turn is embedded in nature. The central issue is how to achieve cost effectiveness while optimising concerns of regionalism, ecological sustainability, equity and sense of place. The argument moves through these stages:

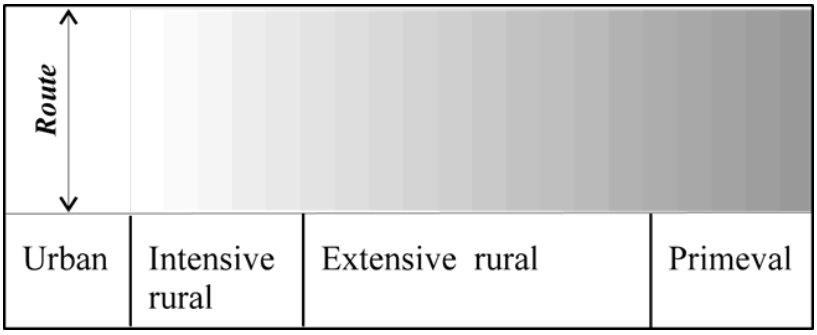
Stage one: Establishing a balance between society and nature

This requires that "a significant, proximate and permanent relationship between the urban, rural and primeval is maintained over time" (Dewar and Uytenbogaardt 1991: 19).

Paradoxically, the success of, *inter alia*, biodiversity conservation starts with the urban system. The development of regional balance must start with the investment line. In abstract space, the investment line establishes a gradation of accessibility from highly public to highly private or remote.

Von Thunen's theory assumes that, as a consequence of transport costs, the intensity of land use decreases as distance from a market point increases (Everson and FitzGerald 1971: 26-27). Adapting this to a linear market – an investment line – suggests that the intensity of agricultural activity decreases until wilderness is finally reached. Access across the region is never equal: the resultant bands of accessibility are basic preconditions for urban, rural and primeval landscapes (Figure 7.1).

Figure 7.1: Regional gradation of land use intensity.



Stage two: Establishing a balance in the relationship between people: optimising access to services and settlement on the investment route

This concept of balance relates to the level of urban performance that should be achieved: the way in which urban structure accommodates, promotes and enhances the activities and events that define settlement life (Dewar and Uytenbogaardt 1991: 19). Applied to regional spatial planning, the focus is upon services, which are preconditions for both economic development and settlement formation (Dewar and Kiepiel 2012: 34).

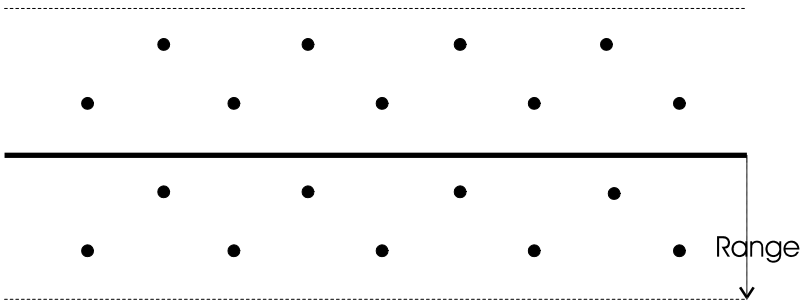
Unlike urban areas where a range of benefits are generated through agglomeration, the preconditions of even the most basic services is a critical issue in rural areas. There are not enough resources to spread investments equally across space: a clinic in every village is simply not possible. This demands concentrated populations or, at least, concentrations of purchasing power at particular times.

Dewar (1985: 50) argues that while economic forces primarily determine the settlement pattern in mature landscapes, in peripheral areas where such forces are not yet operative, services do not follow, they must lead. Public investment in rural services is important in structuring emergent economic forces. The movement route is important here: growth (people, infrastructure, industries) generally follows a linear path (Pottier 1963, cited in Dewar *et al* 1986: 35). In many parts of South Africa, this structuring process is evident, in which settlement patterns adjust in response to the accessibility associated with a movement route (Dewar 1985). Against this, the cost effectiveness of line and point services is now considered (Kiepiel 1994).

Firstly, principles that underlie a cost-effective spatial configuration are illustrated in examples of provision of a bulk water line and a road. Threshold and range are examined, because investments need sufficient support to ensure that they are financially sustainable. Adequate threshold is needed to provide a service on a sustainable basis. Threshold lies within the range of the service, at a distance that consumers are prepared to overcome, in order to access the service. Where the required threshold falls outside the range of the service (for example, dispersed rural settlements), periodic services are necessary to concentrate thresholds at certain points in time.

The range of a line service in regional space establishes a rectangular geometry, structured by the linearity of the service (Figure 7.2).

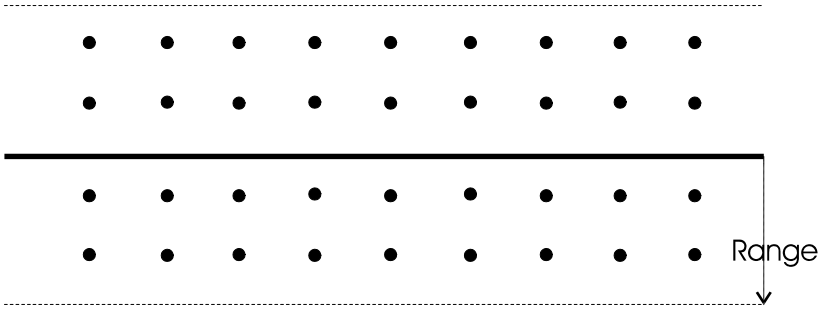
Figure 7.2: Dispersed settlement and a line service.



The minimum requirement for public supply is that the service is delivered at cost. In the case of a bulk water line, this social cost of public supply to a settlement is spread across all consumers and is expressed as cost per capita. The range of the service, for a given threshold population, is determined by the highest connection cost per head wherein the project can be delivered at cost.

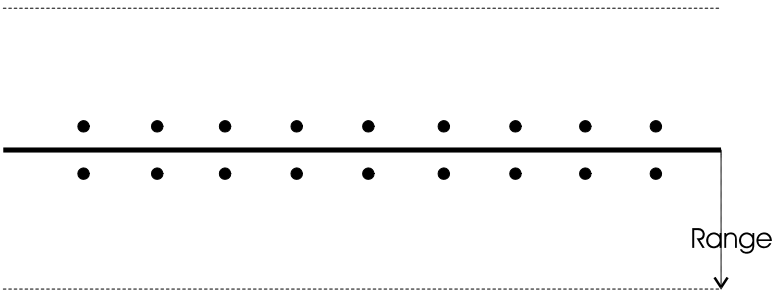
The per capita cost of the project can be decreased through the following spatial configurations. With increased population density (Figure 7.3), costs are spread over a greater number of consumers: costs per head are lowered, raising the social benefits.

Figure 7.3: Densification lowers per capita costs of a line service.



Alternatively, costs per head are lowered where the overall connection cost decreases (Figure 7.4).

Figure 7.4: Line service connection costs lowered.



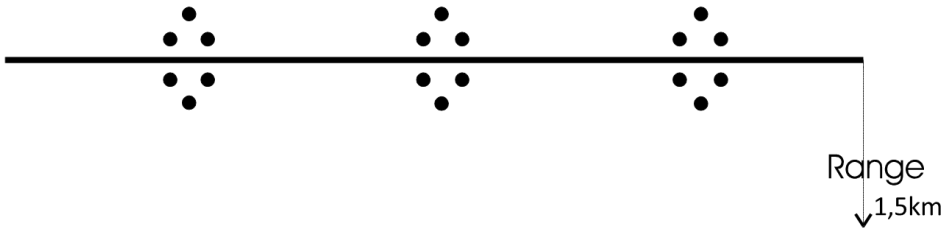
In the case of a road route, social benefits arising from a high threshold and low range are also pertinent (Figures 7.3 and 7.4). Regarding the minimum requirements for a road, traffic engineers equate threshold with a specified minimum daily usage by all vehicles.

For low-income rural regions where public transport is essential, additional considerations are necessary. High settlement densities are necessary for cheap and efficient public transport and high linear densities support energy efficiency (Owens 1985: 35). Because an efficient transportation system integrates non-motorised transport and public transport, the range of a movement route is determined by the distance that people will walk to connect with public transport on the investment line.

For line services, the linear-nodal pattern, Figure 7.5 is a least cost solution: it combines requirements of high density and low range, with returns to scale from some sharing of connection costs within clusters of consumers.

Importantly, this configuration correlates with points on the route where the flows of resources stop (for example, public transportation stops, water break-pressure tanks and reservoirs, electrical substations, IT hubs and so on). Ecologically, this regional configuration does not form a barrier to wildlife movement to the extent of ribbon development (Forman 2019: 456). The identity and distinctiveness of the nodes is maintained by preventing their coalescence (*ibid:* 492).

Figure 7.5: Least cost solution for a line service.



Walking distance from the public transport route establishes range (1,5km for a major route and 0.75km from a lesser route) along the linear route (Louw and Dewar 2012: 51).

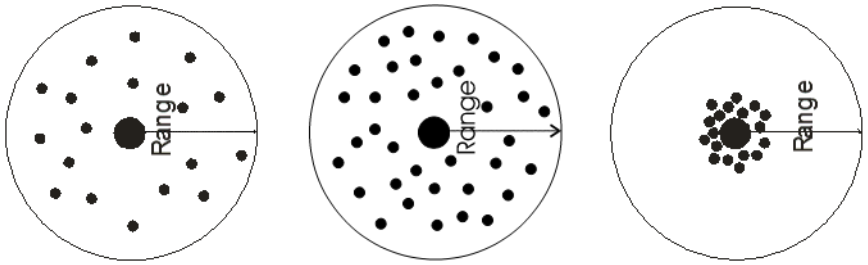
Secondly, efficient provision of line services takes the form of an investment line or route, which is a package of services involving, for example, bulk water and sanitation, electricity, telecommunications and the movement route. Viability of the investment route is reinforced by the economies of scale derived from the joint development of different services (Dewar and Kiepiel 2004: 49).

The coordination of bulk line services is both possible and advantageous. A package of services yields more opportunities than uncoordinated ones. Services support each other, for example, water supply may require electricity. There are savings in capital costs, for example, with shared servitudes and road access for construction.

Maintenance is easier where services follow the route, a critical requirement for the repair of flood damage.

Thirdly, minimum requirement for a point service such as a clinic has similar threshold and range requirements, where range adopts a circular configuration (Figure 7.6). As with the line service, increased density spreads costs over a greater number of consumers, lowering the costs per head and raising the social benefits. The facility is more accessible within a clustered than a dispersed settlement pattern. In combination, the case of the dense clustered pattern is least cost per capita.

Figure 7.6: Possibilities for a point service.



Dewar and Uytenbogaardt (1991: 43-5) argue the particular importance of such compact, dense settlements for small economic enterprises. In compact situations where relatively large markets exist locally, agglomeration and scale economies generate opportunities in new economic sectors. They argue that this is not simply a distributional issue: the absolute level of job generation is affected by compactness and specialisation.

Fourthly, the coordination of point services is also more beneficial than uncoordinated provision. Different social facilities appropriately should seek a relationship with other facilities. The principle of clustering (as opposed to scattering facilities is fundamentally important: it promotes 'one stop shopping', which significantly improves ease of access (Dewar and Kiepiel 2004: 49). Coordination of public investment through a package of social facilities provides the basis for creation of special places across all scales.

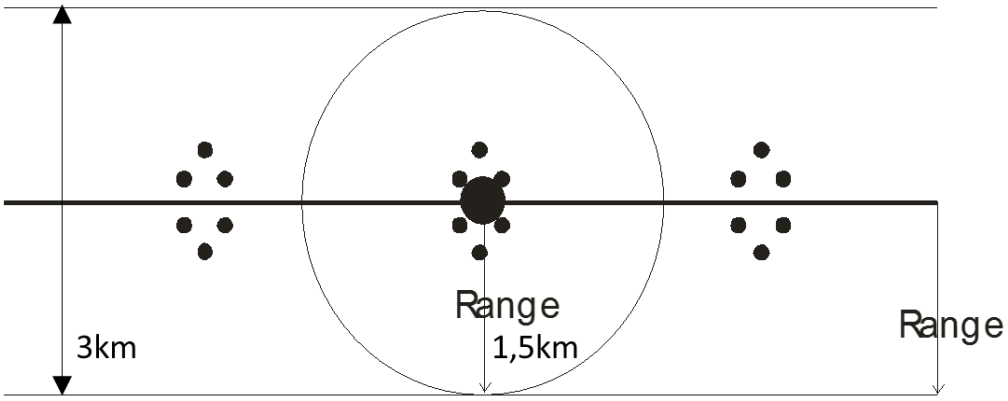
Fifthly, point and line services support each other. Point services require threshold support, which is greatest where flows of people are most concentrated on the lines of

investment – the linear route. Further, point services require the line services on the investment line as the basic infrastructure for their efficient operation. For example, a school requires water, electricity, communications connection and links with public transport.

Similarly, the viability of line services is strengthened by point services. Because a point service has its own demand for utility services, it acts as a cluster of households, increasing threshold support. Figure 7.7 shows the optimal spatial configuration for this simple example of a single investment line in regional space. This is the basic building block of the regional settlement system. These primary elements shape or structure the flows of people and money by the manner in which they are linked together, discussed below.

Regarding the social facility in figure 7.7, the lower limit of range (walking distance) is shown. Range has an upper and a lower limit: the lower limit is the area that contains the minimum threshold to bring the service into being. The upper limit is the amount people are prepared to travel. For a social facility, the upper limit would be higher than the range determined by pedestrian access to the facility.

Figure 7.7: Optimal solution for a point and a line service.



Stage three: Establishing a balance in the relationship between people: optimising access to services and settlement off the investment route

Services provision in decentralised areas as in KwaZulu-Natal is complicated by high levels of poverty and low densities, thus low thresholds. In many areas, population

trends are never certain. While minimal levels of services are a constitutional requirement, situations in which certain areas gain non-viable but higher levels of services and other areas none is clearly inequitable and non-viable. Service delivery requires careful contextual analysis: appropriateness of supply varies with demography, geography, local economy and existing infrastructure.

The selection of technology and infrastructure for efficient supply systems involves a range of considerations that include the nature and extent of externalities; sensitivity to the local resource base; threshold sensitivity (income and settlement density); scale-sensitivity for economic or technical viability that may involve a minimum and maximum scale of operation; and the extent of recurrent costs (operation and maintenance). Simple, direct comparisons of capital costs are misleading. Those with the lowest capital cost are most necessarily those of the highest net economic return and no one technology is best suited to all needs or places (Dewar and Kiepiel 2004: 52).

However, the following point towards optimal solutions (Dewar and Kiepiel 1997; Dewar and Kiepiel 2004). Firstly, spatial restructuring of certain areas may be appropriate, for example, introduction of an investment route that links a number of dispersed settlements.

Secondly, as discussed, while a number of contextual solutions to the provision of utility services are possible, the option modelled on traditional institutional arrangements, however, is most accessible for many people: the lowest, entry level of services should be delivered with little or no operating or maintenance costs. Active conservation of natural resources (water, fuelwood) or solar technologies with minor running costs and flexibility are viable. This option, which should also be available in urban situations, is foundational for emerging towns in rural areas.

Thirdly, for frequented social facilities, resource shortages may demand greater degrees of regional concentration, for example, school towns served by an educational hub of shared facilities: people are brought to the services.

Fourthly, for less frequented facilities, greater use must be made of time and mobility. Periodic markets may play and important role and services are brought to the people.

Because periodic markets can cut transport costs, regional disposable incomes improve.

Fifthly, reconstruction of indigenous forms of social institutions such as medicinal gardens and the insurance value of livestock may be beneficial.

Stage four: The regional grid of services and settlement

Essentially, central place theory recognises the importance of desirable spatial relationships: the degree to which a region generates opportunities for people and provides easy access for all to these is profoundly affected by its structure and form. Traditional forms of regional planning commonly focus investment on hierarchies of settlement nodes in historically-inherited settlements. However, immature economic landscapes are especially dynamic, with new forms of the hierarchy in the process of unfolding (Dewar 1985). This is recognised in the following section, which expands the linear-nodal route to form a regional investment grid.

The intersections of points and lines in regional space create networks of various geometries. These configurations range from closed networks like a dendritic system to an open network like the rectilinear grid, with a radial network intermediate (CSIR 2005: Chapter 5.1). Two of these networks, although quite common, have a number of disadvantages. The radial pattern shows lines of movement that focus on a central point. This is inequitable and promotes primacy in regional space. It is inflexible in the face of growth. Regional space becomes increasingly inaccessible away from the centre with exponentially increasing distance.

The dendritic (tree-like) system shows a pattern like a river and its tributaries. Incomes, hence thresholds, are drained to a distant centre from the periphery. It discourages activity the further it is from the central point. For example, this regional pattern, associated with colonial economies, focuses on the exporting port.

Dewar and Uytenbogaardt (1995: 37-38) argue the merits of the grid, which is one of the oldest structural systems that occurs at all times and all scales. The power of this efficient and equitable form derives from these features: it is highly ordered: within constraints, it allows freedom of response and thus generates opportunities; it has a

high degree of generality that enables it to accommodate a wide range of activities and demands; it is inherently equitable: lines of movement are equi-directional; it exposes people to wider markets and facilitates the circulation of income within the region; it contains the structural power of point, line and cross-over; and it is highly flexible in its accommodation of growth in regions that are never static.

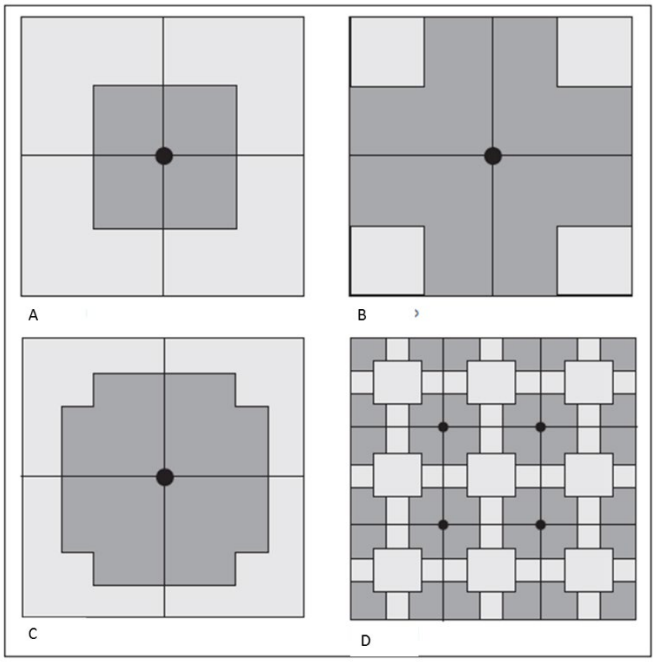
Finally, a hierarchical grid of investment lines provides a diverse and complex pattern of opportunity and access. Space along the route is not equally differentiated. In places where the route meets other routes of the same or different hierarchical order and at transportation stops, certain places are more accessible than others. A hierarchical system of points of accessibility occurs along the route.

Stage five: A regional network of primeval, rural and urban landscapes

An optimal configuration for an investment line and related settlement in regional space was advanced (figure 7.7). Further, the investment line establishes a gradation of accessibility from highly public and exposed to highly private or remote: a zonality that is consistent with basic requirements of intense urban, productive rural and wild primeval systems. On this basis, the intersection of two investment lines are now examined.

Figure 7.8 show alternative ways of aligning the green and built systems (Dewar and Kiepiel 2004: 51; 2012: 34-5). In Figure 7.8a, the cross-over of two investment lines results in the urban and agricultural component being encircled by the primeval component: the ecological tenets overriding urban or agricultural requirements. Figure 7.8b is the opposite extreme: urban and agricultural concerns override the primeval component in four places along the route. Figure 7.8c conceptually represents an optimal set of relationships in an undifferentiated landscape: linkage of cores of primeval land with its wild corridors. It is consistent with ecological tenets and respects the integrity of the rural and urban components: the primeval component establishes a grid of nodes and corridors that, structurally, is the photo-reversal of the linear-nodal configuration of the routes. Figure 7.8d shows how the system comes together as a totality over a larger landscape.

Figure 7.8: The network of landscape character zones, showing how different configurations meet different objectives (Dewar and Kiepiel 2012: 34).



Stage six: Scale requirements for an optimal primeval system in the region

The primeval component should both be considered as a conservation system that is and a system that is to become, through regeneration, rewilding, expansion and so on. A number of points need to be made about this.

Firstly, the size of conservation network is important. As discussed, Lyle (1985: 215-8) calls for a hierarchy of conservation areas of decreasing orders of magnitude: wild areas (large and not radically altered by human use); wild patches (a few square miles, for example, 30 square miles) and wild enclaves (for example, 160 acres). This implies that design of the conservation system must start with a focus on the major regional network in order to make headway in addressing major ecological problems. Core areas need to be as large as possible, connected, redundant (several rather than one) and proximate (Randolph 2004: 559).

Leitao et al (2006: 17) argue that land transformation, habitat loss and fragmentation occur through stages. While habitat loss and its effect on landscape structure is a quantitative one, a qualitative change occurs at a critical threshold: beyond this,

additional loss of habitat fragments the landscape into multiple, small isolated patches (*ibid*: 13). System size, therefore, is fundamental for overall ecological resilience (Jewitt 2017: 144). Evidently, network design is informed by the degree of land transformation (Forman 2019: 51-2, Jewitt *ibid*.).

The conservation network as regional matrix (dominant land cover) is an important qualitative threshold: habitat loss should not exceed 50% of the total landscape to adequately conserve biodiversity (Jewitt 2017: 144; Jewitt *et al* 2015: 8). This equates with an 'Emerald network': large green areas, each providing several key ecological benefits and interconnected with green corridors, which are normally considered the optimum design (Forman 2019: 52, 280). Focus on large, uninterrupted areas of pristine habitat facilitates landscape linkages, minimises edge effects and ensures adequate levels of habitat protection (Jewitt 2017: 142).

Where habitat loss exceeds 50% of the total landscape, the spatial configuration of the remaining habitat patches is important for population persistence (for example, the degree of patch aggregation and suitable stepping stones in the network (Forman 2019: 501; Randolph 2004: 562-3)). With remaining habitat below 50 - 30%, a landscape's ability to support viable populations declines rapidly and habitat connectivity declines (Jewitt 2017: 144).

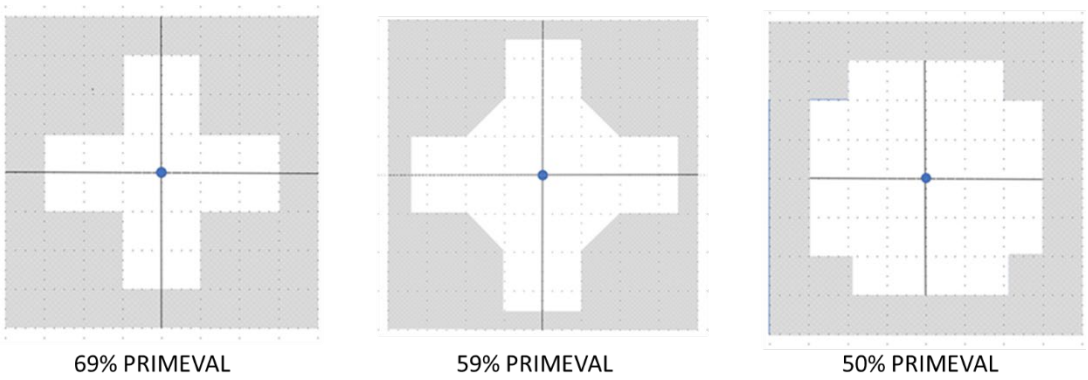
The emerald network, therefore, is the optimal spatial pattern for planning and nature protection (Forman 2019: 280). Because of the trajectory of habitat loss, regional spatial planning should conserve and regenerate at least 60% of the total landscape, in order to build in resilience. This contingency is not necessarily arbitrary, in comparison to carbon-negative countries such as Bhutan. Landscapes already higher than these figures should be conserved to prevent further loss.

Secondly, corridors should be continuous, as wide as possible, redundant and reflect natural and historic conditions (Randolph 2004: 559). Corridor size should be at least a kilometre but kilometres wide where uncertainty of species biology and change prevails (Jewitt 2017: 144).

Thirdly, Figures 7.9 show the distribution of the primary primeval component in relation to the primary movement grid of the region. The 80km X 80km grid broadly

correlates with the 80km spacing of the main urban centres in the KwaZulu-Natal case. Clearly, the greater the extent of the primeval component of the region, the less are the possibilities of expansion of the grid of infrastructure and the settlement hierarchy in this developing landscape. This implies that further inroads of settlement and agriculture into the primeval component, and settlement into agricultural land, must be prevented through urban compaction and densification.

Figure 7.9: Some possible configurations and sizes for the primeval component.



Fourthly, regarding the hierarchy of conservation areas, Jewitt (2017: 144) suggests that the ecological resilience of the protected area network is increased by having a range of protected area types and sizes. Landscape connectivity in KwaZulu-Natal is reliant on a variety of protected area types and sizes (*ibid*.). Contextual influences dominate the determination of these finer grain primeval areas. It is important that these are linked to the macro-system.

An optimum primeval component, therefore, comprises over 60% of the region and is a mirror image of the grid of infrastructure and settlement. It comprises a variety of connected habitat sizes and types. Allowing species to track changing environmental conditions along environmental gradients represents the most natural and cost effective way for species to adapt to climate change (Jewitt 2017: 186).

7.5 CONCLUSION

Optimal configurations of the elements of public structure in abstract region space are considered above. A synthesis concludes that a cost-effective regional configuration of the elements of public infrastructure in abstract space has these characteristics.

First, a buffered primeval system of at least 60% of the region: a hierarchical network of nature conservation that forms a basis of for an extended system of conserved, regenerated and restored wild landscapes, both natural and cultural.

Second, the hierarchy of primeval land that is a mirror image of the urban component of the region. The latter, the capital web, comprises a hierarchal grid of infrastructure, movement and settlement.

Third, the basic building block of the urban component at different scales comprises the linear route of public transport and infrastructure, easily accessible by pedestrians in dense, linear-nodal clusters of settlements along the investment route.

Fourth, the rural landscape is dominated by productive farm land, in which the gradation of intensity of production declines from the urban to the primeval component. Extensive agricultural land like rangeland (veld) form an important external buffer of primeval areas.

Forman and Collinge (1997: 135) argue that society does not need to wait for detailed ecological surveys to act: "The spatial solution, with its few simple patterns and principles, combined with a general survey of a landscape area, is highly effective in conserving nature. Its use is especially critical during the first 40% of removal of natural vegetation in a landscape." Early action to prevent habitat loss and degradation, is more cost effective than to try and restore linkages in disconnected landscapes (Hannah *et al* 2007, cited in Jewitt 2017: 142-3). Implications for the settlement system are similar: the value of the land for agriculture, nature conservation and human settlement increases over time.

The following chapter explores the application of this way of thinking in regional, geographic space. The art of regional spatial planning is marrying hierarchical networks of green space and hierarchical networks of settlement and investment in a symbiotic way, so that each benefits the other.

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CHAPTER EIGHT

A GENERIC METHOD OF REGIONAL SPATIAL PLANNING IN MARGINALISED REGIONS

8.1 INTRODUCTION

This chapter postulates a generic method of regional spatial planning for marginalised regions. While methodology defines a general approach or way of thinking, method is a plan of action, putting methodology into practice in a way that time and resources are used as efficiently as possible.

Regional spatial planning method is directed towards answering three basic questions: *what is*, which defines the current situation in the region, forces operating on it and probable outcomes of these; w*hat should be,* which interprets the regional problem and develops ideas; and w*hat could be*, which moulds the ideas to the realities of context. Table 8.1 shows the steps in the proposed method with an example of a sequence of a year's work.

Table 8.1: Steps in a method of regional spatial planning for marginal areas.

STEP	**MONTH**											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1. INCEPTION												
1.1 Define the region												
1.2 Assemble an interdisciplinary team												
2. SUPER-REGIONAL CONCEPT												
2.1 Define higher fixes and informants												
3. REGIONAL ANALYSIS												
3.1 Landscape character												
3.2 Green spatial structure												

3.3 Human condition												
3.4 Economy												
3.5 Built spatial structure												
3.6 Cultural & institutional												
4. SYNTHESIS												
4.1 Landscape character												
4.2 Zones of development potential												
4.3 The development problem												
4.4 Composite constraints & informants												
5. PLAN FORMULATION												
5.1 Giving direction												
5.2 Idea: Making the structural diagram												
5.3 Applying the diagram to context												
5.4 Planning elements & landscape character												
6. IMPLEMENTATION												
6.1 Constructing the programme												
6.2 Identify the implementation package												
6.3 Prioritization & phasing												
6.4 Areas for more detailed design												
7. MONITORING & EVALUATION												
7.1 Setting up monitoring & evaluation												

The ‘package of plans’ approach, discussed in chapter six, is vital. The overall region simultaneously comprises places within the region and the region is also part of larger places and the world. For analytical purposes, different factors may cover different spatial areas: coincident boundaries with the region are infrequent. The analysis and concept formulation, therefore, must be depicted at various spatial scales. Similarly, the spatial plan is one contribution to the package of plans approach: this approach creates concepts at a number of scales, with each higher-order scale providing the first level of fixes for the scale below.

At least three levels are common in regional spatial planning: the super-regional scale; the regional scale and the precinct scale (smaller areas making up the region). In this method for the generation of a framework plan, two scales are adopted: the super-regional and the regional scales. While work at these scales completes the framework plan, planning does not stop there: action planning (perhaps with new teams) commences. The ability to think across scales is essential.

8.2 INCEPTION

8.2.1 Define the region

The process is initiated by a resolution to formulate or revise a regional spatial plan for a defined region. While the regional definition is often jurisdictional, it may circumscribe a geographic region with a common development challenge typified by a marginal region.

8.2.2 Assemble an interdisciplinary team

Regional spatial planning requires inter-disciplinary skills. These could include: a regional planner (team coordinator), landscape architect, hydrologist, geotechnical scientist, environmental scientist, socio-cultural anthropologist, economist, agricultural specialist, civil engineer (with transportation planning) and GIS specialist. While this comprises the core team, particular skills are brought into the process as the need arises.

As planning progresses, *de facto* leadership of the team shifts with the nature of the work. It is important, therefore, that the team approach is aligned from the outset:

understanding and agreement on the nature of the regional problem and the broad direction forward (chapter 6) is essential.

8.3 UNDERSTANDING SUPER-REGIONAL INFORMANTS

This step in the package of plans approach develops a spatial understanding of the region in its broader context. The region occurs within broader systems (natural systems, space economy, movement and so on). The region and its role is located within the broader spatial structure of these systems: a position is adopted that defines higher level fixes or issues to be resolved. A diagrammatic concept of the region at a broader scale is created.

8.3.1 Higher-level plans and policies

Higher level policies are interrogated to test their applicability to the region. The policies are not simply accepted. If they cannot be adapted to the region, the policy issues are referred to higher levels for resolution.

The spatial implications for high level plans for the region are set out (for example, the national and provincial spatial development frameworks). Policy coordination and alignment is necessary: higher level policies should be translated into regionally-specific forms, and the compatibility of aspatial goals (such as economic goals) and goals of spatial polices are tested in the region. In a rapidly changing world, a number of these policies are pivotal to the development of marginal regions (for example, transportation policy that favours rail or road; smallholder agricultural policy; land reform policy; energy transition policy).

8.3.2 Green spatial structure

Boundaries of the natural systems are not usually coincident with the region, falling within and without. The spatial structure of these natural systems includes the following.

Firstly, physiography is examined to locate the region within major landforms, which form a basis of bioclimatic regions and, in broken terrain, for an understanding of movement systems. Secondly, climatic and hydrological regimes are understood. This

information, which pertains to major river catchments, is derived from Integrated Water Resource Management plans: projected water supply and demand must include scenarios of climate change. Thirdly, major ecosystems are understood in terms of habitat and species rarity. Fourthly, these factors generate major bioclimatic groups, in which regional agricultural systems are located.

While this analysis defines the broader natural systems that planning must work within, it also contextualises the nature and scale of the regional challenges associated with the breakdown of natural systems. The region within the context of the wider natural systems is diagrammatized.

8.3.3 Human condition

The human condition of the region as a totality is analysed in relation to the broader context. An understanding of the wellbeing of the regional community as a totality is contrasted with that of the nation and province to establish the nature and scale of regional inequality, and consequently, the magnitude of intervention required. Further, the region is located in wider spatial patterns of deprivation, groups of which may become nationally significant (for example, lagging regions).

8.3.4 Economy

The role of the region in the broader space economy is identified to establish economic marginalisation. This includes the extent to which the region's economy is in the forefront or background to the national; the extent of undeveloped potential evident in the context of broader economic systems (for example, undeveloped agricultural potential); and the regional economic drivers such as the extent of dependence upon transfers (migrant remittances, welfare grants). The locational significance of the regional economy is understood, in which linkage is fundamental.

The economy of the region as a totality is analysed in relation to the nation and province, showing economic structure and change, with its spatial expression at the broader scale. The socio-economy, its change and spatial variation is analysed in parallel. Because the plan is particularly concerned with the welfare of Braudel's lower

circuits of the socio-economy (chapter five), it is important that the information is presented accordingly.

8.3.5 Built spatial structure

The region within the national and provincial context is diagrammatized, in order to show how it relates to, and connects with, a wider structural context. This leads to a spatial-structural understanding of what exists to reinforce (for example, surplus infrastructure capacity); what to develop (for example, completion or expansion of existing networks of infrastructure); and the missing elements at the broader scale (for example, a provincial road link, bulk water line or the potential of the region and its surrounds for a new institution of tertiary education).

Movement is particularly important. The region is located in relation to the national metropolitan areas and national movement routes. This analysis is repeated at a finer scale, showing the region in relation to the main movement routes and the major towns and cities of the province (or neighbouring areas) or part thereof. An understanding of broader patterns of access and the degree of spatial marginalisation at the super-regional scale is fundamental.

8.4 THE REGIONAL SCALE: ANALYSIS

The next scale of analysis in the package of plans approach is the regional scale. This step analyses the character of landscapes of the region; the green spatial structure; the human condition and its spatial expression; the local economy; the built spatial structure; and the cultural and institutional dimension.

8.4.1 Landscape character

This task involves preparatory work: obtaining information on the region's sense of place as well as setting up a method of landscape character assessment (discussed below). Field trips are undertaken for two purposes. First, landscapes, topographic elements and visual elements such as view cones, where development might threaten sense of place, are identified on the basis of observation.

Second, the field trip aids an initial understanding of the landscape such as the key elements and patterns that determine its character and the hierarchy of landscape character units and their scale. Criteria for the systematic assessment of landscape sensitivity are provisionally conceived and held against the landscape to test their validity.

The product of this analysis is a map of the region's landscape character units and key features that are vulnerable to negative change through development. Because the human experience of landscape includes memory and affective ties to place that influence its character, heritage information is included. The information (table 8.2) is captured in landscape character areas in the region's database.

Table 8.2: Landscape character and heritage information.

CATEGORY	*INFORMATION REQUIRED*	*INDICATORS*	*STATUS*
LANDSCAPE CHARACTER	LANDSCAPE CHARACTER	No development in landscape character areas (LCAs) which threaten landscape character	Absolute
	TOPOGRAPHIC ELEMENTS	No development on ridge lines	Indicative (depending on prominence)
		Absolute slope: no building above a defined altitude	Absolute
		No development on elevated, visually exposed slopes	Absolute
HERITAGE	PALAEONTOLOGY	Protection: no construction in	Absolute

		LCAs with fossil beds	
	ARCHAEOLOGY	Protection: no construction in LCAs of archaeological significance	Absolute
		Survey: Survey sites at smaller scale where palaeontological or archaeological significance is high	Indicative
	HISTORICAL DEVELOPMENT OF HERITAGE SIGNIFICANT OBJECTS AND LANDSCAPES	Identify all LCAs containing built objects and landscape elements of heritage value	
		Prevent destruction of these	Absolute
		No development within view-cone of these	Indicative
		No development in their LCA	Indicative
		Wherever possible, frame and celebrate	Indicative
		Protect LCAs of social and cultural	Absolute

		significance and historical patterns of access	
		Protect associative cultural landscapes	Absolute
BUILT ENVIRONMENT: DESIGN ELEMENTS	DESIGN INFORMANTS	View-cones: Do not build in LCAs with publically significant view-cones	Absolute
		Scenic routes: LCAs containing scenic routes should remain ensconced in green space	Absolute
		Natural gateways should be left in their natural condition	Indicative

8.4.2 Green spatial structure

Similar to the landscape character assessment, this analysis provides non-negotiable constraints that indicate where development should not go (Louw and Dewar 2012). It is important to obtain community consensus on the status of the indicators up front.

The information (table 8.3) is captured in landscape character areas in the region's database. While certain indicators contain examples of severity classes (for example 100 year flooding) it is important that these are contextually informed by specialists. Contextually-specific climate change scenarios (section 8.3.2 above), which inform the severity classes, are central.

Table 8.3: Natural systems information.

CATEGORY	*INFORMATION REQUIRED*	*INDICATORS*	*STATUS*
GEOLOGY	GEOLOGICAL RESOURCES	Extractive value: Mines, quarries, mineral resources	Absolute
GEOTECHNICAL	CRITICAL ENVIRONMENTAL AND COST FACTORS	Inundation: 100 year flooding – no building	Absolute
		Slope instability: $> 18^0$ ($>14^O$ if access road required)	Absolute
		Excavatability of ground	Indicative
		Active, expansive or swelling soil	Absolute
		Erodible soil	Absolute
		Shallow water table	Absolute
CLIMATE	HUMAN COMFORT	Bioclimatic subregion: within human comfort zones	Indicative
		Uplands: avoid slopes with aspect other than N to E	Indicative
	CARBON SINKS	Untransformed natural vegetation: grasslands, forests, wetlands	Absolute

	RENEWABLE ENERGY RESOURCES	Energy and combinations: solar, wind, hydro-power and agro-forestry wastes;	Indicative
HYDROLOGY	COASTAL PROTECTION	Coastal development setbacks	Indicative if protective mitigation allowed
		Sea level: no building below 5m contour	Indicative if protective mitigation allowed
	WETLANDS	No development in these	Absolute
		500m buffer from wetland edge	Indicative
	STRATEGIC WATER AREAS	No development in these	Absolute
	RIVERINE CORRIDORS	Minor streams: 30m buffer	Absolute
		<250m from a water course that feeds into untreated-water supply system or emergency water supply system	Absolute
		<50m from a water course	Absolute
		50 - 250 m from a water course	Indicative

	AGROHYDROLOGY	Irrigable: available water and irrigable soil	Absolute
AGRICULTURAL SOILS	AGRICULTURAL POTENTIAL	Very high and high agricultural potential	Absolute
		Moderate agricultural potential	Indicative
BIODIVERSITY CONSERVATION	BIODIVERSITY CONSERVATION PLAN (Combines floral and faunal; endangered habitats and rare species)	Critical biodiversity area: Irreplaceable – no development	Absolute
		Critical biodiversity area: optimal – no development if biodiversity targets cannot be met elsewhere	Indicative (absolute if targets cannot be met elsewhere)
	SPECIAL FEATURE (e.g. nesting site, migration route)	No development within buffer zone	Absolute
REGIONALLY SPECIFIC	To determine as necessary (e.g. legislated buffers, geological faults)		

8.4.3 The human condition and its spatial expression

The human development challenge within the region is analysed and spatial expressed. A threefold conceptual framework for wellbeing research involves outcomes, processes and structures. This useful classification may be adapted for regional spatial planning purposes.

Outcomes

A further requirement is as much detail as is affordable (for example, census data mapped at a municipal ward level is useful). As design progresses, it may become necessary to test specific ideas against bottom-up community or settlement profiles, for example, resources and needs profiles (McGregor 2010: 340).

In southern Africa, DBSA (2001) provides demographic indicators of the human condition. The purpose of development indicators includes the monitoring of the regional plan, a relationship that should be explored at the outset. Fundamentally, indicators of the human condition derive from the planning methodology that is used. For example, a needs-based approach has specific implications: chapter five pointed to the relationship between needs satisfiers and provisioning systems. This suggests a further purpose: establishing a link with processes.

Processes

Processes are those that generate the wellbeing outcomes. Here, regional spatial planning practice can make an important contribution in understanding the causal links between development conditions and spatial processes, while recognising that spatial factors are a necessary, but not sufficient, explanation of the spatial variation of the human condition. The concept of access is central to this. For example, using comparable settlement data, Kiepiel (1994) found a correlation between welfare and spatial location within an accessibility framework. Using an accessibility approach at the urban scale, Davern *et al* (2017) provide evidence of direct associations between social infrastructure planning and public health.

Indicators of access to the elements of public investment in regional spatial planning are seminal (for example, a method of capital investment planning that identifies unserved need for services is discussed below). This access approach may be extended across the range of material and non-material needs by developing indicators of access to the other elements of public investment and landscapes with a strong sense of place: measures of access to a range of primeval, rural and wild landscapes of the region should be developed.

8.4.4 The local economy

This step involves the identification and assessment of local economies of the region. The focus is particularly upon the non-market and market operators, meeting local needs through local skills and resources.

Firstly, local economies within the region, and the socio-economies they support, are identified: the major towns and their hinterlands are particularly significant (this spatial object is also the focus of institutional development).

Secondly, the economic structure of the local economy is assessed, in which both basic and non-basic services are explored. Special purpose towns such as resource-based towns with a unique and temporary economic base are identified.

Thirdly, the performance of the local economies is assessed. Two issues are involved. The first concerns an assessment of the economic bases of settlements, in order to see if changing circumstances are likely to result in significant decline. This task is essential to the analysis of social services (below), because investment in services above constitutional rights in declining settlements should be avoided unless it arrests decline. This assessment of the generative power of the settlement for services provision differs for towns and other settlements: a settlement is defined as a 'town' if it has an economic base (Dewar 1995: 3). This definition draws attention to the dynamics of specialization and diversification that underpin settlement formation, the mechanics of which hinge upon linkages between town and countryside. The criteria for estimating the generative power of the towns and rural settlements differ as follows.

For all settlements, and almost exclusively for rural settlements, the generative power of settlements for services provision involves the distribution of threshold (and, implicitly, linkage) in space as well as changes over time. In turn, this involves considerations of settlement size, density and location in relation to routes of provincial or national significance as well as the policy environment impacting upon settlement formation.

In addition to the above, the generative power of the towns is related to their economic dynamism. Services investment in settlements with vibrant local economies reinforces those economies through forces of agglomeration and diversification of the economic base. In turn, levels of convenience of consumers are increased. This requires a coarse-grained understanding of the economic bases of the settlements, in order to show propensities to grow or decline (*ibid:* 67) proposes a South African relevant spatial taxonomy of towns that underpins their growth propensity, focusing on linkage and reflecting different economic bases of the towns (table 8.4)

Table 8.4: A spatial typology of growth propensity of towns (Dewar 1995: 67).

	National Routes	**Regional routes**	**Local routes**
Metropolitan zones			
Large-city zones			
Commercial farming zones			
Transitional farming zones			
Subsistence farming zones			

The second performance aspect is the extent of embeddedness of the local socio-economy and its direction of change, which also becomes monitoring criterion. Table 8.5, derived from the meta-qualities identified in chapter five, suggests themes for development of indicators of the desired shift.

Table 8.5: Measures of embeddedness, efficiency and balance: the nature of growth.

Nature of the economy
• Circular economy: reuse, remanufacturing, recycling, disposal • Localisation: Local skills & resources for local needs • Local income circulation • Local ecological footprint and metabolism (e.g carbon emissions) • Marketing mechanisms: periodic markets; people's markets

• Economic structure, diverse, specialised, localised, spans three circuits (needs of core, commons): comparative advantage and non-market economies. • Key sectors: land and landscape restoration, agriculture, water, energy, tourism, markets, service provision and maintenance, resource centres, public works
Direction of change
• Mass to informative economy • Value growth at small and meso scale
Status of key sectors
• Regeneration and restoration sector • Sustainable agriculture • Urban agriculture • Homestead agricultural production • Small-holder agriculture • Eco-tourism • Micro-tourism • Solar energy economy and micro-grids • Appropriate technology • Vernacular architecture • Local utilities ownership & employment: e.g. water & sanitation, energy, transport
Support
• Core, commons, micro and meso • Embedded activities supported • Top-down seamless funding mechanisms in place • Needs-driven community projects linked to funding • Top-down support for periodic markets and rural life skills centres

Finally, the assessment of local needs, resources and skills generates the start of idea. Local needs are determined through local surveys as well as observation: for example, the composition of the monthly grocery basket purchased at the main town reflects the extent that needs are not met locally. For example, provincially, only two (potatoes and dairy) of nine basic foodstuffs that are consumed in the region are sourced in

KwaZulu-Natal (KwaZulu-Natal poverty eradication master plan 2014): a gross picture that does not reflect that local producers may produce export seed to produce imported food. Local resources to meet these needs are similarly identified. Skills required are critical: the need for a winter coat and availability of wool is no use without the skill to weave it.

In this regard, Dewar (1995: A9) identifies conditions for small business to operate successfully: development of an entrepreneurial attitude; technical skills geared to local resources; access to local raw materials; credit; technologies appropriate to the context; and access to local and broader markets. Premises to manufacture and trade at no or low overheads is essential

As the work progresses, more detailed, idea-driven, local analysis emerges, linked to the evolving development profile. For example, in a Wild Coast study, recognition of the indigenous social welfare role of the sea led to a reflexive (iterative) shift in a planning focus from development of a commercial fishery to micro-tourism (Kiepiel and Quinlan 1997).

8.4.5 Analysis of built spatial structure

This step has two main parts:

Regional overview of services, movement hierarchy and dominant patterns of use

The region is diagrammatized to show settlement densities and the route hierarchy; high-order public facilities; hierarchical clusters of public facilities; the principal public transport routes (road and rail); bulk utility services; and dominant patterns of use. This provides an overview of the composite informants and constraints relating to the built environment.

Analysis of unserved need

Dewar *et al* (2012) proposed a regional spatial method for the planning of community facilities and public space, which may be extended to utility services provision. It involves understanding the generative power of settlements for facilities and access to these; a conceptual exploration of the hierarchy of services to be provided and their

thresholds and ranges. Thereafter, existing services are held against ideal ranges to identify unserved need. The method starts by identifying a region in abstract space for analytical and design purposes:

a. Define the services region.

b. Understand the generative capacity of the existing settlement system (includes economic bases of settlements).

c. Map the existing pattern of accessibility.

d. Identify the main services to be provided.

e. Establish different hierarchical levels of service and thresholds.

f. Conceptually explore the concept of clustering.

g. Establish ideal ranges for each hierarchical level of service.

h. Map existing facilities (by service and by level) and apply ideal ranges to uncover areas of greatest unserved need.

8.4.6 Cultural and institutional analysis

This analysis, preferably undertaken by a socio-cultural anthropologist, examines how society is organised. The bottom-up focus is upon the structures and institutions of the region and subregions within, particularly at grassroots level. However, the top-down concept of development also requires interrogation. Two important areas include the values that service providers attach to services standards; and attitudes to the decentralisation of tertiary institutions to village level.

The analysis should be guided by the need to break down dependency: “growing human capacity at community and individual levels so that people can increasingly take control of their own futures” (Dewar 1995: A5). In terms of embeddedness, the analysis supports processes of bringing the economy under social control and embedding society in nature. This includes meeting local needs; supporting the micro- and meso-spheres of the socio-economy including the household economy and the commons; local ownership and control of technology; supporting local mechanisms

of social welfare and mutual support; and facilitating information networks for social development and environmental conservation. Like the economic analysis, this analysis will deepen as ideas are generated.

The initial focus of analysis concerns essentials that drive the planning and development process and encompasses project success factors of broad based support, strong organisation and leadership (Dewar 1995).

The first is an institution that drives the development process. Dewar (1995: A3) argues that a committee structure is an important mechanism for ensuring that the community 'owns' the process and that levels of participation are high. It places "concept formation and implementation under control of representatives of local communities, and which is based on particular interest groupings of those representatives" (Dewar 1995 A21). Another is identifying and nurturing democratically-affirmed leadership through a full range of skills (technical, managerial, community) necessary for their roles (Dewar 1995 A20).

A third is funding structures in order to kick-start projects of expressed community interests and build capacity. Funding structures are conceptualised in relation to the organisation of a rollout of public works programmes and associated skills development that follow.

A fourth is establishment and development of communication networks for internal communication and external support and research. The physical dimension is a rural-life skill centre and facilitator/coordinator to put packages in place in response of community requirements.

Other initial areas of focus relate to themes that are germane to marginal areas. One concerns local values and institutions that would support ecological regeneration and landscape restoration. Part of this is investigation of potentially associated activities such as emerging processes of micro-tourism (Kiepiel and Quilan 1997). In addition to eco-tourism, the following sectors are important to the development of an embedded economy of marginal areas: agriculture; marketing and small manufacturing; renewable energy; construction; education and training; and social and utility (including recycling) services provision and management.

Agriculture offers an example for institutional and cultural analysis. For example, to understand the complex social dynamics of agricultural systems, Ament *et al* (2021: 13) argue that embeddedness and sustainable agricultural systems are informed by a number of characteristics of 'instrumentalism' and 'marketness'. For example, instrumentalism concerns shared commitment, eco-humanist goals, localisation of inputs and outputs, social connection and values. Exploring such issues may lead to reconstruction of traditional horticulture through respect of traditional norms related to seasonal land use. Marketness informs issues such as traditional or market orientation.

Finally, as the work proceeds, the focus becomes more specific and this emerging profile supports the economic one. A planning outcome should include specific guidance on a return to embeddedness.

8.5 SYNTHESIS

It is necessary to synthesise the analytical information in a number of forms. Firstly, landscape character units are demarcated to provide a data frame for storage of geographic information; and for an assessment of landscape character sensitivity that informs judgements that are made in the subsequent steps. Secondly, an overlay process, which draws upon the information stored in the landscape character units, defines zones of development potential. Thirdly, a statement of the development problem is articulated. This synthesises and causally connects the conclusions of the specialist work. Finally, a composite map of constraints and informants is developed to guide regional design.

8.5.1 Landscape character

In this stage, the synthesis requires three tasks. The first is a delineation of concrete places in the region, as opposed to abstract spaces, in which to locate design (chapter five). This provides the basis for a more holistic way of managing the countryside (Bishop and Phillips, 2004). Although it moves beyond a sectoral approach, it nevertheless provides landscape units that can be used for sectoral purposes (for example, management of agricultural land or biodiversity).

The second is a data frame that records the attributes of these places and other areal data arising from the specialist analyses. In this manner, parametric data like slope or soil classes are transformed from thematic data into geographic data, located in a defined place (chapter five).

The third is a systematic assessment of the sensitivity of the regional landscapes to the impact of buildings and structures that make up the capital web. This informs the definition of zones of potential in the next step.

Landscape character assessment is an important tool that can be used for these purposes. The overall aim of landscape planning, design and management should be to achieve sustainable landscapes that are as visually, biodiverse and culturally rich as possible to meet all of society's social, economic and environmental needs. A better understanding of the diversity, character and distinctiveness, evolution, sensitivity to change and the management needs of landscapes is essential to help achieve this aim (Chris Blandford Associates 2006, cited in Kiepiel and Escott 2017: 9).

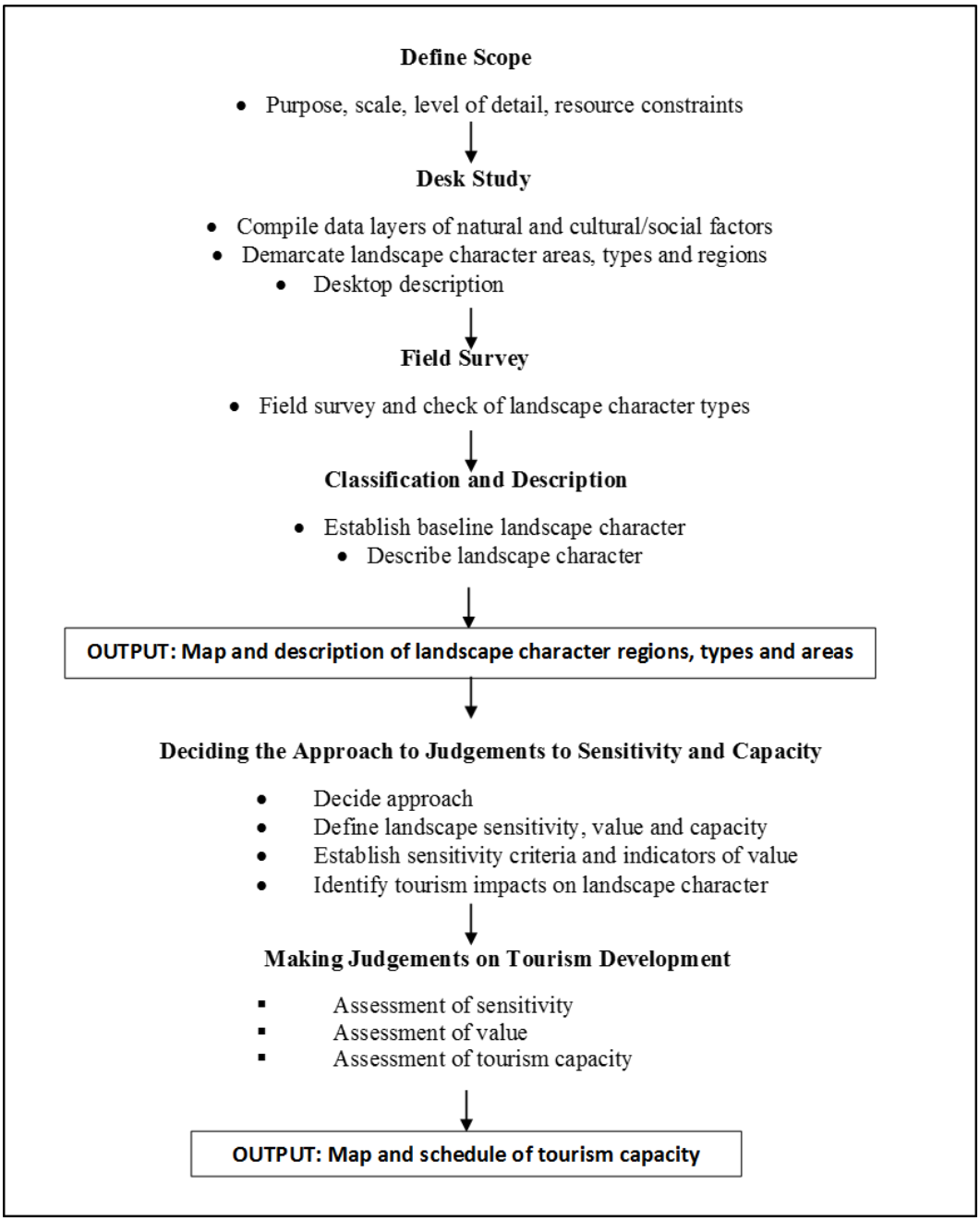
Internationally, landscape character assessment is increasing in importance as a planning tool that informs how change is managed (CA and SNH. 2003). In regional spatial planning, managing landscape character involves the problem of constancy and change: how can the identity of a place be preserved under the pressure of new functional demands (Norberg-Schulz, 1980).

The principle of authenticity is central: international precedent shows that in all landscapes of quality, there is an identifiable logic in the locational pattern of settlements (Dewar and Louw, 2009). There are two dimensions to this. The one, considered here, concerns the relationship between settlement and landscape. The strength of the identity of a place is found in a meaningful fit between site and settlement (and architectural detail): in the process of change, the primary structural properties of these have to be preserved (Norberg-Schulz, 1980). A second dimension of authenticity is considered in the next step.

Figure 8.1 is an example of a landscape character assessment of the KwaSani region of KwaZulu-Natal, a region that contains considerable tourist potential, based on the English-Scottish method (Swanwick and Land Use Consultants 2002). It is a two stage

process that describes the character of landscapes and evaluates them to inform a range of different decisions (for example, tourism development). An advantage of the common database for the specialist studies is that the sectoral data also contributes to landscape character description (for example, biodiversity).

Figure 8.1: Example of landscape character assessment method (Kiepiel and Escott 2017).



The method is appropriate to a package of plans approach: it involves a hierarchy of nested landscape character units. For example, the KwaSani assessment (Escott and Kiepiel 2010: 7) involved three scales in descending size: landscape character regions, landscape character types and landscape character areas. The last mentioned, averaging about 500ha, but down to a hectare where necessary, were at a sufficiently fine grain for management of a number of interests additional to landscape character (for example, biodiversity and heritage). It is important that a data base of fine-grain, workable landscape character units is established.

For purpose of the following step, two products are necessary. The first is the delimitation and description of the landscape character areas of the region. The second is an assessment of sensitivity at the intermediate level (landscape character types): the assessment can be repeated at a more detailed scale as necessary. This systematic sensitivity assessment is an iteration of the analysis shown in table 8.2.

8.5.2 Definition of zones of development potential

This step defines three zones of development potential: no-go, tread lightly or areas that could be considered for development. The step draws on the landscape character database and the results are housed in landscape character areas.

This step is informed by the second dimension of authenticity. Settlement does not take the form of random pockets. It follows a structural logic that is strongly informed by access: it is underpinned by the nature of (particularly) movement and other forms of sub-regional infrastructure that logically follow movement (Dewar and Louw 2009: 10).

Two forms of reasoning are involved in defining the zones. The first is essentially mechanical. All landscape character areas housing absolute constraints become no-go areas, which derive from the absolute constraints of natural systems and landscape character. A no-go area precludes settlement and associated infrastructure. Being a product of absolute constraints, it provides a hard fix. Even if these areas occur within the structural zone of the build environment (the capital web), development should be precluded from them. These no-development areas activate the principle that the starting point of planning is where development should not go.

The second form of reasoning involves judgement in relation to the indicative constraints housed in the database. These constraints are contextually interpreted. On one hand, these areas may be upgraded to absolute constraints. For example, moderate soils that occur in large zones of good soils should be upgraded to 'good' to preserve the integrity of an agricultural system. Similarly, a landscape character area containing a heritage site should be upgraded if surrounded by irreplaceable biodiversity: a key consideration is restoring regional dominance of primeval areas through conservation or regeneration.

On the other hand, the indicative constraints may be interpreted as tread lightly or areas where development could be considered. Tread lightly areas are places where some development could be allowed but in small-scale and in a sensitive form that maintains the dominance of wilderness and agriculture. Tread lightly areas are places where a number of indicative indicators overlap.

However, the indicative constraints may also be downgraded where the structural logic of the built system is overriding (for example, a moderate soil may be incorporated into home or community gardens of an agricultural settlement).

Finally, outside of the constrained areas, places that could be considered for development are candidates whose suitability for development derives from the structural logic of settlement: the location of the landscape unit relative to regional and sub-regional infrastructure (Dewar and Louw 2009: 17). The completion of this step is the start of idea.

8.5.3 The development problem

In Lynch's terms (chapter five), this step establishes 'what is the problem', not what are the problems. This step synthesises the conclusions of the specialist work on the assessments of landscape character and natural systems, the development challenge expressed in the human condition and its spatial expression, the nature of the economic and institutional problem and that of the build environment (settlement, movement and services). This synthesis sets out the spatial implications for planning: it is the start of idea. The team collectively agrees on the nature of the problem: all the different

disciplinary perspectives work on the same interpretation of the problem but adding their own interdisciplinary perspectives to it.

8.5.4 Composite constraints and informants

The spatial synthesis involves overlays of the individual information layers to identify patterns of overlap: a composite map is produced. The existing capital web is overlaid upon the landscapes of the region (places defined by landscape character areas) that have varying development potential: essentially, point and line data overlay geographic data. This map shows all the information that informs the design of the green space and the built environment. In the following step, this information is interpreted to identify ideas for future development of the built environment.

8.6 PLAN FORMULATION

This step develops the direction of the plan and ideas for its achievement. 'Idea' involves the clarification of the desired relationships between the elements of structure, informed by the performance principles. Directive implications discussed in chapter seven are expressed in ideas for these desired relationships (for example, integrating hierarchies of services, movement and settlement; and balance between the primary landscapes of the region). To achieve this, initial ideas for the green structure are reconciled with those for the capital web. From this point, attention shifts to the path of development of the individual elements of structure and landscape management.

8.6.1 Giving direction

The spatial implications of the following factors requires contextual interpretation: each factor must be translated into indicators that capture what the spatial plan intends to achieve in the regional context. Although the expression of these factors is contextually specific, they are some generic factors that need to be considered in all contexts.

The first is the emerging international tendencies (chapter six): economic globalisation, increasing structural employment and inequality; ecological overshoot and biodiversity loss; climate change; fossil fuel dependency; water security and local

water capture; and food security. The second is the national and provincial challenges: chapter six provided examples in which global challenges are flavoured by some unique characteristics of the South African context. The third is the internationally recognised performance qualities: Chapters five and six set out meta-qualities and more detailed qualities that give direction to regional spatial planning. The fourth is the law: chapter six provided the example of South Africa law that is significant for planning.

Finally, precedent that informs the regional spatial plan is derived from successful cases internationally, locally or historically. While these may be derived from regional spatial planning, the spatial implications of the embedded vernacular region is particularly important. At the project level, local irrigation settlements are a historical example that has sustained over a century.

8.6.2 Idea: Making the structural diagram

8.6.2.1 Define design principles for the development of idea

This step moves the process into design: it establishes spatial principles of intervention. The following are examples of principles that relate to the regional as a totality; the primeval and rural components; initiating local economies; institutional development; and the development of the settlement system.

a. The principle of regional balance establishes the desired relationships between the primeval, rural and urban landscapes of the region: design starts by putting nature first. The regional mosaic, in which primeval and productive rural lands must dominate, must include a primeval matrix (the dominant regional land cover). The development footprint must be small and compact: there should be large breaks between villages (Louw and Dewar 2012: 48).

b. Development should respond positively to the character of the landscape, conserving, restoring or enhancing its character.

c. The primeval component supports ecological and human needs (for example, ecological integrity and people's need for contact with wild places). Its multi-

functionality implies that while pristine biodiversity is an essential part, it includes other attributes that support human needs for wild places.

d. Continuities of agriculture should be maintained and not disrupted by scattered pockets of suburban settlement (Louw and Dewar 2012: 48).

e. Local economies are founded on local resource patterns, in which water, soil, energy and landscape character (tourism's resource base) are foundational. This may necessitate regeneration of the resource base through public works programmes (for example, irrigation settlements).

f. Shift to an informative economy requires creation of information networks in which institutions of knowledge development and transfer have an active role.

g. New development should respond to, and build upon, existing regional infrastructure, not be scattered.

8.6.2.2 Initial idea for the green structure

This step is in two sequential parts: the primeval and the rural components.

Initial idea for the primeval component

This step initiates development of an idea of the green structure: specialist assistance aids design.

A macro-network of primeval land is designed in abstract space (chapter seven) in relation to the sphere of influence of the main town and its cross-over route (the 80km x 80km grid in the KwaZulu-Natal example). In order for the primeval component to meet a minimum target of 60% of the regional land cover, a hybrid system will often be necessary.

A hybrid network is constructed around a backbone of biodiversity conservation. This backbone comprises existing nodes and corridors of biodiversity conservation, which is extended to include other critical biodiversity recorded in the landscape character database.

Thereafter, other absolute constraints from the database are integrated with the biodiversity conservation backbone, to create a broader macro-system of regional nodes and corridors of primeval land (for example, sensitive landscapes, absolute geotechnical constraints, heritage sites, carbon sinks, and strategic water areas). Further, not all add-ons are absolute constraints: the design includes areas of landscape character restoration and ecological regeneration. Ecologically, the design recognises the possibility of ecological regeneration through rewilding. From a human perspective, it extends the regional repertoire of wild lands, even though they may not presently be areas of pristine biodiversity.

The idea, moulded to the landscape character facets, provides a preliminary concept that guides the next steps.

Initial idea for rural component

This step finalised the initial design of the green structure of the region. An overall rural component is designed around the absolute and indicative constraints. Within this, a micro-network of the primeval component is identified within production landscapes along the same principles of gradation of land use intensity and buffering as the macro-system: this extends the regional continuity of biodiversity conservation and riverine systems through a network of micro-nodes and corridors, linked to the macro-system. It provides a vital recreation outlet, protection of ecosystem services and a rural tourism asset.

Finally, broad, intensive-agricultural zones close to urban markets are identified. The design idea is moulded to the landscape character facets.

8.6.2.3 Develop an initial idea for the capital web

This step develops an idea of an ordering system for the built environment: an accessibility surface of points of higher and lower accessibility. This surface is a synthesis of the following information from the analysis in step three: existing hierarchies of movement, settlement, public facilities and bulk utility services; existing patterns of accessibility; the generative power of settlements for services provision; and the extent of unserved need (but mindful of thresholds).

The product of this synthesis is a structural zone(s) that is an authentic location for the settlement component of the region.

8.6.3 Applying the diagram to context

The concept is finalised by overlaying the initial concept for the built component over that of the green structure (expressed as landscape character areas). This step highlights required adjustments in the capital web or green structure.

As a general rule, the structural argument underpinning the capital web does not overrule the absolute constraints of the no-go zones: if no-go zones fall within the structural zone, development should not be allowed in them (Dewar and Louw 2009: 20). Adjustments to no-go zones, therefore, only involve their expansion, not attrition.

Tread lightly and possible development zones can be reinterpreted. Tread lightly zones can be upgraded or downgraded. In all cases, however, the dominance of the primeval and rural, appropriately buffered (regionally and locally), must dominate decision-making (*ibid.*).

With the finalised spatial-structural concept, the emerging space economy of the region can be identified. New settlements, where necessary, are associated with the existing or proposed regional and subregional routes. Settlement do not have to be directly on them, but need to be very close and structurally connected with them. Planning of services can proceed.

8.6.4 Planning the elements of public structure and landscape character

This step addresses the design of the elements of public structure and landscape management. While the spatial concept for the region provides an accessibility surface in which the elements can be integrated into an overall structural framework, specific design and management issues pertaining to the regional context are addressed in this step.

In the case of the primeval component of green space, for example, an existing emerald biodiversity network could call for community management, educational programmes and introduction of a micro-tourism trail. This contextual emphasis upon eco-tourism

would be further supported by a full landscape character assessment of the tourism capacity of the region, in order to manage the range of urban, rural and primeval tourism. However, a hybrid primeval area could require regeneration through rewilding and public works programmes; or biodiversity protection onto privately-owned farmland to extend a national park into public-private ownership (Cadman *et al* 2010: 66-85).

Landscape character and each of the elements of public structure (green space, movement, public facilities, hard public space, utility services and settlement systems) are considered in terms of their role, components, general principles, design considerations and proposals (City of Cape Town 1999: 27). While they are discussed individually, they must always be viewed in terms of the spatial-structural concept for the region: sectoral planning must remain integrated and contribute to the regional totality.

Just one of the elements, social facilities, is considered below, in order to provide an example of this way of thinking. Drawing upon City of Cape Town (1999: 54-60) and Dewar and Louw (2017), this example of social facilities emphasises the notion of resource centres for knowledge transfer and development, as drivers of innovation and positive change in marginal regions.

Role

Chapter seven discussed the role of social facilities, which provide essential collective support for the regional population.

Further, the developmental role of resource centres is explored: making and exchanging knowledge is central. The first aspect is how the facility will drive regional development, and other services and infrastructure necessary for this (for example, digital connectivity): the extent of a physical facility or an online presence is a key consideration. The second is spatial: whether to use a sufficiently large facility as an instrument of consolidation (building and expanding on existing strengths) or as an instrument of regeneration (locating it in relatively underdeveloped or stagnating places in the hope of creating future developmental impulses) (Dewar and Louw 2017).

General principles

General principles that underpin social services provision are exposure, reinforcement, sharing facilities, fewer but better, multi-functional and innovation (City of Cape town 1999). Innovation considers addressing new needs under constrained resources. The resource centre has a central role in this regard.

Settlement and landscape design considerations

Issues considered under hard public space are important (chapter seven), for example, association with a public space; bounded space; an active public face provided by the facilities to their attached public space; and place-making through essential landscaping (City of Cape Town 1999). For a rural resource centre, attracting and retaining staff with their own requirements may be key a locational or urban design consideration.

Proposals

Firstly, while the traditional components of social facilities programmes are important, new needs of marginal regions are explored (for example, small business support and development, information dissemination about services, urban agriculture and marketing support) (City of Cape Town 1999).

Secondly, regarding the form of provision, clusters of facilities, associated with the hierarchy of accessibility is necessary. The hierarchical kit of parts should be explored. This returns to the following steps in the method of capital investment planning (Dewar *et al* 2012):

a. Explore options for meeting unserved need, testing against existing thresholds: identify all missing elements, (missing services with the same or lower thresholds) from the hierarchically appropriate 'kit of parts' (highest order first, as this serves the widest area).

b. Pursue the concept of the 'kit of parts' by marrying existing and new services and marrying hierarchical levels of settlement to hierarchical 'kits'. This identifies the points most accessible to the areas of un-served demand. The

facility either locates at this point or reinforces areas of un-served need at a point nearby, which is accessible to a different type of facility (provided this is appropriately located), to start a new cluster.

This provides a basis for the creation of special places. Regional space is moulded into a hierarchical system of nesting clusters in accordance with principles of a central place theory (section 2.3.5).

Regarding the facility for knowledge transfer and development, Dewar and Louw (2017) emphasise further locational considerations: Services to the people (central to unserved demand) or people to the services (creating 'university' towns); equitable spread across regional space or located in a limited number of strong centres; benefit from historical infrastructure investments or initiating new investment; location in highly accessible places or creating new patterns of accessibility; and a self-sufficient institution or one that mutually supports an existing settlement.

Implementation issues

Issues include rationalisation of existing facilities; a plan for their funding, provision and management; and investigations to understand community requirements in relation to new needs such as urban agriculture: the role of the knowledge transfer and development institution is key.

8.7 IMPLEMENTATION

This step identifies a series of strategies that will translate the plan into action: detailed action plans will subsequently be formulated for each strategy. The implementation package constructs the implementation programme that involves an identification of strategies; strategy description; prioritization and phasing; and areas for more detailed design (Dewar and Kiepiel 1997).

8.7.1 Constructing the programme

Process is a key concern that underpins implementation (chapter five). Because the plan should counter disembeddedness, factors that underpin dependency must be addressed directly. The programme should be founded on the empowerment of

vernacular processes at the community level that will create the region: central to this is the development of the soft factors like leadership, skills and local ownership and management of public facilities and utility services. Financial mechanisms for this are critical. The construction of the programme requires carful conceptualisation of the package in order to maximise developmental benefit (Dewar and Kiepiel (1997: 67-72).

8.7.2 Identify the implementation package

Strategies may take the form of one, or combinations, of the projects, programmes, policies and spatial actions areas (for example, implementation of a public works programme should involve projects for skills enhancement).

Each strategy in the package is described and includes the following information: purpose; aims and rationale; linkages within the broader context of the plan; potential benefits and limitations; powers employed (budgetary and regulatory); estimated resources required; potential implementing agents; and sources of funding. This description forms one of the tools for subsequent monitoring of action programmes: actual implementation is compared with the strategy description.

8.7.3 Prioritization and phasing

Prioritization and phasing of the extensive list of implementation strategies results from matching actions to available resources: it largely derives from the logic of the plan (certain actions are preconditions for others) and capacity to implement. Capacity should be seen broadly: the regional authority's implementational powers and ability to exercise those; the management system; the external supportive environment and linkages with this; and capacity and linkages with the regional community.

Implementational balance also impacts upon it: this ensures an appropriate spread of strategies across the range of regional issues, a defining feature of an integrated plan. It addresses potential conflicts between welfare and productive investments; and between development and ecology, which may require political decisions in advance. Characteristic of investment projects are distinguished: this allows pre-screening and ensures that projects are highly geared (Dewar 1994: 11; Dewar 1995: 76-83).

While prioritization identifies the sequence of attention to the strategies, phasing allocates these in a time-schedule for action. Three principles for phasing the overall package are firstly, starting with commitment from affected communities and adequate capacities for implementational action. Secondly, a balanced package that characterised all phases of implementation. Thirdly, maintaining a balance between flexibility and continuity in later phases of implementation.

8.7.4 Areas for more detailed design

Planning of the elements of public structure and landscape character (above) identifies areas for more detailed design. To prevent the regional plan atomising into sectoral silos, a relational project matrix (table 8.6) is useful (City of Cape Town 1999: 96-97). This matrix includes spatially referenced management zones and accompanying maps. For regional purposes, management zones should correspond with landscape character units (for example, landscape character type), in order to forward a bioregional approach.

Table 8.6: A relational project matrix.

MANAGEMENT ZONE	Landscape character type 1 (map x)	Landscape character type 2 (map y)	Landscape character type 3 (map z)
GREEN SPACE			
Primeval			
Rural			
BUILT ENVIRONMENT			
Movement			
Social facilities			
Hard public space			
Utility services			
Settlement			

LANDSCAPE CHARACTER			

8.8 SETTING UP MONITORING AND EVALUATION

Monitoring and review are critical to adaptive planning that learns by doing. This step cannot simply become a bureaucratic process that monitors isolated projects. It should set in place a learning system in which communication is essential: it is part of the region's process of knowledge development and transfer.

Monitoring is an ongoing process that measures and evaluates regional dynamics and achievements of the plan, which in turn enables adjustments. There are three types of monitoring that are required: the regional dynamics, including external forces; the consequences of actions generated by the regional plan; and the effectiveness of implementation strategies: each strategy needs to be measured in terms of its own goals and objectives, as well as the performance criteria (section 8.6.1) that inform the plan as a whole (Dewar and Kiepiel 1997: 73-79).

Monitoring is essential for a number of reasons. Changing conditions potentially affect the revenue base and is important for budgetary purposes: it assists in controlling resource flows. Ongoing adjustments to the plan are enabled and implementation blockages identified. It also ensure that planning actions are highly geared.

Design of monitoring criteria is integral to all three main steps of the planning process. Monitoring of regional dynamics differs from monitoring the impact of actions resulting from the plan. Regional dynamics require analytical tools and techniques that are appropriate to the regional context. Monitoring the actions resulting from the plan involves a conceptual distinction between physical projects and policy (for example, land use regulation).

On hand, policies need to be monitored in terms of their own goals, objectives and unintended outcomes, as well as the regional performance criteria. On the other, physical projects, an expression of investment, also give rise to internalities: they result in a set of outputs, as well as outcomes. Thus they are measured against

internalities (outputs and outcomes) as well as externalities (measured against desired performance qualities). Measurement identifies not only on how they contribute to the objectives of the plan, but also how effectively resources have been utilised.

Review is the periodic assessment of the overall plan or implementation package to confirm the integrity or recommend their revision. Review involves either the overall plan or review of the implementation strategies (necessary reprioritization is an important element of this). In both cases, the purposes of review are to check the appropriateness of the implementation package to achieve what was intended; to check that the intentions are still relevant; and consequently to authorise appropriate actions (*ibid:* 74).

Review of the implementation strategies involve priorities for short term and ongoing actions and should occur after a year to reprioritize as necessary. Review of the overall plan is a medium-term exercise (unless monitoring indicates otherwise). Here, the regional dynamics and their implications for the plan are assessed: the regional concept is reassessed in this light. Overall, review questions whether the context, the assumptions and the direction of the original plan remain relevant. If the plan has been properly made and has been driven by performance criteria, the central actions and ideas will remain valid (*ibid:* 80).

8.9 CONCLUSION

This chapter has advanced a place-based, spatial-structural method of regional spatial planning for marginal regions. Being part of a package of plans process, this method ends with the production of a spatial framework for the region. The planning process, however, does not end here. The planning process moves into an action-driven process of implementation: the implementation strategies are translated into detailed action plans. New planning teams are mobilised with a range of different skills. Monitoring and evaluation of this implementational action, focusing mainly on the action plans, needs to be part of the process.

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CHAPTER NINE

CONCLUSION

A number of themes run through this work. The first is that large numbers of the world's population live in marginal regions, in both urban and rural areas. The case of KwaZulu-Natal, a province that includes about a third of the land under traditional administration, housing over five million people, has been used to illustrate the scale of the problem.

The second is that the scale of the environmental and developmental challenges facing these regions are enormous: these include ecological breakdown; high levels of poverty, unemployment and inequality; high levels of illiteracy; low levels of skills transmission; inadequate access to clean potable water (with resulting disease threats); food and energy insecurity. These trends are not static but set in a global system that is fuelling their dynamic. The case of the customary areas has been used to illustrate the scale of the problem. If it continues there is a strong likelihood that it will result in social breakdown and violence.

A third is that these problems are not going to solve themselves from the bottom-up: regional planning is an essential tool for advancement. However, a review of ten regional spatial plans for district municipalities in KwaZulu-Natal shows that current regional planning, which is still informed by the demonstrably incorrect precepts of modernism, is failing to deal with real challenges on the ground. The plans offer standardized, pro-forma solutions to complex and diverse problems. They tend to be excessively land-use based: they are programmatic plans that seek end states of land use rather than the initiation of processes of development.

While the plans seek to be comprehensive they fail to translate appropriate values into implementable solutions. They are conceptually weak, unclear in their focus and in how to achieve a positive development path. The proposed solutions are not in scale with magnitude of poverty and inequality: it is largely assumed that they will improve through growth-based economic approaches. Environmental destruction is neglected. Sense of place receives scant attention.

The plans have difficulty working across scales and tend to entrench a single provincial-based approach. While this might suit certain contexts, this cannot be assumed without contextual knowledge. For example, services provision for rural areas with poor accessibility and low thresholds with few urban centres cannot be addressed through a standardized nodal approach. Improvements in people's wellbeing and the quality of their environment will not result from plans that focus on achieving economic growth through trickle-down processes. The challenges need to be tackled directly.

A fourth theme, which derives from an international literature review of the evolution of regional planning, shows that there is no one way of achieving development. Appropriately, plans should look very different according to context. While there is a rhetorical recognition of the importance of a contextual plan, theoretical positions remain obsessed with globally-competitive economic growth and distracted from systemic societal and ecological problems of the real world. The influence of modernism is not entirely shed, and importantly, where a concern with spatial issues has been recognised, spatial planning has often been abandoned.

Alternatives are emerging to fill the void in mainstream regional planning in related disciplines and fields such as environmental design and planning, rural development, vernacular design, bioregional planning, landscape character assessment and in economic theory (for example, steady-state economics and neo-endogenous development). The need for contextually-informed plans is a central consideration underlying this thinking. However, there is an increasing recognition that the adoption of sound ecological practices is non-negotiable in any plan.

A fifth theme is, while there is no standardised approach to regional planning, methodology and method become central. There are a number of aspects to this. Driven by an eco-humanist ethic, methodology recognises the multi-dimensionality of human and ecological needs and requirements. This recognition calls for multiple conceptions of space, in which thematic and geographic space are basic, complementary categories.

In turn, this recognition highlights the importance of complementary methods: particularly spatial-structural method and landscape character assessment. The spatial-structural method is a means of expressing relationships of value, captured by performance qualities, in relative, abstract space (for example, the quality of a balanced relationship between primeval, rural and urban landscapes). However, these spatial facts fall into real places, which can be defined by landscape character method.

This is achieved through a design way of thinking: a creative process that sets in place constraints to which vernacular processes may respond in their own interests, through ordering and creating balanced relationships between the elements of public structure in the landscapes of the region.

Embeddedness is another meta-performance quality that permeates the methodology and method. Planning should become a counter-movement that confronts societal and ecological challenges directly: a return to a vernacular precedent in which an economy is embedded in culture and both the economy and culture are embedded in nature. The implication is that ecologically responsible planning must tackle global ecological breakdown and tackle poverty and inequality in marginal regions directly.

A sixth theme relates to the form of the regional spatial plan. The art of regional spatial planning lies in integrating hierarchical networks of green space and hierarchical networks of settlement and investment in a symbiotic way, so that each benefits the other. This creates a structural framework that is located in place: in the landscapes of the region.

Once the framework is in place, capital investment planning and landscape character management can be fine-tuned to regional requirements, planned as an integrated totality rather than in sectoral silos (for example, simultaneous planning of regional space and land reform (Piet Louw Architects 2013: 89; UN-Habitat 2021)). The form of implementation of the regional spatial plan is important. Because embeddedness should be pursued, the shift towards greater self-reliance requires particular attention being paid to empowering initiatives in the implementation package. In turn, monitoring sets up a process of learning through doing, which is essential for adaptive change.

A landscape character approach as a foundation for regional spatial planning is particularly important. A landscape character approach has been shown to be a potential foundation for a return to a place-based approach to regional planning, which has largely been shed from mainstream planning since the last century (Hall and Tewdwr-Jones 2020: 335). However, it is evident that the landscape character approach is complementary to, but should not replace, the spatial-structural approach. Both are necessary for regional spatial planning, because space is not a monolithic concept.

The contributions of the study to the knowledge base of regional spatial planning include the following. Exploration of the premodern vernacular precedent supports a position on the value direction of contemporary landscape character management. Pragmatically, the work pinpointed critical bottlenecks in local planning, including its institutionalisation. From the international literature review, it is evident that despite the lingering precepts of modernism and aspatial reductionism, almost all schools of thought about regional development have potential contributions and insights which should inform plan formulation. A number of findings arose from an exploration of methodology and its operationalisation, such as the potential role of planning as a counter-movement to engage disembeddedness: addressing non-material needs are shown to be part of this. Further, a regional spatial planning argument for the integration of the elements of public structure in abstract space was postulated.

Breakdown of ecology and people's wellbeing in marginal regions must be tackled directly. To advance the findings of this study in South Africa, three interrelated, strategic peace studies are suggested to promote a shift towards Polanyian 'embeddedness'. These require governance structures for their implementation: in South Africa, legislative provisions relating to provincial and regional spatial planning (sections 3.2.3 and 6.2.3) may be employed for such purposes.

The first is the conceptualisation of large public works programmes that are commensurate to the scale of the problem. These should centre on the implementation of regional spatial plans: ecological regeneration, landscape character restoration and development of the capital web. Development of leadership, skills and local funding

mechanisms are essential. Such a programme, initiated as pilot project, should be scaled up to similar regions, followed by a national rollout.

The second involves establishment of dedicated regional development agencies. This is necessary because transformation is unlikely happen through present processes of spatial development planning (for example, Dyosi 2016: 94). Chapter four, however, has pointed to successful application of such mechanisms. In KwaZulu-Natal, Cato Manor Development Agency also provides a precedent (Robinson *et al* 2004). Establishment of development agencies recognises the scale and complexity of the required transformation (Harris 2011).

The third recognises that the task is so onerous, and so dependent on learning, that it requires mobilisation of society's primary institutions of learning. Transformation from disembedded conditions will not simply happen through laissez faire, even with spatial preconditions in place: ongoing information, research, learning and mentorship are required. A process of change driven through a decentralised network of knowledge development and exchange is necessary: development of information networks is central. The role of tertiary educational institutions may be pivotal: universities, for example, may establish an online and physical presence down to village level.

This study was introduced with the admonition that neglecting ecological and societal breakdown will almost inevitably result in violence. The choice is between exiting the trajectory of breakdown by design or disaster, because exiting the trajectory is inevitable one way or another (Bradshaw *et al* 2021).

Scientists point to yet more negative tipping points of global climate change and its accompanying ecological and social crises that will be disastrous for people across the world (Carrington 2022). Bradshaw *et al* (2021) contend that in the face of these global problems - mass extinction, declining health, climate-disruption upheavals (including looming massive migrations) and resource conflicts this century - only a realistic appreciation of the colossal challenges facing the international community might allow it to chart a less-ravaged future.

Philosopher Lea Ypi (Kellaway 2022) reminds us that hope is a moral responsibility. But young people also remind us that there is no hope without action. Planning should not become locked into 'unfettered sociological relativism' and planners need not be reticent about design. Laissez-faire arose by design (Polanyi 2001) and resilience theory reminds us that it will take creativity to get out of this systemic mess.

Marginal regions provide an opportunity for a new beginning.

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APPENDIX 1

ASSESSMENT SCHEDULES

This appendix presents assessment schedules for the 2019 spatial development frameworks of the district municipalities of KwaZulu-Natal. The assessment criteria are explained in chapters six and seven (sections 6.3, 7.2 and 7.3).

ASSESSMENT: AMAJUBA SPATIAL DEVELOPMENT FRAMEWORK

Note: The plan scores 'very poor' if, amongst other things, an issue is excluded/no information.

Table 1: Form of the plan

	Negative performance	***Very poor***	***Poor***	***Moderate***	***Good***	***Very good***	**Positive performance**
1.1	Values unclear & blurred						Clear & appropriate values (environmentalism and humanism)
1.2	Weak concept entrenching status quo						Strong concept promoting positive change
1.3	Incoherent spatial logic						Coherent spatial logic
1.4	Inappropriate focus						Clear regional focus
1.5	Focus within regional boundaries only						Part of 'Package of plans' approach
1.6	Inappropriate in terms of contextual constraints						Viable in terms of contextual constraints
1.7	Based on assumptions about access to technology						Based on, and scaled to, lowest common denominator
1.8	Programmatically driven						Focus on structure and space
1.9	Focus on land use						Focus on the elements of public structure
1.10	Comprehensive plan						Minimalist framework
1.11	Hierarchically confused						Hierarchical integration of the different elements of public structure
1.12	Blurred patterns of accessibility						Clear hierarchy of accessibility from very public (exposed) to very private (embedded)
1.13	Weak budgetary direction						Clear budgetary direction
1.14	Inadequate regulatory direction						Clear and appropriate regulatory direction

ASSESSMENT: AMAJUBA SPATIAL DEVELOPMENT FRAMEWORK

Table 2: Performance of elements of structure - Green space

	Negative performance	***Very poor***	***Poor***	***Moderate***	***Good***	***Very good***	**Positive performance**
2.1	Weak green concept						Strong, regenerative green concept
2.2	Ignore ecological principles						Put nature first
2.3	Hierarchical simplification and fragmentation of green space						Promote dominance of a hierarchical system of connected natural habitats
2.4	Promote urban sprawl						Maintain a dynamic balance between primeval, rural and urban landscapes
2.5	Ignore local resources						Maximise natural capital and conserve all resources of local value
2.6	Deteriorating water resources and importation of water						Protect water resources and promote local water capture
2.7	Ignore hazards						Prevent settlement from occurring on hazards (e.g. sea level rise, areas prone to flooding, fault lines, unstable soils and slopes)
2.8	Ignore food security, loss of agricultural land and large-scale mono-cultivation						Protect agricultural land, address food security and greater opportunities for small farmers.

ASSESSMENT: AMAJUBA SPATIAL DEVELOPMENT FRAMEWORK

Table 3: Performance of elements of structure - Movement of all modes

	Negative performance	***Very poor***	***Poor***	***Moderate***	***Good***	***Very good***	**Positive performance**
3.1	Inappropriate use of modes						Different modes play a role to which they are best suited
3.2	Fragmentation of modal system						Integration of all modes of transportation
3.3	Promotion of private motor vehicles						Prioritisation of non-motorised transport and public transportation
3.4	Fragmented network						Create a permeable movement network
3.5	Destination-based system						Create a neutral (grid-like) system to encourage the spread of opportunities
3.6	Blurred and confused hierarchy						Clear and logical hierarchy
3.7	Prioritise mobility						Encourage accessibility
3.8	Reinforce existing demand patterns						Movement network used structurally to encourage change, where necessary
3.9	Expand aggregate movement						Reduce aggregate movement

ASSESSMENT: AMAJUBA SPATIAL DEVELOPMENT FRAMEWORK

Table 4: Performance of elements of structure - Public institutions and facilities

	Negative performance	***Very poor***	***Poor***	***Moderate***	***Good***	***Very good***	**Positive performance**
4.1	Inappropriate in form and type						Appropriate in form and type to local need
4.2	Inaccessible						Located in places of high accessibility
4.3	Skewed distribution						Equitably distributed
4.4	Inefficient						Efficient: each tranche of investment reduces the largest amount of unserved demand
4.5	Hierarchically non-aligning						Hierarchically aligned with movement, infrastructure and hard public space
4.6	Isolated events						Clustering of facilities (to encourage multi-purpose trips and to create special places)
4.7	Embedded locations						Exposed locations
4.8	Single use						Multi-functional
4.9	Little use of available technologies						Makes maximum use of available technologies
4.10	Non-viable facilities						Ensure viable facilities in terms of range and threshold

ASSESSMENT: AMAJUBA SPATIAL DEVELOPMENT FRAMEWORK

Table 5: Performance of elements of structure - Hard public open space

	Negative performance	***Very poor***	***Poor***	***Moderate***	***Good***	***Very good***	**Positive performance**
5.1	Poor quality spaces						Qualitatively-fine spaces
5.2	Embedded and inaccessible location						Accessible location
5.3	Ignore periodicity						Accommodate periodicity

ASSESSMENT: AMAJUBA SPATIAL DEVELOPMENT FRAMEWORK

Table 6: Performance of elements of structure - Utility services

	Negative performance	***Very poor***	***Poor***	***Moderate***	***Good***	***Very good***	**Positive performance**
6.1	Little use of historical investments in infrastructure						Maximum use of historical investments in infrastructure
6.2	Isolated event						Network expansion
6.3	Non-aligned, isolated form of line service						Align different forms of line services so that they reinforce one another
6.4	Non-aligned hierarchies of utility services and facilities						Hierarchy of utility services aligned with hierarchy of facilities
6.5	Excessive use of non-renewable resources						Maximum use of renewable resources in terms of inputs
6.6	Inefficient use of throughputs						Efficient use of throughputs (e.g. land, water, energy, finance)
6.7	No recycling						Maximum recycling of wastes
6.8	Irresponsible disposal of wastes						Ecologically-responsible disposal of wastes
6.9	Inappropriate and unaffordable forms of utility services						Forms of utility services are appropriate and affordable
6.10	No economic spin-offs						Contribute to pre-conditions for income generation
6.11	Information technology inaccessible and inappropriate to needs						Information technology easily accessible and appropriate to people's needs

ASSESSMENT: AMAJUBA SPATIAL DEVELOPMENT FRAMEWORK

Table 7: Performance of elements of structure - Settlement systems

	Negative performance	***Very poor***	***Poor***	***Moderate***	***Good***	***Very good***	**Positive performance**
7.1	Create wasteful and expensive new settlements						As far as possible make use of existing settlements to absorb growth
7.2	Encourage sprawl						Infill new development to improve existing urban performance
7.3	Embedded in inaccessible places						If new settlements are necessary to deliver social and local economic services, locate them in highly accessible places
7.4	Housing-led growth						Ensure new settlements have viable economic bases
7.5	Consider settlements in isolation from movement infrastructure						Use new transport links to reinforce, and increase the range of, new and existing settlements
7.6	Non-aligned elements of public structure						Aligned with hierarchies of movement, facilities, utilities and hard public spaces

ASSESSMENT: AMAJUBA SPATIAL DEVELOPMENT FRAMEWORK

Table 8: Performance – Sense of place

	Negative performance	***Very poor***	***Poor***	***Moderate***	***Good***	***Very good***	**Positive performance**
8.1	Ignore landscape character						Work with landscape character
8.2	Encourage standardisation						Promote and protect uniqueness and a sense of place
8.3	Ignore special places						Promote and protect valuable elements of the biophysical and cultural landscape

ASSESSMENT: HARRY GWALA SPATIAL DEVELOPMENT FRAMEWORK

Note: The plan scores 'very poor' if, amongst other things, an issue is excluded/no information.

Table 1: Form of the plan

	Negative performance	***Very poor***	***Poor***	***Moderate***	***Good***	***Very good***	**Positive performance**
1.1	Values unclear & blurred				■		Clear & appropriate values (environmentalism and humanism)
1.2	Weak concept entrenching status quo		■				Strong concept promoting positive change
1.3	Incoherent spatial logic		■				Coherent spatial logic
1.4	Inappropriate focus		■				Clear regional focus
1.5	Focus within regional boundaries only			■			Part of 'Package of plans' approach
1.6	Inappropriate in terms of contextual constraints		■				Viable in terms of contextual constraints
1.7	Based on assumptions about access to technology		■				Based on, and scaled to, lowest common denominator
1.8	Programmatically driven		■				Focus on structure and space
1.9	Focus on land use		■				Focus on the elements of public structure
1.10	Comprehensive plan			■			Minimalist framework
1.11	Hierarchically confused		■				Hierarchical integration of the different elements of public structure
1.12	Blurred patterns of accessibility		■				Clear hierarchy of accessibility from very public (exposed) to very private (embedded)
1.13	Weak budgetary direction		■				Clear budgetary direction
1.14	Inadequate regulatory direction	■					Clear and appropriate regulatory direction

ASSESSMENT: HARRY GWALA SPATIAL DEVELOPMENT FRAMEWORK

Table 2: Performance of elements of structure - Green space

	Negative performance	***Very poor***	***Poor***	***Moderate***	***Good***	***Very good***	**Positive performance**
2.1	Weak green concept						Strong, regenerative green concept
2.2	Ignore ecological principles						Put nature first
2.3	Hierarchical simplification and fragmentation of green space						Promote dominance of a hierarchical system of connected natural habitats
2.4	Promote urban sprawl						Maintain a dynamic balance between primeval, rural and urban landscapes
2.5	Ignore local resources						Maximise natural capital and conserve all resources of local value
2.6	Deteriorating water resources and importation of water						Protect water resources and promote local water capture
2.7	Ignore hazards						Prevent settlement from occurring on hazards (e.g. sea level rise, areas prone to flooding, fault lines, unstable soils and slopes)
2.8	Ignore food security, loss of agricultural land and large-scale mono-cultivation						Protect agricultural land, address food security and greater opportunities for small farmers.

ASSESSMENT: HARRY GWALA SPATIAL DEVELOPMENT FRAMEWORK

Table 3: Performance of elements of structure - Movement of all modes

	Negative performance	***Very poor***	***Poor***	***Moderate***	***Good***	***Very good***	**Positive performance**
3.1	Inappropriate use of modes						Different modes play a role to which they are best suited
3.2	Fragmentation of modal system						Integration of all modes of transportation
3.3	Promotion of private motor vehicles						Prioritisation of non-motorised transport and public transportation
3.4	Fragmented network						Create a permeable movement network
3.5	Destination-based system						Create a neutral (grid-like) system to encourage the spread of opportunities
3.6	Blurred and confused hierarchy						Clear and logical hierarchy
3.7	Prioritise mobility						Encourage accessibility
3.8	Reinforce existing demand patterns						Movement network used structurally to encourage change, where necessary
3.9	Expand aggregate movement						Reduce aggregate movement

ASSESSMENT: HARRY GWALA SPATIAL DEVELOPMENT FRAMEWORK

Table 4: Performance of elements of structure - Public institutions and facilities

	Negative performance	***Very poor***	***Poor***	***Moderate***	***Good***	***Very good***	**Positive performance**
4.1	Inappropriate in form and type						Appropriate in form and type to local need
4.2	Inaccessible						Located in places of high accessibility
4.3	Skewed distribution						Equitably distributed
4.4	Inefficient						Efficient: each tranche of investment reduces the largest amount of unserved demand
4.5	Hierarchically non-aligning						Hierarchically aligned with movement, infrastructure and hard public space
4.6	Isolated events						Clustering of facilities (to encourage multi-purpose trips and to create special places)
4.7	Embedded locations						Exposed locations
4.8	Single use						Multi-functional
4.9	Little use of available technologies						Makes maximum use of available technologies
4.10	Non-viable facilities						Ensure viable facilities in terms of range and threshold

ASSESSMENT: HARRY GWALA SPATIAL DEVELOPMENT FRAMEWORK

Table 5: Performance of elements of structure - Hard public open space

	Negative performance	***Very poor***	***Poor***	***Moderate***	***Good***	***Very good***	**Positive performance**
5.1	Poor quality spaces						Qualitatively-fine spaces
5.2	Embedded and inaccessible location						Accessible location
5.3	Ignore periodicity						Accommodate periodicity

ASSESSMENT: HARRY GWALA SPATIAL DEVELOPMENT FRAMEWORK

Table 6: Performance of elements of structure - Utility services

	Negative performance	***Very poor***	***Poor***	***Moderate***	***Good***	***Very good***	**Positive performance**
6.1	Little use of historical investments in infrastructure						Maximum use of historical investments in infrastructure
6.2	Isolated event						Network expansion
6.3	Non-aligned, isolated form of line service						Align different forms of line services so that they reinforce one another
6.4	Non-aligned hierarchies of utility services and facilities						Hierarchy of utility services aligned with hierarchy of facilities
6.5	Excessive use of non-renewable resources						Maximum use of renewable resources in terms of inputs
6.6	Inefficient use of throughputs						Efficient use of throughputs (e.g. land, water, energy, finance)
6.7	No recycling						Maximum recycling of wastes
6.8	Irresponsible disposal of wastes						Ecologically-responsible disposal of wastes
6.9	Inappropriate and unaffordable forms of utility services						Forms of utility services are appropriate and affordable
6.10	No economic spin-offs						Contribute to pre-conditions for income generation
6.11	Information technology inaccessible and inappropriate to needs						Information technology easily accessible and appropriate to people's needs

ASSESSMENT: HARRY GWALA SPATIAL DEVELOPMENT FRAMEWORK

Table 7: Performance of elements of structure - Settlement systems

	Negative performance	***Very poor***	***Poor***	***Moderate***	***Good***	***Very good***	**Positive performance**
7.1	Create wasteful and expensive new settlements						As far as possible make use of existing settlements to absorb growth
7.2	Encourage sprawl						Infill new development to improve existing urban performance
7.3	Embedded in inaccessible places						If new settlements are necessary to deliver social and local economic services, locate them in highly accessible places
7.4	Housing-led growth						Ensure new settlements have viable economic bases
7.5	Consider settlements in isolation from movement infrastructure						Use new transport links to reinforce, and increase the range of, new and existing settlements
7.6	Non-aligned elements of public structure						Aligned with hierarchies of movement, facilities, utilities and hard public spaces

ASSESSMENT: HARRY GWALA SPATIAL DEVELOPMENT FRAMEWORK

Table 8: Performance – Sense of place

	Negative performance	***Very poor***	***Poor***	***Moderate***	***Good***	***Very good***	**Positive performance**
8.1	Ignore landscape character						Work with landscape character
8.2	Encourage standardisation						Promote and protect uniqueness and a sense of place
8.3	Ignore special places						Promote and protect valuable elements of the biophysical and cultural landscape

ASSESSMENT: ILEMBE SPATIAL DEVELOPMENT FRAMEWORK

Note: The plan scores 'very poor' if, amongst other things, an issue is excluded/no information.

Table 1: Form of the plan

	Negative performance	***Very poor***	***Poor***	***Moderate***	***Good***	***Very good***	**Positive performance**
1.1	Values unclear & blurred						Clear & appropriate values (environmentalism and humanism)
1.2	Weak concept entrenching status quo						Strong concept promoting positive change
1.3	Incoherent spatial logic						Coherent spatial logic
1.4	Inappropriate focus						Clear regional focus
1.5	Focus within regional boundaries only						Part of 'Package of plans' approach
1.6	Inappropriate in terms of contextual constraints						Viable in terms of contextual constraints
1.7	Based on assumptions about access to technology						Based on, and scaled to, lowest common denominator
1.8	Programmatically driven						Focus on structure and space
1.9	Focus on land use						Focus on the elements of public structure
1.10	Comprehensive plan						Minimalist framework
1.11	Hierarchically confused						Hierarchical integration of the different elements of public structure
1.12	Blurred patterns of accessibility						Clear hierarchy of accessibility from very public (exposed) to very private (embedded)
1.13	Weak budgetary direction						Clear budgetary direction
1.14	Inadequate regulatory direction						Clear and appropriate regulatory direction

ASSESSMENT: ILEMBE SPATIAL DEVELOPMENT FRAMEWORK

Table 2: Performance of elements of structure - Green space

	Negative performance	***Very poor***	***Poor***	***Moderate***	***Good***	***Very good***	**Positive performance**
2.1	Weak green concept						Strong, regenerative green concept
2.2	Ignore ecological principles						Put nature first
2.3	Hierarchical simplification and fragmentation of green space						Promote dominance of a hierarchical system of connected natural habitats
2.4	Promote urban sprawl						Maintain a dynamic balance between primeval, rural and urban landscapes
2.5	Ignore local resources						Maximise natural capital and conserve all resources of local value
2.6	Deteriorating water resources and importation of water						Protect water resources and promote local water capture
2.7	Ignore hazards						Prevent settlement from occurring on hazards (e.g. sea level rise, areas prone to flooding, fault lines, unstable soils and slopes)
2.8	Ignore food security, loss of agricultural land and large-scale mono-cultivation						Protect agricultural land, address food security and greater opportunities for small farmers.

ASSESSMENT: ILEMBE SPATIAL DEVELOPMENT FRAMEWORK

Table 3: Performance of elements of structure - Movement of all modes

	Negative performance	***Very poor***	***Poor***	***Moderate***	***Good***	***Very good***	**Positive performance**
3.1	Inappropriate use of modes						Different modes play a role to which they are best suited
3.2	Fragmentation of modal system						Integration of all modes of transportation
3.3	Promotion of private motor vehicles						Prioritisation of non-motorised transport and public transportation
3.4	Fragmented network						Create a permeable movement network
3.5	Destination-based system						Create a neutral (grid-like) system to encourage the spread of opportunities
3.6	Blurred and confused hierarchy						Clear and logical hierarchy
3.7	Prioritise mobility						Encourage accessibility
3.8	Reinforce existing demand patterns						Movement network used structurally to encourage change, where necessary
3.9	Expand aggregate movement						Reduce aggregate movement

ASSESSMENT: ILEMBE SPATIAL DEVELOPMENT FRAMEWORK

Table 4: Performance of elements of structure - Public institutions and facilities

	Negative performance	***Very poor***	***Poor***	***Moderate***	***Good***	***Very good***	**Positive performance**
4.1	Inappropriate in form and type						Appropriate in form and type to local need
4.2	Inaccessible						Located in places of high accessibility
4.3	Skewed distribution						Equitably distributed
4.4	Inefficient						Efficient: each tranche of investment reduces the largest amount of unserved demand
4.5	Hierarchically non-aligning						Hierarchically aligned with movement, infrastructure and hard public space
4.6	Isolated events						Clustering of facilities (to encourage multi-purpose trips and to create special places)
4.7	Embedded locations						Exposed locations
4.8	Single use						Multi-functional
4.9	Little use of available technologies						Makes maximum use of available technologies
4.10	Non-viable facilities						Ensure viable facilities in terms of range and threshold

ASSESSMENT: ILEMBE SPATIAL DEVELOPMENT FRAMEWORK

Table 5: Performance of elements of structure - Hard public open space

	Negative performance	***Very poor***	***Poor***	***Moderate***	***Good***	***Very good***	**Positive performance**
5.1	Poor quality spaces						Qualitatively-fine spaces
5.2	Embedded and inaccessible location						Accessible location
5.3	Ignore periodicity						Accommodate periodicity

ASSESSMENT: ILEMBE SPATIAL DEVELOPMENT FRAMEWORK

Table 6: Performance of elements of structure - Utility services

	Negative performance	***Very poor***	***Poor***	***Moderate***	***Good***	***Very good***	**Positive performance**
6.1	Little use of historical investments in infrastructure						Maximum use of historical investments in infrastructure
6.2	Isolated event						Network expansion
6.3	Non-aligned, isolated form of line service						Align different forms of line services so that they reinforce one another
6.4	Non-aligned hierarchies of utility services and facilities						Hierarchy of utility services aligned with hierarchy of facilities
6.5	Excessive use of non-renewable resources						Maximum use of renewable resources in terms of inputs
6.6	Inefficient use of throughputs						Efficient use of throughputs (e.g. land, water, energy, finance)
6.7	No recycling						Maximum recycling of wastes
6.8	Irresponsible disposal of wastes						Ecologically-responsible disposal of wastes
6.9	Inappropriate and unaffordable forms of utility services						Forms of utility services are appropriate and affordable
6.10	No economic spin-offs						Contribute to pre-conditions for income generation
6.11	Information technology inaccessible and inappropriate to needs						Information technology easily accessible and appropriate to people's needs

ASSESSMENT: ILEMBE SPATIAL DEVELOPMENT FRAMEWORK

Table 7: Performance of elements of structure - Settlement systems

	Negative performance	***Very poor***	***Poor***	***Moderate***	***Good***	***Very good***	**Positive performance**
7.1	Create wasteful and expensive new settlements						As far as possible make use of existing settlements to absorb growth
7.2	Encourage sprawl						Infill new development to improve existing urban performance
7.3	Embedded in inaccessible places						If new settlements are necessary to deliver social and local economic services, locate them in highly accessible places
7.4	Housing-led growth						Ensure new settlements have viable economic bases
7.5	Consider settlements in isolation from movement infrastructure						Use new transport links to reinforce, and increase the range of, new and existing settlements
7.6	Non-aligned elements of public structure						Aligned with hierarchies of movement, facilities, utilities and hard public spaces

ASSESSMENT: ILEMBE SPATIAL DEVELOPMENT FRAMEWORK

Table 8: Performance – Sense of place

	Negative performance	***Very poor***	***Poor***	***Moderate***	***Good***	***Very good***	**Positive performance**
8.1	Ignore landscape character						Work with landscape character
8.2	Encourage standardisation						Promote and protect uniqueness and a sense of place
8.3	Ignore special places						Promote and protect valuable elements of the biophysical and cultural landscape

ASSESSMENT: KING CETSHWAYO SPATIAL DEVELOPMENT FRAMEWORK

Note: The plan scores 'very poor' if, amongst other things, an issue is excluded/no information.

Table 1: Form of the plan

	Negative performance	*Very poor*	*Poor*	*Moderate*	*Good*	*Very good*	Positive performance
1.1	Values unclear & blurred				■		Clear & appropriate values (environmentalism and humanism)
1.2	Weak concept entrenching status quo			■			Strong concept promoting positive change
1.3	Incoherent spatial logic			■			Coherent spatial logic
1.4	Inappropriate focus				■		Clear regional focus
1.5	Focus within regional boundaries only				■		Part of 'Package of plans' approach
1.6	Inappropriate in terms of contextual constraints		■				Viable in terms of contextual constraints
1.7	Based on assumptions about access to technology			■			Based on, and scaled to, lowest common denominator
1.8	Programmatically driven				■		Focus on structure and space
1.9	Focus on land use				■		Focus on the elements of public structure
1.10	Comprehensive plan				■		Minimalist framework
1.11	Hierarchically confused				■		Hierarchical integration of the different elements of public structure
1.12	Blurred patterns of accessibility			■			Clear hierarchy of accessibility from very public (exposed) to very private (embedded)
1.13	Weak budgetary direction			■			Clear budgetary direction
1.14	Inadequate regulatory direction				■		Clear and appropriate regulatory direction

ASSESSMENT: KING CETSHWAYO SPATIAL DEVELOPMENT FRAMEWORK

Table 2: Performance of elements of structure - Green space

	Negative performance	*Very poor*	*Poor*	*Moderate*	*Good*	*Very good*	Positive performance
2.1	Weak green concept						Strong, regenerative green concept
2.2	Ignore ecological principles						Put nature first
2.3	Hierarchical simplification and fragmentation of green space						Promote dominance of a hierarchical system of connected natural habitats
2.4	Promote urban sprawl						Maintain a dynamic balance between primeval, rural and urban landscapes
2.5	Ignore local resources						Maximise natural capital and conserve all resources of local value
2.6	Deteriorating water resources and importation of water						Protect water resources and promote local water capture
2.7	Ignore hazards						Prevent settlement from occurring on hazards (e.g. sea level rise, areas prone to flooding, fault lines, unstable soils and slopes)
2.8	Ignore food security, loss of agricultural land and large-scale mono-cultivation						Protect agricultural land, address food security and greater opportunities for small farmers.

ASSESSMENT: KING CETSHWAYO SPATIAL DEVELOPMENT FRAMEWORK

Table 3: Performance of elements of structure - Movement of all modes

	Negative performance	*Very poor*	*Poor*	*Moderate*	*Good*	*Very good*	Positive performance
3.1	Inappropriate use of modes						Different modes play a role to which they are best suited
3.2	Fragmentation of modal system						Integration of all modes of transportation
3.3	Promotion of private motor vehicles						Prioritisation of non-motorised transport and public transportation
3.4	Fragmented network						Create a permeable movement network
3.5	Destination-based system						Create a neutral (grid-like) system to encourage the spread of opportunities
3.6	Blurred and confused hierarchy						Clear and logical hierarchy
3.7	Prioritise mobility						Encourage accessibility
3.8	Reinforce existing demand patterns						Movement network used structurally to encourage change, where necessary
3.9	Expand aggregate movement						Reduce aggregate movement

ASSESSMENT: KING CETSHWAYO SPATIAL DEVELOPMENT FRAMEWORK

Table 4: Performance of elements of structure - Public institutions and facilities

	Negative performance	*Very poor*	*Poor*	*Moderate*	*Good*	*Very good*	Positive performance
4.1	Inappropriate in form and type						Appropriate in form and type to local need
4.2	Inaccessible						Located in places of high accessibility
4.3	Skewed distribution						Equitably distributed
4.4	Inefficient						Efficient: each tranche of investment reduces the largest amount of unserved demand
4.5	Hierarchically non-aligning						Hierarchically aligned with movement, infrastructure and hard public space
4.6	Isolated events						Clustering of facilities (to encourage multi-purpose trips and to create special places)
4.7	Embedded locations						Exposed locations
4.8	Single use						Multi-functional
4.9	Little use of available technologies						Makes maximum use of available technologies
4.10	Non-viable facilities						Ensure viable facilities in terms of range and threshold

ASSESSMENT: KING CETSHWAYO SPATIAL DEVELOPMENT FRAMEWORK

Table 5: Performance of elements of structure - Hard public open space

	Negative performance	*Very poor*	*Poor*	*Moderate*	*Good*	*Very good*	Positive performance
5.1	Poor quality spaces						Qualitatively-fine spaces
5.2	Embedded and inaccessible location						Accessible location
5.3	Ignore periodicity						Accommodate periodicity

ASSESSMENT: KING CETSHWAYO SPATIAL DEVELOPMENT FRAMEWORK

Table 6: Performance of elements of structure - Utility services

	Negative performance	*Very poor*	*Poor*	*Moderate*	*Good*	*Very good*	Positive performance
6.1	Little use of historical investments in infrastructure				■		Maximum use of historical investments in infrastructure
6.2	Isolated event				■		Network expansion
6.3	Non-aligned, isolated form of line service			■			Align different forms of line services so that they reinforce one another
6.4	Non-aligned hierarchies of utility services and facilities				■		Hierarchy of utility services aligned with hierarchy of facilities
6.5	Excessive use of non-renewable resources			■			Maximum use of renewable resources in terms of inputs
6.6	Inefficient use of throughputs			■			Efficient use of throughputs (e.g. land, water, energy, finance)
6.7	No recycling				■		Maximum recycling of wastes
6.8	Irresponsible disposal of wastes				■		Ecologically-responsible disposal of wastes
6.9	Inappropriate and unaffordable forms of utility services			■			Forms of utility services are appropriate and affordable
6.10	No economic spin-offs				■		Contribute to pre-conditions for income generation
6.11	Information technology inaccessible and inappropriate to needs			■			Information technology easily accessible and appropriate to people's needs

ASSESSMENT: KING CETSHWAYO SPATIAL DEVELOPMENT FRAMEWORK

Table 7: Performance of elements of structure - Settlement systems

	Negative performance	*Very poor*	*Poor*	*Moderate*	*Good*	*Very good*	Positive performance
7.1	Create wasteful and expensive new settlements						As far as possible make use of existing settlements to absorb growth
7.2	Encourage sprawl						Infill new development to improve existing urban performance
7.3	Embedded in inaccessible places						If new settlements are necessary to deliver social and local economic services, locate them in highly accessible places
7.4	Housing-led growth						Ensure new settlements have viable economic bases
7.5	Consider settlements in isolation from movement infrastructure						Use new transport links to reinforce, and increase the range of, new and existing settlements
7.6	Non-aligned elements of public structure						Aligned with hierarchies of movement, facilities, utilities and hard public spaces

ASSESSMENT: KING CETSHWAYO SPATIAL DEVELOPMENT FRAMEWORK

Table 8: Performance – Sense of place

	Negative performance	*Very poor*	*Poor*	*Moderate*	*Good*	*Very good*	Positive performance
8.1	Ignore landscape character						Work with landscape character
8.2	Encourage standardisation						Promote and protect uniqueness and a sense of place
8.3	Ignore special places						Promote and protect valuable elements of the biophysical and cultural landscape

ASSESSMENT: UGU SPATIAL DEVELOPMENT FRAMEWORK

Note: The plan scores 'very poor' if, amongst other things, an issue is excluded/no information.

Table 1: Form of the plan

	Negative performance	***Very poor***	***Poor***	***Moderate***	***Good***	***Very good***	**Positive performance**
1.1	Values unclear & blurred			■			Clear & appropriate values (environmentalism and humanism)
1.2	Weak concept entrenching status quo		■				Strong concept promoting positive change
1.3	Incoherent spatial logic		■				Coherent spatial logic
1.4	Inappropriate focus		■				Clear regional focus
1.5	Focus within regional boundaries only		■				Part of 'Package of plans' approach
1.6	Inappropriate in terms of contextual constraints		■				Viable in terms of contextual constraints
1.7	Based on assumptions about access to technology		■				Based on, and scaled to, lowest common denominator
1.8	Programmatically driven		■				Focus on structure and space
1.9	Focus on land use			■			Focus on the elements of public structure
1.10	Comprehensive plan		■				Minimalist framework
1.11	Hierarchically confused			■			Hierarchical integration of the different elements of public structure
1.12	Blurred patterns of accessibility		■				Clear hierarchy of accessibility from very public (exposed) to very private (embedded)
1.13	Weak budgetary direction			■			Clear budgetary direction
1.14	Inadequate regulatory direction		■				Clear and appropriate regulatory direction

ASSESSMENT: UGU SPATIAL DEVELOPMENT FRAMEWORK

Table 2: Performance of elements of structure - Green space

	Negative performance	***Very poor***	***Poor***	***Moderate***	***Good***	***Very good***	**Positive performance**
2.1	Weak green concept						Strong, regenerative green concept
2.2	Ignore ecological principles						Put nature first
2.3	Hierarchical simplification and fragmentation of green space						Promote dominance of a hierarchical system of connected natural habitats
2.4	Promote urban sprawl						Maintain a dynamic balance between primeval, rural and urban landscapes
2.5	Ignore local resources						Maximise natural capital and conserve all resources of local value
2.6	Deteriorating water resources and importation of water						Protect water resources and promote local water capture
2.7	Ignore hazards						Prevent settlement from occurring on hazards (e.g. sea level rise, areas prone to flooding, fault lines, unstable soils and slopes)
2.8	Ignore food security, loss of agricultural land and large-scale mono-cultivation						Protect agricultural land, address food security and greater opportunities for small farmers.

ASSESSMENT: UGU SPATIAL DEVELOPMENT FRAMEWORK

Table 3: Performance of elements of structure - Movement of all modes

	Negative performance	***Very poor***	***Poor***	***Moderate***	***Good***	***Very good***	**Positive performance**
3.1	Inappropriate use of modes			■			Different modes play a role to which they are best suited
3.2	Fragmentation of modal system		■				Integration of all modes of transportation
3.3	Promotion of private motor vehicles			■			Prioritisation of non-motorised transport and public transportation
3.4	Fragmented network		■				Create a permeable movement network
3.5	Destination-based system	■					Create a neutral (grid-like) system to encourage the spread of opportunities
3.6	Blurred and confused hierarchy			■			Clear and logical hierarchy
3.7	Prioritise mobility		■				Encourage accessibility
3.8	Reinforce existing demand patterns		■				Movement network used structurally to encourage change, where necessary
3.9	Expand aggregate movement		■				Reduce aggregate movement

ASSESSMENT: UGU SPATIAL DEVELOPMENT FRAMEWORK

Table 4: Performance of elements of structure - Public institutions and facilities

	Negative performance	***Very poor***	***Poor***	***Moderate***	***Good***	***Very good***	**Positive performance**
4.1	Inappropriate in form and type						Appropriate in form and type to local need
4.2	Inaccessible						Located in places of high accessibility
4.3	Skewed distribution						Equitably distributed
4.4	Inefficient						Efficient: each tranche of investment reduces the largest amount of unserved demand
4.5	Hierarchically non-aligning						Hierarchically aligned with movement, infrastructure and hard public space
4.6	Isolated events						Clustering of facilities (to encourage multi-purpose trips and to create special places)
4.7	Embedded locations						Exposed locations
4.8	Single use						Multi-functional
4.9	Little use of available technologies						Makes maximum use of available technologies
4.10	Non-viable facilities						Ensure viable facilities in terms of range and threshold

ASSESSMENT: UGU SPATIAL DEVELOPMENT FRAMEWORK

Table 5: Performance of elements of structure - Hard public open space

	Negative performance	***Very poor***	***Poor***	***Moderate***	***Good***	***Very good***	**Positive performance**
5.1	Poor quality spaces						Qualitatively-fine spaces
5.2	Embedded and inaccessible location						Accessible location
5.3	Ignore periodicity						Accommodate periodicity

ASSESSMENT: UGU SPATIAL DEVELOPMENT FRAMEWORK

Table 6: Performance of elements of structure - Utility services

	Negative performance	***Very poor***	***Poor***	***Moderate***	***Good***	***Very good***	**Positive performance**
6.1	Little use of historical investments in infrastructure						Maximum use of historical investments in infrastructure
6.2	Isolated event						Network expansion
6.3	Non-aligned, isolated form of line service						Align different forms of line services so that they reinforce one another
6.4	Non-aligned hierarchies of utility services and facilities						Hierarchy of utility services aligned with hierarchy of facilities
6.5	Excessive use of non-renewable resources						Maximum use of renewable resources in terms of inputs
6.6	Inefficient use of throughputs						Efficient use of throughputs (e.g. land, water, energy, finance)
6.7	No recycling						Maximum recycling of wastes
6.8	Irresponsible disposal of wastes						Ecologically-responsible disposal of wastes
6.9	Inappropriate and unaffordable forms of utility services						Forms of utility services are appropriate and affordable
6.10	No economic spin-offs						Contribute to pre-conditions for income generation
6.11	Information technology inaccessible and inappropriate to needs						Information technology easily accessible and appropriate to people's needs

ASSESSMENT: UGU SPATIAL DEVELOPMENT FRAMEWORK

Table 7: Performance of elements of structure - Settlement systems

	Negative performance	***Very poor***	***Poor***	***Moderate***	***Good***	***Very good***	**Positive performance**
7.1	Create wasteful and expensive new settlements						As far as possible make use of existing settlements to absorb growth
7.2	Encourage sprawl						Infill new development to improve existing urban performance
7.3	Embedded in inaccessible places						If new settlements are necessary to deliver social and local economic services, locate them in highly accessible places
7.4	Housing-led growth						Ensure new settlements have viable economic bases
7.5	Consider settlements in isolation from movement infrastructure						Use new transport links to reinforce, and increase the range of, new and existing settlements
7.6	Non-aligned elements of public structure						Aligned with hierarchies of movement, facilities, utilities and hard public spaces

ASSESSMENT: UGU SPATIAL DEVELOPMENT FRAMEWORK

Table 8: Performance – Sense of place

	Negative performance	***Very poor***	***Poor***	***Moderate***	***Good***	***Very good***	**Positive performance**
8.1	Ignore landscape character						Work with landscape character
8.2	Encourage standardisation						Promote and protect uniqueness and a sense of place
8.3	Ignore special places						Promote and protect valuable elements of the biophysical and cultural landscape

ASSESSMENT: UMGUNGUNDLOVU SPATIAL DEVELOPMENT FRAMEWORK

Note: The plan scores 'very poor' if, amongst other things, an issue is excluded/no information.

Table 1: Form of the plan

	Negative performance	***Very poor***	***Poor***	***Moderate***	***Good***	***Very good***	**Positive performance**
1.1	Values unclear & blurred						Clear & appropriate values (environmentalism and humanism)
1.2	Weak concept entrenching status quo						Strong concept promoting positive change
1.3	Incoherent spatial logic						Coherent spatial logic
1.4	Inappropriate focus						Clear regional focus
1.5	Focus within regional boundaries only						Part of 'Package of plans' approach
1.6	Inappropriate in terms of contextual constraints						Viable in terms of contextual constraints
1.7	Based on assumptions about access to technology						Based on, and scaled to, lowest common denominator
1.8	Programmatically driven						Focus on structure and space
1.9	Focus on land use						Focus on the elements of public structure
1.10	Comprehensive plan						Minimalist framework
1.11	Hierarchically confused						Hierarchical integration of the different elements of public structure
1.12	Blurred patterns of accessibility						Clear hierarchy of accessibility from very public (exposed) to very private (embedded)
1.13	Weak budgetary direction						Clear budgetary direction
1.14	Inadequate regulatory direction						Clear and appropriate regulatory direction

ASSESSMENT: UMGUNGUNDLOVU SPATIAL DEVELOPMENT FRAMEWORK

Table 2: Performance of elements of structure - Green space

	Negative performance	***Very poor***	***Poor***	***Moderate***	***Good***	***Very good***	**Positive performance**
2.1	Weak green concept						Strong, regenerative green concept
2.2	Ignore ecological principles						Put nature first
2.3	Hierarchical simplification and fragmentation of green space						Promote dominance of a hierarchical system of connected natural habitats
2.4	Promote urban sprawl						Maintain a dynamic balance between primeval, rural and urban landscapes
2.5	Ignore local resources						Maximise natural capital and conserve all resources of local value
2.6	Deteriorating water resources and importation of water						Protect water resources and promote local water capture
2.7	Ignore hazards						Prevent settlement from occurring on hazards (e.g. sea level rise, areas prone to flooding, fault lines, unstable soils and slopes)
2.8	Ignore food security, loss of agricultural land and large-scale mono-cultivation						Protect agricultural land, address food security and greater opportunities for small farmers.

ASSESSMENT: UMGUNGUNDLOVU SPATIAL DEVELOPMENT FRAMEWORK

Table 3: Performance of elements of structure - Movement of all modes

	Negative performance	***Very poor***	***Poor***	***Moderate***	***Good***	***Very good***	**Positive performance**
3.1	Inappropriate use of modes						Different modes play a role to which they are best suited
3.2	Fragmentation of modal system						Integration of all modes of transportation
3.3	Promotion of private motor vehicles						Prioritisation of non-motorised transport and public transportation
3.4	Fragmented network						Create a permeable movement network
3.5	Destination-based system						Create a neutral (grid-like) system to encourage the spread of opportunities
3.6	Blurred and confused hierarchy						Clear and logical hierarchy
3.7	Prioritise mobility						Encourage accessibility
3.8	Reinforce existing demand patterns						Movement network used structurally to encourage change, where necessary
3.9	Expand aggregate movement						Reduce aggregate movement

Table 4: Performance of elements of structure - Public institutions and facilities

	Negative performance	***Very poor***	***Poor***	***Moderate***	***Good***	***Very good***	**Positive performance**
4.1	Inappropriate in form and type			■			Appropriate in form and type to local need
4.2	Inaccessible			■			Located in places of high accessibility
4.3	Skewed distribution		■				Equitably distributed
4.4	Inefficient		■				Efficient: each tranche of investment reduces the largest amount of unserved demand
4.5	Hierarchically non-aligning			■			Hierarchically aligned with movement, infrastructure and hard public space
4.6	Isolated events			■			Clustering of facilities (to encourage multi-purpose trips and to create special places)
4.7	Embedded locations			■			Exposed locations
4.8	Single use	■					Multi-functional
4.9	Little use of available technologies		■				Makes maximum use of available technologies
4.10	Non-viable facilities	■					Ensure viable facilities in terms of range and threshold

Table 5: Performance of elements of structure - Hard public open space

	Negative performance	***Very poor***	***Poor***	***Moderate***	***Good***	***Very good***	**Positive performance**
5.1	Poor quality spaces						Qualitatively-fine spaces
5.2	Embedded and inaccessible location						Accessible location
5.3	Ignore periodicity						Accommodate periodicity

ASSESSMENT: UMGUNGUNDLOVU SPATIAL DEVELOPMENT FRAMEWORK

Table 6: Performance of elements of structure - Utility services

	Negative performance	***Very poor***	***Poor***	***Moderate***	***Good***	***Very good***	**Positive performance**
6.1	Little use of historical investments in infrastructure						Maximum use of historical investments in infrastructure
6.2	Isolated event						Network expansion
6.3	Non-aligned, isolated form of line service						Align different forms of line services so that they reinforce one another
6.4	Non-aligned hierarchies of utility services and facilities						Hierarchy of utility services aligned with hierarchy of facilities
6.5	Excessive use of non-renewable resources						Maximum use of renewable resources in terms of inputs
6.6	Inefficient use of throughputs						Efficient use of throughputs (e.g. land, water, energy, finance)
6.7	No recycling						Maximum recycling of wastes
6.8	Irresponsible disposal of wastes						Ecologically-responsible disposal of wastes
6.9	Inappropriate and unaffordable forms of utility services						Forms of utility services are appropriate and affordable
6.10	No economic spin-offs						Contribute to pre-conditions for income generation
6.11	Information technology inaccessible and inappropriate to needs						Information technology easily accessible and appropriate to people's needs

ASSESSMENT: UMGUNGUNDLOVU SPATIAL DEVELOPMENT FRAMEWORK

Table 7: Performance of elements of structure - Settlement systems

	Negative performance	***Very poor***	***Poor***	***Moderate***	***Good***	***Very good***	**Positive performance**
7.1	Create wasteful and expensive new settlements						As far as possible make use of existing settlements to absorb growth
7.2	Encourage sprawl						Infill new development to improve existing urban performance
7.3	Embedded in inaccessible places						If new settlements are necessary to deliver social and local economic services, locate them in highly accessible places
7.4	Housing-led growth						Ensure new settlements have viable economic bases
7.5	Consider settlements in isolation from movement infrastructure						Use new transport links to reinforce, and increase the range of, new and existing settlements
7.6	Non-aligned elements of public structure						Aligned with hierarchies of movement, facilities, utilities and hard public spaces

Table 8: Performance – Sense of place

	Negative performance	***Very poor***	***Poor***	***Moderate***	***Good***	***Very good***	**Positive performance**
8.1	Ignore landscape character						Work with landscape character
8.2	Encourage standardisation						Promote and protect uniqueness and a sense of place
8.3	Ignore special places						Promote and protect valuable elements of the biophysical and cultural landscape

ASSESSMENT: UMZINYATHI SPATIAL DEVELOPMENT FRAMEWORK

Note: The plan scores 'very poor' if, amongst other things, an issue is excluded/no information.

Table 1: Form of the plan

	Negative performance	***Very poor***	***Poor***	***Moderate***	***Good***	***Very good***	**Positive performance**
1.1	Values unclear & blurred						Clear & appropriate values (environmentalism and humanism)
1.2	Weak concept entrenching status quo						Strong concept promoting positive change
1.3	Incoherent spatial logic						Coherent spatial logic
1.4	Inappropriate focus						Clear regional focus
1.5	Focus within regional boundaries only						Part of 'Package of plans' approach
1.6	Inappropriate in terms of contextual constraints						Viable in terms of contextual constraints
1.7	Based on assumptions about access to technology						Based on, and scaled to, lowest common denominator
1.8	Programmatically driven						Focus on structure and space
1.9	Focus on land use						Focus on the elements of public structure
1.10	Comprehensive plan						Minimalist framework
1.11	Hierarchically confused						Hierarchical integration of the different elements of public structure
1.12	Blurred patterns of accessibility						Clear hierarchy of accessibility from very public (exposed) to very private (embedded)
1.13	Weak budgetary direction						Clear budgetary direction
1.14	Inadequate regulatory direction						Clear and appropriate regulatory direction

ASSESSMENT: UMZINYATHI SPATIAL DEVELOPMENT FRAMEWORK

Table 2: Performance of elements of structure - Green space

	Negative performance	***Very poor***	***Poor***	***Moderate***	***Good***	***Very good***	**Positive performance**
2.1	Weak green concept						Strong, regenerative green concept
2.2	Ignore ecological principles						Put nature first
2.3	Hierarchical simplification and fragmentation of green space						Promote dominance of a hierarchical system of connected natural habitats
2.4	Promote urban sprawl						Maintain a dynamic balance between primeval, rural and urban landscapes
2.5	Ignore local resources						Maximise natural capital and conserve all resources of local value
2.6	Deteriorating water resources and importation of water						Protect water resources and promote local water capture
2.7	Ignore hazards						Prevent settlement from occurring on hazards (e.g. sea level rise, areas prone to flooding, fault lines, unstable soils and slopes)
2.8	Ignore food security, loss of agricultural land and large-scale mono-cultivation						Protect agricultural land, address food security and greater opportunities for small farmers.

ASSESSMENT: UMZINYATHI SPATIAL DEVELOPMENT FRAMEWORK

Table 3: Performance of elements of structure - Movement of all modes

	Negative performance	***Very poor***	***Poor***	***Moderate***	***Good***	***Very good***	**Positive performance**
3.1	Inappropriate use of modes						Different modes play a role to which they are best suited
3.2	Fragmentation of modal system						Integration of all modes of transportation
3.3	Promotion of private motor vehicles						Prioritisation of non-motorised transport and public transportation
3.4	Fragmented network						Create a permeable movement network
3.5	Destination-based system						Create a neutral (grid-like) system to encourage the spread of opportunities
3.6	Blurred and confused hierarchy						Clear and logical hierarchy
3.7	Prioritise mobility						Encourage accessibility
3.8	Reinforce existing demand patterns						Movement network used structurally to encourage change, where necessary
3.9	Expand aggregate movement						Reduce aggregate movement

ASSESSMENT: UMZINYATHI SPATIAL DEVELOPMENT FRAMEWORK

Table 4: Performance of elements of structure - Public institutions and facilities

	Negative performance	***Very poor***	***Poor***	***Moderate***	***Good***	***Very good***	**Positive performance**
4.1	Inappropriate in form and type						Appropriate in form and type to local need
4.2	Inaccessible						Located in places of high accessibility
4.3	Skewed distribution						Equitably distributed
4.4	Inefficient						Efficient: each tranche of investment reduces the largest amount of unserved demand
4.5	Hierarchically non-aligning						Hierarchically aligned with movement, infrastructure and hard public space
4.6	Isolated events						Clustering of facilities (to encourage multi-purpose trips and to create special places)
4.7	Embedded locations						Exposed locations
4.8	Single use						Multi-functional
4.9	Little use of available technologies						Makes maximum use of available technologies
4.10	Non-viable facilities						Ensure viable facilities in terms of range and threshold

ASSESSMENT: UMZINYATHI SPATIAL DEVELOPMENT FRAMEWORK

Table 5: Performance of elements of structure - Hard public open space

	Negative performance	***Very poor***	***Poor***	***Moderate***	***Good***	***Very good***	**Positive performance**
5.1	Poor quality spaces						Qualitatively-fine spaces
5.2	Embedded and inaccessible location						Accessible location
5.3	Ignore periodicity						Accommodate periodicity

ASSESSMENT: UMZINYATHI SPATIAL DEVELOPMENT FRAMEWORK

Table 6: Performance of elements of structure - Utility services

	Negative performance	***Very poor***	***Poor***	***Moderate***	***Good***	***Very good***	**Positive performance**
6.1	Little use of historical investments in infrastructure						Maximum use of historical investments in infrastructure
6.2	Isolated event						Network expansion
6.3	Non-aligned, isolated form of line service						Align different forms of line services so that they reinforce one another
6.4	Non-aligned hierarchies of utility services and facilities						Hierarchy of utility services aligned with hierarchy of facilities
6.5	Excessive use of non-renewable resources						Maximum use of renewable resources in terms of inputs
6.6	Inefficient use of throughputs						Efficient use of throughputs (e.g. land, water, energy, finance)
6.7	No recycling						Maximum recycling of wastes
6.8	Irresponsible disposal of wastes						Ecologically-responsible disposal of wastes
6.9	Inappropriate and unaffordable forms of utility services						Forms of utility services are appropriate and affordable
6.10	No economic spin-offs						Contribute to pre-conditions for income generation
6.11	Information technology inaccessible and inappropriate to needs						Information technology easily accessible and appropriate to people's needs

ASSESSMENT: UMZINYATHI SPATIAL DEVELOPMENT FRAMEWORK

Table 7: Performance of elements of structure - Settlement systems

	Negative performance	***Very poor***	***Poor***	***Moderate***	***Good***	***Very good***	**Positive performance**
7.1	Create wasteful and expensive new settlements						As far as possible make use of existing settlements to absorb growth
7.2	Encourage sprawl						Infill new development to improve existing urban performance
7.3	Embedded in inaccessible places						If new settlements are necessary to deliver social and local economic services, locate them in highly accessible places
7.4	Housing-led growth						Ensure new settlements have viable economic bases
7.5	Consider settlements in isolation from movement infrastructure						Use new transport links to reinforce, and increase the range of, new and existing settlements
7.6	Non-aligned elements of public structure						Aligned with hierarchies of movement, facilities, utilities and hard public spaces

ASSESSMENT: UMZINYATHI SPATIAL DEVELOPMENT FRAMEWORK

Table 8: Performance – Sense of place

	Negative performance	***Very poor***	***Poor***	***Moderate***	***Good***	***Very good***	**Positive performance**
8.1	Ignore landscape character						Work with landscape character
8.2	Encourage standardisation						Promote and protect uniqueness and a sense of place
8.3	Ignore special places						Promote and protect valuable elements of the biophysical and cultural landscape

ASSESSMENT: UTHUKELA SPATIAL DEVELOPMENT FRAMEWORK

Note: The plan scores 'very poor' if, amongst other things, an issue is excluded/no information.

Table 1: Form of the plan

	Negative performance	***Very poor***	***Poor***	***Moderate***	***Good***	***Very good***	**Positive performance**
1.1	Values unclear & blurred						Clear & appropriate values (environmentalism and humanism)
1.2	Weak concept entrenching status quo						Strong concept promoting positive change
1.3	Incoherent spatial logic						Coherent spatial logic
1.4	Inappropriate focus						Clear regional focus
1.5	Focus within regional boundaries only						Part of 'Package of plans' approach
1.6	Inappropriate in terms of contextual constraints						Viable in terms of contextual constraints
1.7	Based on assumptions about access to technology						Based on, and scaled to, lowest common denominator
1.8	Programmatically driven						Focus on structure and space
1.9	Focus on land use						Focus on the elements of public structure
1.10	Comprehensive plan						Minimalist framework
1.11	Hierarchically confused						Hierarchical integration of the different elements of public structure
1.12	Blurred patterns of accessibility						Clear hierarchy of accessibility from very public (exposed) to very private (embedded)
1.13	Weak budgetary direction						Clear budgetary direction
1.14	Inadequate regulatory direction						Clear and appropriate regulatory direction

ASSESSMENT: UTHUKELA SPATIAL DEVELOPMENT FRAMEWORK

Table 2: Performance of elements of structure - Green space

	Negative performance	***Very poor***	***Poor***	***Moderate***	***Good***	***Very good***	**Positive performance**
2.1	Weak green concept						Strong, regenerative green concept
2.2	Ignore ecological principles						Put nature first
2.3	Hierarchical simplification and fragmentation of green space						Promote dominance of a hierarchical system of connected natural habitats
2.4	Promote urban sprawl						Maintain a dynamic balance between primeval, rural and urban landscapes
2.5	Ignore local resources						Maximise natural capital and conserve all resources of local value
2.6	Deteriorating water resources and importation of water						Protect water resources and promote local water capture
2.7	Ignore hazards						Prevent settlement from occurring on hazards (e.g. sea level rise, areas prone to flooding, fault lines, unstable soils and slopes)
2.8	Ignore food security, loss of agricultural land and large-scale mono-cultivation						Protect agricultural land, address food security and greater opportunities for small farmers.

ASSESSMENT: UTHUKELA SPATIAL DEVELOPMENT FRAMEWORK

Table 3: Performance of elements of structure - Movement of all modes

	Negative performance	***Very poor***	***Poor***	***Moderate***	***Good***	***Very good***	**Positive performance**
3.1	Inappropriate use of modes						Different modes play a role to which they are best suited
3.2	Fragmentation of modal system						Integration of all modes of transportation
3.3	Promotion of private motor vehicles						Prioritisation of non-motorised transport and public transportation
3.4	Fragmented network						Create a permeable movement network
3.5	Destination-based system						Create a neutral (grid-like) system to encourage the spread of opportunities
3.6	Blurred and confused hierarchy						Clear and logical hierarchy
3.7	Prioritise mobility						Encourage accessibility
3.8	Reinforce existing demand patterns						Movement network used structurally to encourage change, where necessary
3.9	Expand aggregate movement						Reduce aggregate movement

ASSESSMENT: UTHUKELA SPATIAL DEVELOPMENT FRAMEWORK

Table 4: Performance of elements of structure - Public institutions and facilities

	Negative performance	***Very poor***	***Poor***	***Moderate***	***Good***	***Very good***	**Positive performance**
4.1	Inappropriate in form and type						Appropriate in form and type to local need
4.2	Inaccessible						Located in places of high accessibility
4.3	Skewed distribution						Equitably distributed
4.4	Inefficient						Efficient: each tranche of investment reduces the largest amount of unserved demand
4.5	Hierarchically non-aligning						Hierarchically aligned with movement, infrastructure and hard public space
4.6	Isolated events						Clustering of facilities (to encourage multi-purpose trips and to create special places)
4.7	Embedded locations						Exposed locations
4.8	Single use						Multi-functional
4.9	Little use of available technologies						Makes maximum use of available technologies
4.10	Non-viable facilities						Ensure viable facilities in terms of range and threshold

Table 5: Performance of elements of structure - Hard public open space

	Negative performance	***Very poor***	***Poor***	***Moderate***	***Good***	***Very good***	**Positive performance**
5.1	Poor quality spaces						Qualitatively-fine spaces
5.2	Embedded and inaccessible location						Accessible location
5.3	Ignore periodicity						Accommodate periodicity

ASSESSMENT: UTHUKELA SPATIAL DEVELOPMENT FRAMEWORK

Table 6: Performance of elements of structure - Utility services

	Negative performance	***Very poor***	***Poor***	***Moderate***	***Good***	***Very good***	**Positive performance**
6.1	Little use of historical investments in infrastructure						Maximum use of historical investments in infrastructure
6.2	Isolated event						Network expansion
6.3	Non-aligned, isolated form of line service						Align different forms of line services so that they reinforce one another
6.4	Non-aligned hierarchies of utility services and facilities						Hierarchy of utility services aligned with hierarchy of facilities
6.5	Excessive use of non-renewable resources						Maximum use of renewable resources in terms of inputs
6.6	Inefficient use of throughputs						Efficient use of throughputs (e.g. land, water, energy, finance)
6.7	No recycling						Maximum recycling of wastes
6.8	Irresponsible disposal of wastes						Ecologically-responsible disposal of wastes
6.9	Inappropriate and unaffordable forms of utility services						Forms of utility services are appropriate and affordable
6.10	No economic spin-offs						Contribute to pre-conditions for income generation
6.11	Information technology inaccessible and inappropriate to needs						Information technology easily accessible and appropriate to people's needs

ASSESSMENT: UTHUKELA SPATIAL DEVELOPMENT FRAMEWORK

Table 7: Performance of elements of structure - Settlement systems

	Negative performance	***Very poor***	***Poor***	***Moderate***	***Good***	***Very good***	**Positive performance**
7.1	Create wasteful and expensive new settlements						As far as possible make use of existing settlements to absorb growth
7.2	Encourage sprawl						Infill new development to improve existing urban performance
7.3	Embedded in inaccessible places						If new settlements are necessary to deliver social and local economic services, locate them in highly accessible places
7.4	Housing-led growth						Ensure new settlements have viable economic bases
7.5	Consider settlements in isolation from movement infrastructure						Use new transport links to reinforce, and increase the range of, new and existing settlements
7.6	Non-aligned elements of public structure						Aligned with hierarchies of movement, facilities, utilities and hard public spaces

ASSESSMENT: UTHUKELA SPATIAL DEVELOPMENT FRAMEWORK

Table 8: Performance – Sense of place

	Negative performance	***Very poor***	***Poor***	***Moderate***	***Good***	***Very good***	**Positive performance**
8.1	Ignore landscape character						Work with landscape character
8.2	Encourage standardisation						Promote and protect uniqueness and a sense of place
8.3	Ignore special places						Promote and protect valuable elements of the biophysical and cultural landscape

ASSESSMENT: ZULULAND SPATIAL DEVELOPMENT FRAMEWORK

Note: The plan scores 'very poor' if, amongst other things, an issue is excluded/no information.

Table 1: Form of the plan

	Negative performance	***Very poor***	***Poor***	***Moderate***	***Good***	***Very good***	**Positive performance**
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1.2	Weak concept entrenching status quo		■				Strong concept promoting positive change
1.3	Incoherent spatial logic		■				Coherent spatial logic
1.4	Inappropriate focus		■				Clear regional focus
1.5	Focus within regional boundaries only			■			Part of 'Package of plans' approach
1.6	Inappropriate in terms of contextual constraints		■				Viable in terms of contextual constraints
1.7	Based on assumptions about access to technology		■				Based on, and scaled to, lowest common denominator
1.8	Programmatically driven		■				Focus on structure and space
1.9	Focus on land use			■			Focus on the elements of public structure
1.10	Comprehensive plan		■				Minimalist framework
1.11	Hierarchically confused			■			Hierarchical integration of the different elements of public structure
1.12	Blurred patterns of accessibility		■				Clear hierarchy of accessibility from very public (exposed) to very private (embedded)
1.13	Weak budgetary direction		■				Clear budgetary direction
1.14	Inadequate regulatory direction			■			Clear and appropriate regulatory direction

ASSESSMENT: ZULULAND SPATIAL DEVELOPMENT FRAMEWORK

Table 2: Performance of elements of structure - Green space

	Negative performance	***Very poor***	***Poor***	***Moderate***	***Good***	***Very good***	**Positive performance**
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ASSESSMENT: ZULULAND SPATIAL DEVELOPMENT FRAMEWORK

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	Negative performance	***Very poor***	***Poor***	***Moderate***	***Good***	***Very good***	**Positive performance**
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3.9	Expand aggregate movement						Reduce aggregate movement

ASSESSMENT: ZULULAND SPATIAL DEVELOPMENT FRAMEWORK

Table 4: Performance of elements of structure - Public institutions and facilities

	Negative performance	***Very poor***	***Poor***	***Moderate***	***Good***	***Very good***	**Positive performance**
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Table 5: Performance of elements of structure - Hard public open space

	Negative performance	***Very poor***	***Poor***	***Moderate***	***Good***	***Very good***	**Positive performance**
5.1	Poor quality spaces						Qualitatively-fine spaces
5.2	Embedded and inaccessible location						Accessible location
5.3	Ignore periodicity						Accommodate periodicity

ASSESSMENT: ZULULAND SPATIAL DEVELOPMENT FRAMEWORK

Table 6: Performance of elements of structure - Utility services

	Negative performance	***Very poor***	***Poor***	***Moderate***	***Good***	***Very good***	**Positive performance**
6.1	Little use of historical investments in infrastructure			■			Maximum use of historical investments in infrastructure
6.2	Isolated event		■				Network expansion
6.3	Non-aligned, isolated form of line service		■				Align different forms of line services so that they reinforce one another
6.4	Non-aligned hierarchies of utility services and facilities			■			Hierarchy of utility services aligned with hierarchy of facilities
6.5	Excessive use of non-renewable resources		■				Maximum use of renewable resources in terms of inputs
6.6	Inefficient use of throughputs		■				Efficient use of throughputs (e.g. land, water, energy, finance)
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6.9	Inappropriate and unaffordable forms of utility services		■				Forms of utility services are appropriate and affordable
6.10	No economic spin-offs	■					Contribute to pre-conditions for income generation
6.11	Information technology inaccessible and inappropriate to needs			■			Information technology easily accessible and appropriate to people's needs

ASSESSMENT: ZULULAND SPATIAL DEVELOPMENT FRAMEWORK

Table 7: Performance of elements of structure - Settlement systems

	Negative performance	***Very poor***	***Poor***	***Moderate***	***Good***	***Very good***	**Positive performance**
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7.5	Consider settlements in isolation from movement infrastructure						Use new transport links to reinforce, and increase the range of, new and existing settlements
7.6	Non-aligned elements of public structure						Aligned with hierarchies of movement, facilities, utilities and hard public spaces

ASSESSMENT: ZULULAND SPATIAL DEVELOPMENT FRAMEWORK

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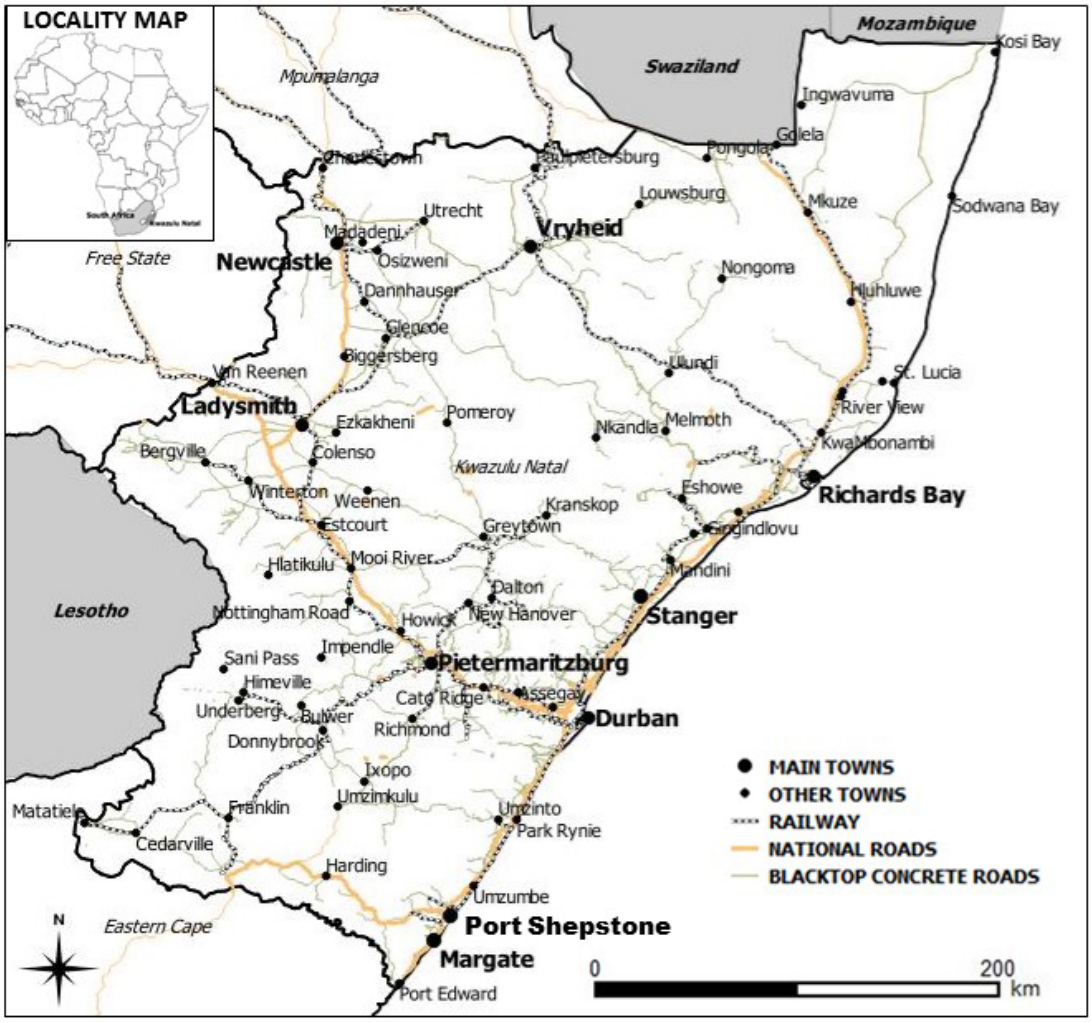
8.2	Encourage standardisation						Promote and protect uniqueness and a sense of place
8.3	Ignore special places						Promote and protect valuable elements of the biophysical and cultural landscape

APPENDIX 2

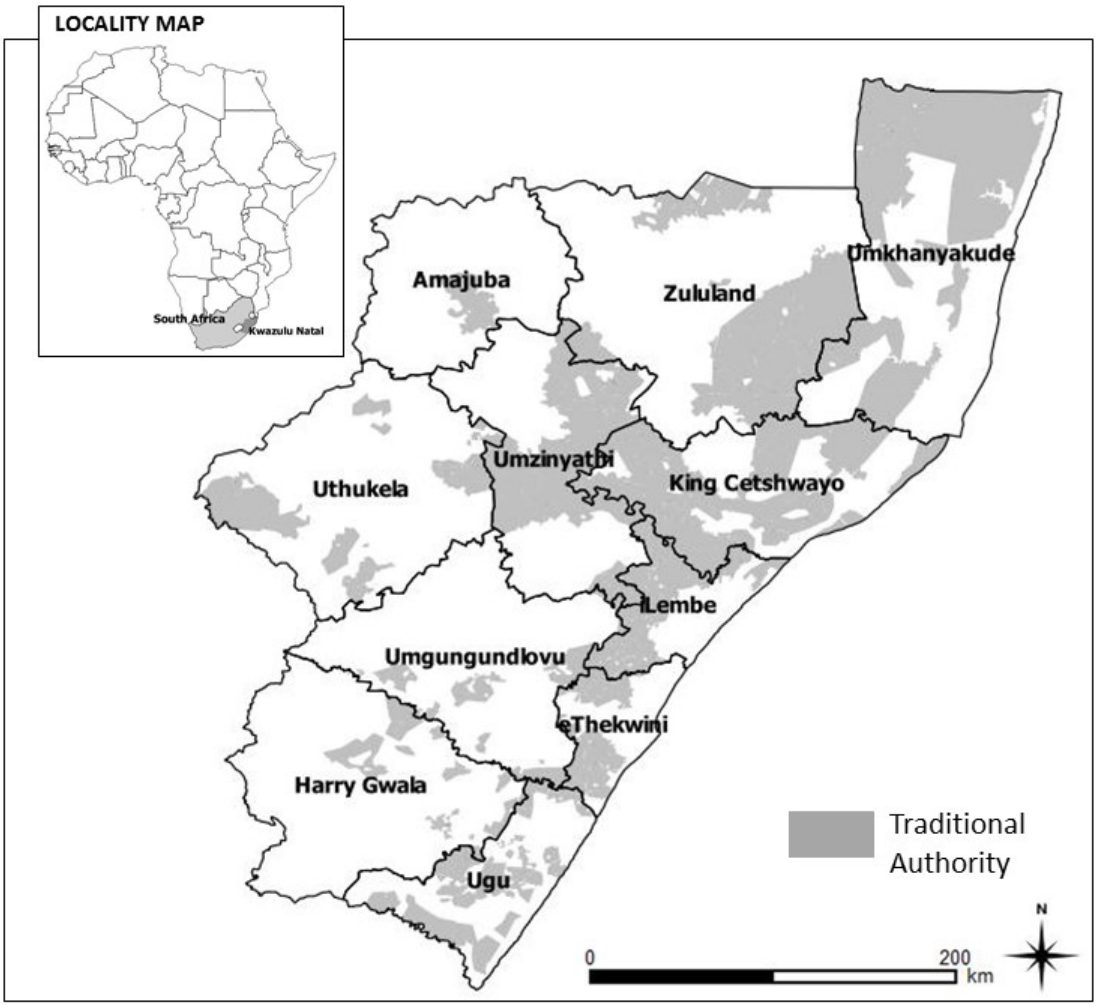
MAPS AND DIAGRAMS

Figure A2.1: A map of the province of KwaZulu-Natal, South Africa.



Note: A detailed map of KwaZulu-Natal is available online (KZN COGTA 2017).

Figure A2.2: District and metropolitan municipalities of KwaZulu-Natal with Traditional Authorities.



Data source for municipalities: Municipal Demarcation Board (2019).

Figure A2.3a: Schematic diagram of the physiography of KwaZulu and Natal, 1978 boundaries (Thorrington-Smith, Rosenberg and McCrystal 1978: 8).

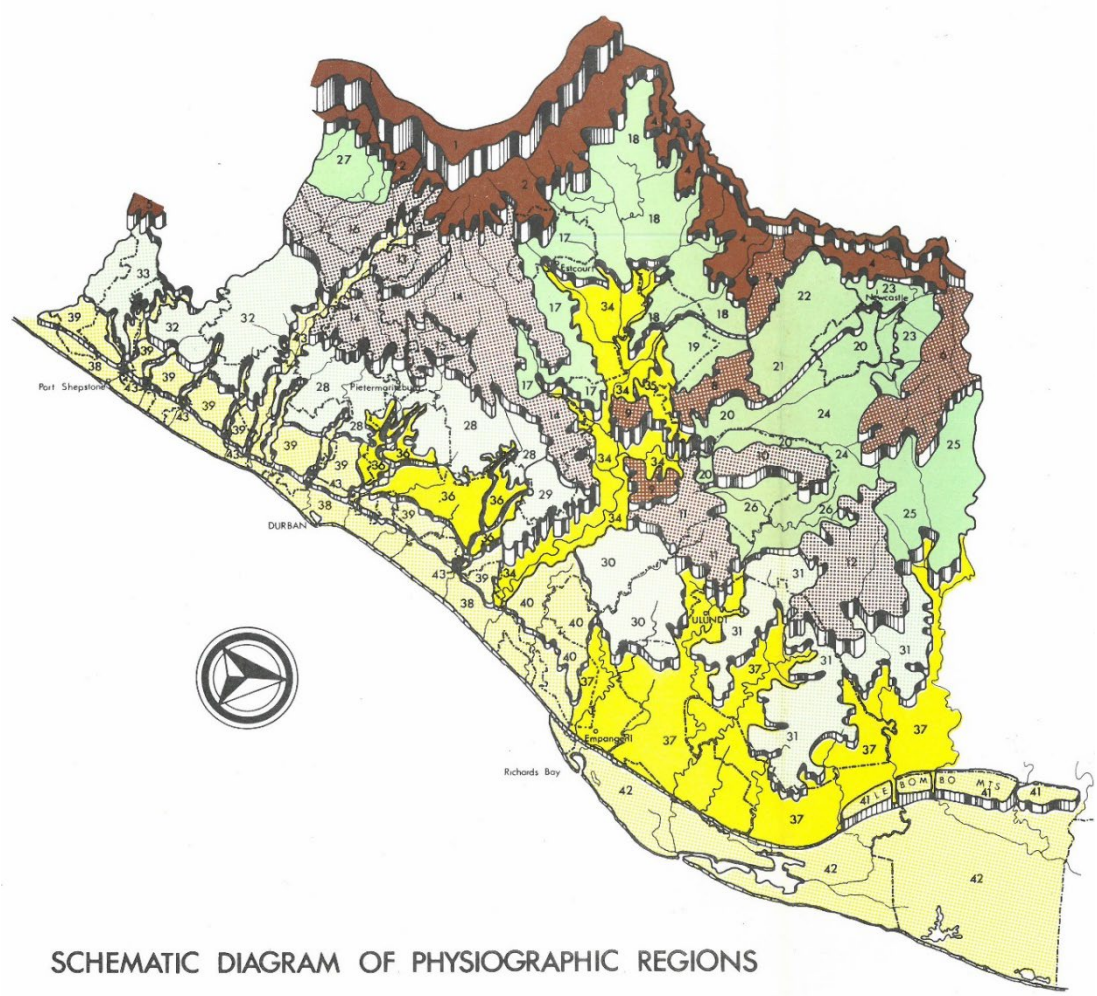


Figure A2.3b: Legend for schematic diagram of the physiography of KwaZulu and Natal, 1978 boundaries (Thorrington-Smith, Rosenberg and McCrystal 1978: 8).

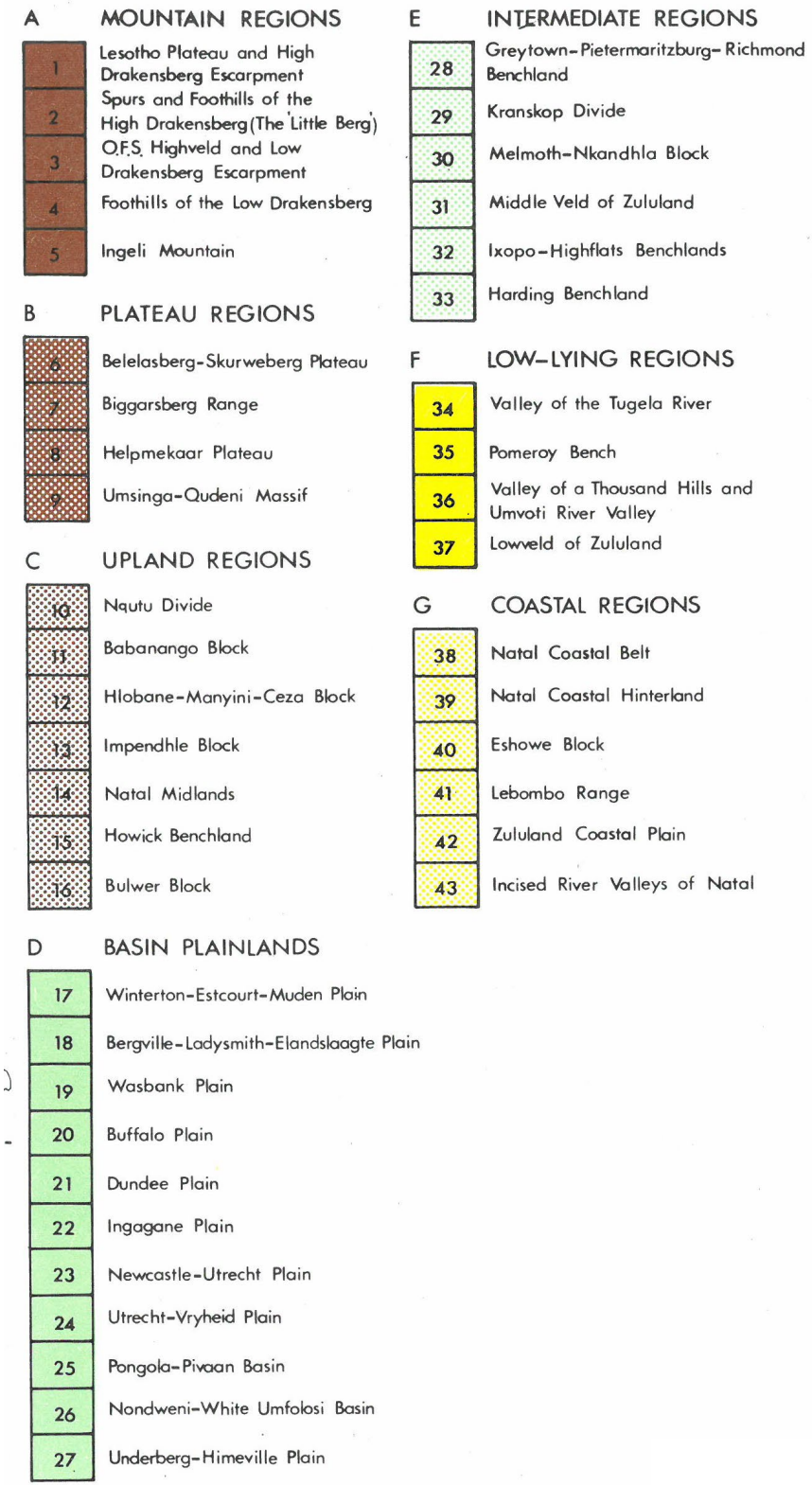


Figure A2.4: KwaZulu-Natal Bioclimatic Groups (Department of Agricultural Development 1992).

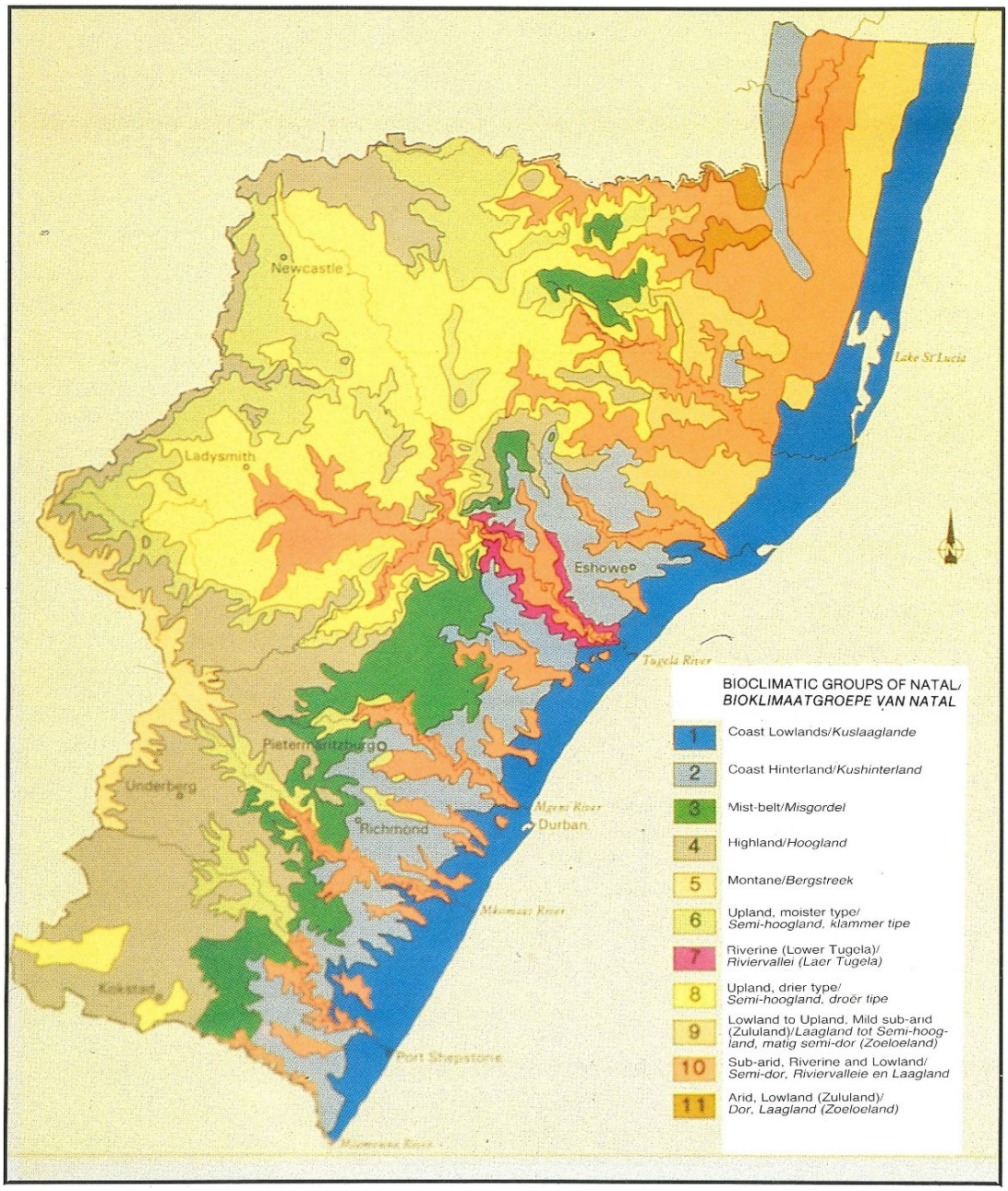


Figure A2.5: The Natal Railway system (Heydenrych and du Plooy 1994: 54).

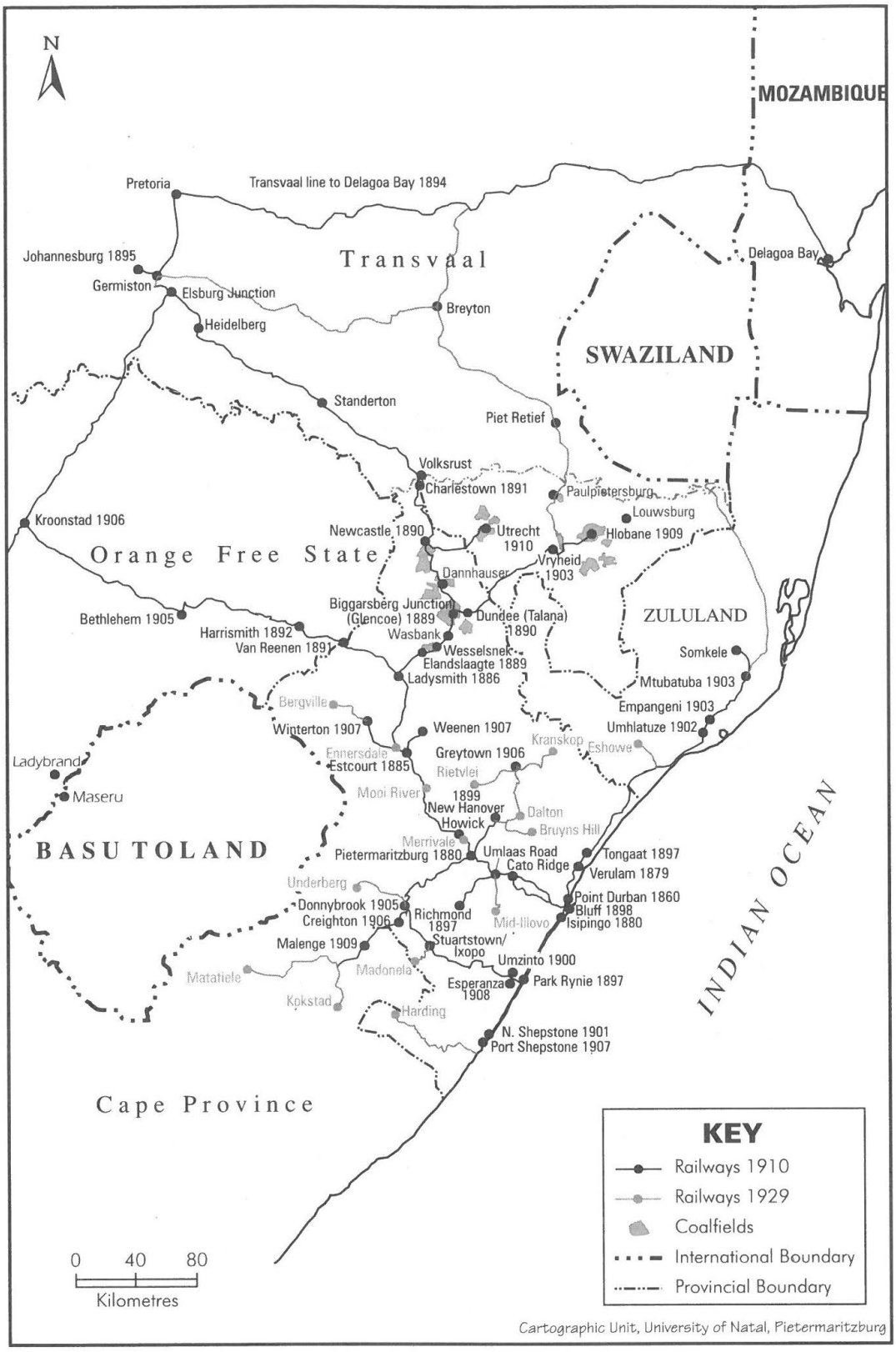
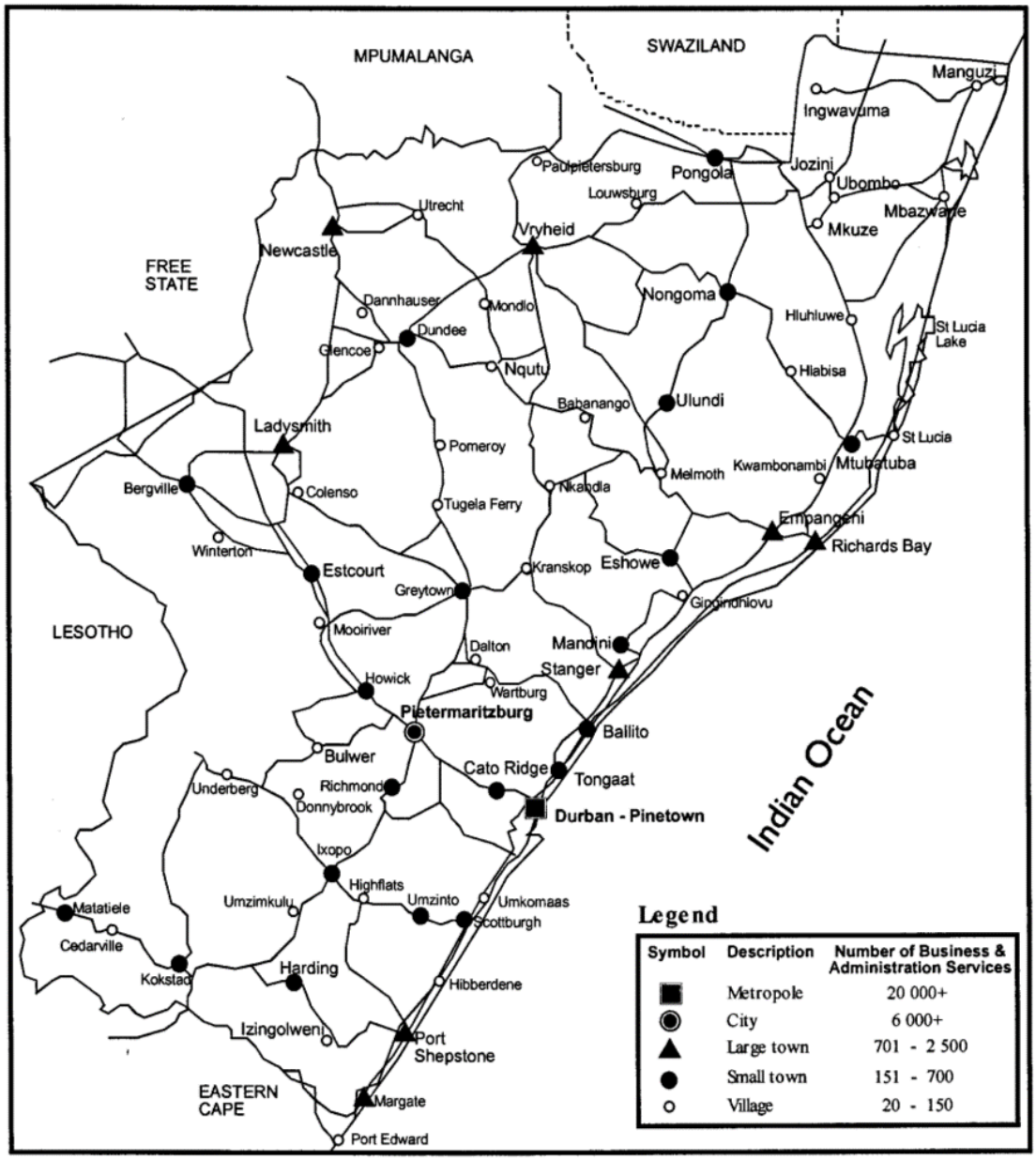


Figure A2.6: Central places, KwaZulu-Natal, 2000 (Warrington 2001: 68).



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