

**Land use changes within the uMngeni and Mpofana
municipalities: An assessment of Environmental Impact
Assessments 1999 - 2010**

by

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Abstract

Land is a non-renewable and finite resource which comprises a variety of ecosystems that support biological diversity and provide food, shelter and raw materials to society. With a multitude of land uses competing for this precious resource, the land is becoming fragmented, altered and transformed. Land transformation has been acknowledged as a key contributor to the degradation of the environment and has serious implications for poverty, food security and biodiversity.

This research focuses on land use changes within the uMngeni and Mpofana municipalities in KwaZulu-Natal. The main objectives were to critically review Environmental Impact Assessment (EIA) decisions and document those EIAs received and finalised over the period 1999 – 2010, spatially define the location of decided EIAs, determine the types of EIA decisions issued, characterise the type and extent of land uses, describe patterns of land use change and identify the key factors responsible for changes in land use.

During the research period a total of 337 EIA applications were received and 332 EIA applications were completed in the uMngeni Municipality and 182 EIA applications were received and 178 completed in the Mpofana Municipality. The types of EIA decisions issued consist of Records of Decisions, Environmental Authorisations, Exemptions, Withdrawals and Commencements.

The key classes of land use changes that have occurred in uMngeni Municipality are Agriculture to Residential, whilst within the Mpofana Municipality the predominant land use change occurred within the Agricultural land use category. For both municipalities the Agriculture to Residential land use category experienced the greatest extent in land use change. In authorising EIA applications, the predominant key decision factors were based on the comments from Ezemvelo KwaZulu-Natal Wildlife and Amafa aKwaZulu-Natali. In refusing

EIA decisions the findings of various specialist studies, incompatible land uses and land use planning initiatives were the predominant key decision factors.

The conclusions are that agricultural land is being transformed for use as non-agricultural activities specifically that of residential use. The recommendations include the need for accurate record keeping of data and information pertaining to EIAs and the integration of spatial planning tools and initiatives including Geographical Information Systems in the review of EIAs to improve decision making.

Declaration

I, Reka Bhikraj-Kallicharan declare that:

- (i) The research reported in this dissertation, except where otherwise indicated, is my original work.
- (ii) This dissertation has not been submitted for any degree or examination at any other University.
- (iii) This dissertation does not contain other persons' data, pictures, graphs or other information, unless specifically acknowledged as being sourced from other researchers.
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List of Acronyms

DAEA&RD	Department of Agriculture, Environmental Affairs and Rural Development
DEAT	Department of Environmental Affairs and Tourism
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
ECA	Environment Conservation Act, Act No. 43 of 1989
EIA	Environmental Impact Assessment
GIS	Geographic Information System
NEMA	National Environmental Management Act, Act No 107 of 1998
NEPA	National Environmental Policy Act of 1969
PC2	Provincial Priority Corridor
PSEDS	Provincial Spatial Economic Development Strategy
RoD	Record of Decision
SoER	State of the Environment Report
UNEP	United Nations Environmental Programme
UNCED	United Nations Conference on the Environment and Development
WCD	World Commission on Environment and Development

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CHAPTER 1: INTRODUCTION

1.1. Introduction

Land is a limited and non-renewable natural resource which provides minerals, fresh water, biodiversity, food and a livelihood and working space for mankind (Friedheim and Kassam, 1994). Shipton and Goheen (1992) suggest that in Africa, land is used not just to produce food for survival or shelter, but also to represent wealth and a means to gain power and control over others. In addition, land comprises a diversity of ecosystems that support a multitude of species - some rare, threatened or endangered species and, as such, land has an intrinsic value. According to Fischer et al. (2006) approximately 12% of the earth's land is located in protected areas with less than half of this area being managed primarily for biodiversity conservation. In contrast, approximately 40% of the earth's surface is covered by croplands and pastures for the production of food (Foley, et al. 2005).

Wessels et al. (2003) and Detsis (2010) are of the view that changes in land use (specifically agricultural abandonment or intensification and urbanisation) will have adverse effects on the goods and services that ecosystems provide to humans. Wakelin (2001) reported that the greatest threat to the future survival of the critically endangered Blue Swallow (*Hirundo atrocaerulea*) is the loss and fragmentation of suitable habitat (viz. primary untransformed grasslands) which are being utilised for pastures, seed potatoes, sugar cane and commercial timber. Narayanan and Hanjagi (2009) confirmed that the loss of forests and lakes to agriculture and urban growth is likely to cause permanent and irreversible changes to the ecology of the area, while Foley, et al. (2005) concluded that the impacts of land uses have resulted in a modification of the ecosystems, changing atmospheric conditions and a decline in biodiversity as a result of the alteration, fragmentation and loss of habitats for species.

Land can be regarded as a resource base and Haughton et al. (2009) recognised the potential conflicts between land uses for food security, a living space that provides water availability and energy security and biodiversity conservation. Rathman et al. (2010) are supportive of the concept of competing land uses and draw specific attention to the dilemma of using agricultural land for food production or energy production (biofuels). With a multitude of competing uses for land and an ever increasing population there is a growing competition for the resource.

In the World Bank's policy paper on Poverty and Hunger, food security was defined as *"access by all people at all times to enough food for an active and healthy life"* (Prah, 1988, page 14). Cassman and Harwood (1995) observed that food security on a global level is dependent on the availability of high potential agricultural systems (land with good soil and adequate water resources). In these systems, four crops (viz. wheat, rice, corn and potatoes) almost entirely contribute to the world's total food production, and that to produce more food globally it was preferable to rather increase crop yields, develop new food sources or to cultivate more land (Miller, 2009). In consequence, agricultural areas are under pressure for conversion to non-agricultural use and as areas that were available to grow and provide food for human society declined it would be essential to observe the factors influencing land use changes because the state or transformation of land had significant implications for food security (Wolman and Fournier, 1987).

The United Nations Environmental Programme (UNEP, 2003) recognises that rapid population growth, rising levels of poverty and inappropriate development practices are the main factors to influence transformation of the natural environment in Africa, while drought, disease, unfavourable terms of international trade and debt burden are competing factors. All these factors place enormous pressure on the land and threaten the habitats ability to support biodiversity.

According to the State of the Environment Report (SoER) from the Department of Environmental Affairs and Tourism (2010), close to 18% of South Africa's natural cover has been transformed, predominantly by cultivation (11%), degradation of the natural cover (5%), urban land use (2%), and forestry (1%). In support of these figures, the SoER (DEAT, 2010) records that food production (in particular maize) per person has decreased since 1975, the availability of arable land has declined in the 1990s due to an expansion of settlements, and as of 1996 the population living in urban areas (cities) has increased from 53% to 58%, primarily due to urban sprawl and informal settlement areas.

The South African Department of Agriculture (Republic of South Africa, 2007) in its National Policy on the preservation of agricultural land indicates that approximately 55% of the country's land mass has the potential for agricultural production, while just over 3% of this land qualifies as high potential land. The province of KwaZulu-Natal contains approximately 42% of this land and is regarded as having the highest agricultural potential in South Africa with this being attributed to the high rainfall experienced in the eastern part of the country and the diversity of climatic conditions.

It was reported by AgriSA in The Witness paper (06 March 2009) that South Africa currently faces a challenge of restoring high potential agricultural land - specifically within the land reform process to contribute to job creation and improve food supply. In support, Greenberg (The Mercury, 30 March 2009) commented that whilst South Africa has been nationally food secure for decades by focusing on large scale, capital intensive commercial production systems, it had not prevented millions from going hungry daily and identified local markets and land reform projects to be suitable vehicles to reduce this disparity.

A further consequence of land transformation is that land of important conservation value that provides habitat for rare, threatened species is becoming fragmented, and this has serious implications from a biodiversity perspective

(Coverdale and Longmore, pers comms., 18 August 2009). In support of this observation Gilpin et al. (1992) and Orians and Lack (1992) confirmed that the loss of natural habitat has been as a consequence of agricultural transformation. Wilson (2000) and Primack (2000) further recognised that a major impact of transforming land to agricultural and other uses is that the natural habitat for species is reduced, fragmented or destroyed, thereby threatening the survival of many species, reducing biological diversity and causing irreversible damage to biogeochemical processes.

Similar views were expressed as early as 1979, where the loss of agricultural land to non-agricultural uses was raised as a concern and acknowledged as an irreversible change to the land (Crossan, 1979). In 2001, Singh and Mohan recorded that the transformation of agricultural land to non-agricultural use deprived the land from being productive in terms of generating food and placed an additional pressure on the remaining agricultural land. More recently, following a review of case studies in the American agrarian landscape, Gragson (2008) concluded that once land has been altered it can never be restored to its exact previous conditions.

Therefore it can be acknowledged that the transformation of land from natural areas (veld or grassland) to agriculture may serve to increase food production and improve food security. However, on the other hand the transformation of land used for agricultural purposes to urban uses will decrease food production and food security. Furthermore it appears that the land used for agricultural use may also be of high biodiversity value. Hence the transformation of this land may result in the loss of biodiversity.

Being able to quantify land use changes and the permissible extent of transformation is critical in ensuring that the environment is not being cumulatively stressed beyond an unsustainable level. In balancing environmental, economic and social considerations to achieve sustainable

development lies the tool of Environmental Impact Assessment (EIA) which is used to facilitate integrated decision making. The EIA is a process where the impacts on the land can be predicated, measured, and evaluated and Treweek (1996) identified Geographical Information Systems (GIS) as a potentially valuable tool to assess alternatives (i.e. sites, routes or designs) in EIAs.

EIA and GIS can be seen as effective spatial tools in predicting the potential consequences of activities that can result in adverse environmental impacts. According to Neke and Du Plessis (2004), the ability to predict transformation and probable future land uses will be useful in decision making so as to limit damaging impacts on biodiversity. Foley et al. (2005, page 572) recognised that there is a key challenge to assess and manage inherent trade-offs in meeting *“immediate human needs and maintaining capacity of ecosystems to provide goods and services in the future”* and recommended that the skills of a wide array of decision makers and policy actions will be required to better manage the landscape. This is in keeping with the findings of Schneeberger et al. (2007) who indicated that land use changes had implications for present and future decision makers and policy and planning sectors and Veldkamp and Lambin (2001) who reiterated that the complexity of land use systems requires a multidisciplinary analysis and that spatial data should be incorporated into decision making to inform policy formulation and drive land use changes.

Various perceptions have emerged amongst Environmental Assessment Practitioners (EAP's), government officials, policy makers, planners and the general public in response to applications that have been authorised through the EIA process. Some are of the view that a surge in development will stimulate the economy and create jobs, while others believe that development will lead to the fragmentation of important habitats and that the use of high potential agricultural land for development will threaten the ability of the nation to produce food for its people (personal observation). At a local level, and in particular in areas dependant on agricultural and natural resources for social and economic

development, the transformation of land and the degradation of ecosystems and the services that they supply can have far reaching environmental, social and economic impacts.

In acknowledging that land transformation is a key contributor to the degradation of the environment there is a dire need to ascertain the various types of land use changes that are occurring over time and to take cognisance of the extent of development pressures that the environment is experiencing. By examining Environmental Impact Assessments (EIAs), one is able to observe the factors influencing land transformation and assist decision makers to formulate policies and plans to achieve sustainable development.

1.2. Aim and Objectives

The aim of the research was to document the EIAs that were approved in the uMngeni and Mpofana local municipalities over the period 1999 – 2010*, with a particular focus on observing the changes that have occurred in land uses. The research had the following main objectives:

1. To quantify the number of EIA applications received and finalised, spatially define the location of decided EIAs, and to determine the types of EIA decisions made within the uMngeni and Mpofana municipalities.
2. To characterise the type and extent of land use change that has occurred during the period 1999 - 2010 in the uMngeni and Mpofana municipalities and to determine, describe and discuss patterns of land use change.
3. To identify the key factors responsible for the changes in land use by reviewing the EIA decisions and critically reviewing the resultant land use changes.

* 01 January 1999 to 31 March 2010.

The rationale for this research was to create a record of the number of EIAs received, decided upon, the types of decisions made, to illustrate where changes in land uses have occurred (provide a spatial reference) and to establish what those land use changes and their extents are as a consequence of the EIA decision making process. The consideration of alternatives, public participation and cumulative impacts are key elements in the EIA process and, in examining the key decision factors of EIA decisions and any possible trends in land use changes, the intention of the research was to take cognisance of a decade of decision making and its impact upon the environment.

1.3. Outline of Thesis

Chapter one outlines the importance of land and the implication of land use transformation, particularly agricultural to non-agricultural uses. The chapter sets out the aim and objectives of the research. Chapter two provides a review of literature that is relevant to the research with a focus on demonstrating the relevance of EIAs in decision making, South Africa's legislative basis for conducting EIAs, the content of an EIA decision (Record of Decision or Environmental Authorisation) and the rationale for using EIA decisions to consider land use transformation. Chapter three describes the research area and the methods used to meet the aim of the research. The results of the research are presented in Chapter four. Chapter five includes a discussion of the findings with regards to the number, locality and types of EIAs authorised, the types and extent of land use transformation that have occurred and the factors responsible. Chapter six concludes and synthesises the research, in which the aim and objectives of the research will be revised and each objective discussed. Recommendations to the provincial decision making authority are made to improve EIA decision making by incorporating planning guidelines and the use of Geographic Information Systems (GIS) into the review process.

CHAPTER 2: LITERATURE REVIEW

2.1. Introduction

Chapter two provides a review of the literature that is relevant to the research with a focus on demonstrating the necessity of Environmental Impact Assessment (EIA) in decision making, the international perspective of EIA and South Africa's legislative basis for conducting EIAs. It outlines the content and structure of an Environmental Authorisation (EA) with the intention of illustrating the elements of an EIA decision and the rationale for using EIA decisions to consider land use transformation due to its effectiveness or usefulness in making decisions. The chapter does not reflect the elements of an EIA process or the use of EIA in international countries as these are considered beyond the scope of the research.

2.2. Introduction to Environmental Impact Assessment

The International Association of Impact Assessment (1999, page 1) defines an Environmental Impact Assessment (EIA) as:

“the process of identifying, predicting, evaluating and mitigating the biophysical, social, and other relevant effects of development proposals prior to major decisions being taken and commitments made”

or essentially as the process of identifying the future consequences of a current or proposed action. According to Glasson et al. (1994) the first formal requirement for an EIA can be traced to the United States where in 1969 the National Environmental Policy Act (NEPA) required the possible environmental impacts of a proposal to be considered prior to a decision being taken on whether or not to proceed. A significant paradigm shift had occurred during this decade with the realisation that environmental consequences were as a result of human actions and that resources were no longer finite or unlimited in their supply. California was the first American state to implement the NEPA in 1970, and it was as early as this that it was recognised that the problems associated

with burgeoning development and the pollution and destruction of the natural environment would be a universal threat (Wood, 1995).

2.3. Legislative background

With a growing concern for the environment and its management manifesting itself worldwide, the United Nations Conference on the Human Environment was hailed as an instrumental event in Stockholm, June 1972. According to Kidd (2008) it produced a Declaration of twenty-six (26) principles, an Action Plan of one hundred and nine (109) recommendations, led to the formulation of the United Nations Environment Programme (UNEP) and, most notably, introduced a co-ordinated approach to international environmental issues. Yet armed with these instruments, the industrial disaster at Bhopal in December 1984, the nuclear accident at Chernobyl (April 1986), the oil spill and grounding of the Exxon Valdez (March 1989), the first scientific documenting of the hole in the ozone layer (in 1985), and rising concern regarding the loss of biodiversity were observed during this decade (Aucamp, 2009).

The World Commission on Environment and Development (WCED) was tasked with the responsibility of examining environment and development issues in 1983 and reported in *Our Common Future* on the concept of sustainable development and the challenges of population and human resources, food security, loss of species, human settlements, energy choices and industry (Bruntland, 1987). The report defined sustainable development as “*development that meets the needs of the present without compromising the ability of future generations to meet their own needs*” and Gro Harlem Bruntland (1987, page 41) expressed that the concept is based on the notion of ‘needs’, with particular reference to the essential needs of the world's poor and the idea of ‘limitations’ which can be imposed by the state of technology and social organisation on the environment's ability to meet present and future needs. The report emphasized the importance of countries adopting Environmental Impact Assessments to identify significant impacts on the environment and set the scene for the United Nations Conference

on the Environment and Development (UNCED) in Rio de Janeiro in June 1992 which is commonly referred to as 'The Earth Summit'.

The discussions at the two week Earth Summit conference revolved around rethinking economic development to include an integration of social, environmental and economic factors and to address issues of pollution, destruction of natural resources and poverty. The conference culminated in *the Rio Declaration* of twenty-seven principles following on from the Stockholm principles including *Agenda 21*, *the Statement of Forest Principles* and opened two treaties for signature namely the *United Nations Framework Convention on Climate Change* and the *United Nations Convention on Biological Diversity*. Principle 17 of the Rio Declaration on Environment and Development states that “*environmental impact assessment, as a national instrument, shall be undertaken for proposed activities that are likely to have a significant adverse impact on the environment and are subject to a decision of a competent national authority*” (Kidd, 2008, page 195). Gilpin (1995) specified that Principle 17 endorsed the worldwide use of EIA as a tool in assessing environmental impacts.

In South Africa, Glazewski (2005) documented that the practice of EIA and the consideration of environmental concerns in development decisions came to prominence with the South African Department of Environmental Affairs and Tourism publishing a series of guideline documents referred to as the *Integrated Environmental Management Guideline Series* in 1992 and later redefining them in 1998. Kidd and Retief (2009) stated that the concept of EIA initially emerged as the focus shifted from the debate around ‘environment’ and ‘conservation’ to ‘integration’ and ‘sustainable development’ followed by the need to regulate EIA and the concept of integrated environmental management.

The use of EIA procedures as a tool to address the challenge of unsustainable development was further recognised at the World Summit on Sustainable Development (WSSD) in Johannesburg 2002. Its endorsement was documented

in the Plan of Implementation of the World Summit on Sustainable Development in Chapter 3 on Patterns of consumption and production, in Chapter 4 on Protecting the natural resource base, in Chapter 8 on Sustainable development for Africa, and, in Chapter 10 on the Means of implementation (United Nations, 2002).

2.4. The legislative framework for conducting EIAs in South Africa

2.4.1. Environment Conservation Act, Act No. 73 of 1989

The purpose of the Environment Conservation Act, Act No 73 of 1989 (Republic of South Africa, 1989) (ECA), was to provide for the effective protection and controlled utilisation of the environment and can be taken as the first legislative attempt to define the term “environment”. In terms of section 1 of the ECA, the environment was taken to mean “the aggregate of surrounding objects, conditions and influences that influence the life and habits of man or any other organism or collection of organisms”.

The ECA was considered to be the enabling legislation for EIA in South Africa as it provided the Minister with powers under Sections 21, 22 and 26 to identify those activities which, in the Minister’s opinion, may have a substantial detrimental effect on the environment, whether in general or in respect of certain areas; to prohibit the undertaking of identified activities without prior written authorisation and to establish EIA regulations with regard to any such identified activity. Accordingly in 1997, a list of activities was published in Government Notice No. R1182 of 05 September 1997 (Republic of South Africa, 1997a) and the EIA process to be followed were published in Government Notice No. R1183 of 05 September 1997 (Republic of South Africa, 1997b) thus ensuring the legal requirement to undertake an EIA (Kidd and Retief, 2009).

2.4.2. Constitution of the Republic of South Africa, Act No. 108 of 1996

The Constitution of the Republic of South Africa Act No. 108 of 1996 (Republic of South Africa, 1996) is the supreme law of the land and is noted as one of the

most progressive in the world (Kidd, 2008). Chapter 2 (The Bill of Rights) contains a number of relevant and specific environmental clauses. The overarching environmental right in Section 24 states that:

“Everyone has the right –

- (a) to an environment that is not harmful to their health or well-being; and
- (b) to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that –
 - (i) prevent pollution and ecological degradation;
 - (ii) promote conservation; and
 - (iii) secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.”

The implications of this are that it protects our health and well-being and places a duty on the State to protect the environment through the use of reasonable steps (current and future plans). Although not clearly defined in the Act, the aspects of ‘health’ may be interpreted as the protection from hazards in the workplace and various sources of pollution - air, water and noise, whilst ‘well-being’ infers the ability to enjoy our life, including an aesthetic and spiritual dimension of the natural environment. Even though it is clear that a duty has been imposed on the government to act, it is not as apparent as to what ‘reasonable measures’ this action would necessitate. Furthermore, the negative phrasing of the clause confers a right to an environment not detrimental to the health of a person, and not just a limitless right to a healthy environment. Barnard (1999) suggests that the protection of the environment through section 24 will provide effective implementation of environmental management principles and the content of the ECA and the National Environmental Management Act, Act No. 107 of 1998.

2.4.3. National Environmental Management Act, Act No. 107 of 1998

The National Environmental Management Act, Act No. 107 of 1998 (NEMA) (Republic of South Africa, 1998) can be regarded as the flagship environmental

statute passed under South Africa's democratic government. The NEMA in its long title seeks to:

“provide for co-operative environmental governance by establishing principles for decision-making on matters affecting the environment, institutions that will promote co-operative governance and procedures for co-ordinating environmental functions exercised by organs of state; to provide for certain aspects of the administration and enforcement of other environmental management laws; and to provide for matter connected therewith” (1998, page 1).

Essentially, NEMA provides a framework for broad environmental law reform and includes sections on land, planning and development, conservation, natural and cultural resources, waste management and pollution control. NEMA's primary objective is to provide for co-operative governance by establishing principles for decision making on matters affecting the environment (s2(1)(c)). This pioneering piece of legislation gives effect to two aspects of the Constitution; namely the overarching principle of co-operative governance which requires that the different spheres of government must co-operate and consult with one another to ensure effective governance (Kidd, 2008) and it fulfils the duty incumbent on the State to protect the environment through reasonable legislative measures. This is significant in that the environment is designated as an area of 'concurrent national and provincial competence' (Preamble) and it proposes that both authorities are responsible for the administration of laws protecting the environment. This implies that intra and inter-departmental partnerships and good working relationships are necessary by all organs of the state to ensure that there is integration, participation and co-operation when striving to achieve sustainable development (DEAT & DAEA&RD, 2007).

According to section 1 in NEMA, 'environment' is defined as the surroundings within which humans exist and that are made up of - (i) the land, water and atmosphere of the earth; (ii) micro-organisms, plant and animal life; (iii) any part or combination of (i) and (ii) and the interrelationships among and between them;

and (iv) the physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and wellbeing; whilst 'sustainable development' is defined as the integration of social, economic and environmental factors into planning, implementation and decision making so as to ensure that development serves present and future generations.

Chapter one of the Act contains a number of principles that guide the interpretation of the Act and how the functions should be exercised. The most important principle states that *"Environmental management must place people and their needs at the forefront of its concern, and serve their physical, psychological, developmental, cultural and social interests equitably"* (s2(2)). The central and underlying theme in the NEMA principles is that of sustainable development and the requirement that *"Development must be socially, environmentally and economically sustainable"* (s2(3)). Thus, as per section 2(4)(a) of NEMA sustainable development requires that:

- i) the disturbance of ecosystems and loss of biological diversity are avoided, or, where they cannot be altogether avoided, are minimised and remedied;
- ii) that pollution and degradation of the environment are avoided, or, where they cannot be altogether avoided, are minimised and remedied;
- iii) that the disturbance of landscapes and sites that constitute the nation's cultural heritage is avoided, or, where they cannot be altogether avoided, are minimised and remedied;
- iv) that waste is avoided, or where it cannot be altogether avoided, are minimised and re-used and recycled where possible and otherwise disposed of in a responsible manner;
- v) that the use and exploitation of non-renewable natural resources is responsible and equitable, and takes into account the consequences of the depletion of the resource;

- vi) that the development, use and exploitation of renewable resources and the ecosystems of which they are part do not exceed the level beyond which their integrity is jeopardised;
- vii) that a risk-averse and cautious approach is applied, which takes into account the limits of current knowledge about the consequences of decisions and actions; and
- viii) that negative impacts on the environment and on people's environmental rights be anticipated and prevented, and where they cannot be altogether prevented, are minimised and remedied.

Of particular significance to EIA and its review are the preventative and precautionary principles which recognise that actions to the environment are uncertain and may be irreversible and should rather be avoided at first than attempting to remedy them at a later stage (Kidd, 2008). Sustainable development requires that we do not foreclose on the opportunities available to future generations due to uncertainty or a lack of information and understanding of the consequences of our actions. Amongst the preventative principle and the precautionary principle lies the polluter pays principle (s2(4)(p)) which is manifested as follows *“The costs of remedying pollution, environmental degradation and consequent adverse health effects and of preventing, controlling or minimising further pollution, environmental damage or adverse health effects must be paid for by those responsible for harming the environment.”* This principle ensures that the person responsible for any pollution must also incur the cost associated with the consequences of the pollution.

It is interesting to note that some of the principles contained in NEMA are mirrored as the guidelines that were decided at the Rio Earth Summit of 1992 and are reflective of emerging international environmental laws. Yet, at the same time, NEMAs principles are indicative of South Africa's distinctive social circumstances (Strydom and King, 2009). The principles put people first and includes a need to redress the country's apartheid past *“Equitable access to*

environmental resources, benefits and services to meet basic human needs and ensure human well-being must be pursued and special measures may be taken to ensure access thereto by categories of persons disadvantaged by unfair discrimination” (s2(4)(d)). Several other NEMA principles such as consultation, transparency and public participation are considered to be crucial by EIA decision makers and are implemented through the Integrated Environmental Management (IEM) process outlined in Chapter 5 of NEMA.

Chapter five of NEMA deals with Integrated Environmental Management (IEM) and initially gave considerable support to the Environment Conservation Act’s (Act No. 73 of 1989) environmental assessment section and the Environmental Impact Assessment Regulations (Government Notice R1182 and R1183 of 05 September 1997) promulgated under the same Act. Integrated Environmental Management is a procedure designed to ensure that the environmental consequences of developments are understood and adequately considered in the planning process. This chapter emphasizes that to achieve the philosophy of IEM, the implementation of NEMA’s environmental management principles are imperative. The general objective of Section 23 is *“to ensure the integrated environmental management of activities”*. The subsequent section in NEMA (23(2)(a-f)) details the general objectives of IEM.

Section 24 elaborates on how the objectives outlined in Section 23 are to be achieved and s24(1) requires that *“the potential consequences for or impacts on the environment of listed activities or specified activities must be considered, investigated, assessed and reported on to the competent authority”* This in itself is a milestone for environmental protection as it takes into account potential impacts that a proposed activity may have on the environment and affords an opportunity for constructive planning, assessment of impacts and their significance and the consideration of alternatives and appropriate mitigation measures.

Section 24(2) elaborates on the powers of the Minister, or an MEC to identify:

- (a) activities which may not commence without environmental authorisation from the competent authority;
- (b) geographical areas based on environmental attributes, and as specified in spatial development tools adopted in the prescribed manner by the environmental authority, in which specified activities may not commence without environmental authorisation from the competent authority;
- (c) geographical areas based on environmental attributes, and geographical areas based on environmental attributes, and specified in spatial development tools adopted in the prescribed manner by the environmental authority, in which specified activities may be excluded from authorisation by the competent authority;
- (d) activities contemplated in paragraphs (a) and (b) that may commence without an environmental authorisation, but that must comply with prescribed norms or standards.

This section is imperative as activities that are known to cause detrimental harm to the environment require an environmental authorisation and specific geographical areas of conservation significance, which support threatened habitats and species, are afforded protection and can be excluded from authorisation. Activities which are not deemed to cause detrimental harm to the environment can be excluded from the authorisation process. It is critical to note that these areas and activities would however require detailed assessment through their respective planning and legislative processes.

Section 24(4) outlines the procedures required for the investigation, assessment and communication of the potential impact of activities. This section is paramount in its importance with respect to undertaking environmental impact assessments. The requirements contained in s24(b) are concise with respect to every application for an environmental authorisation as they call for:

“(i) investigation of the potential consequences or impacts of the alternatives to the activity on the environment and assessment of the significance of those potential consequences or impacts, including the option of not implementing the activity; (ii) investigation of mitigation measures to keep adverse consequences or impacts to a minimum; (iii) investigation, assessment and evaluation of the impact of any proposed listed or specified activity on any national estate; (iv) reporting on gaps in knowledge, the adequacy of predictive methods and underlying assumptions, and uncertainties encountered in compiling the required information; (v) investigation and formulation of arrangements for the monitoring and management of consequences for or impacts on the environment, and the assessment of the effectiveness of such arrangements after their implementation; (vi) consideration of environmental attributes identified in the compilation of information and maps; and (vii) provision for the adherence to requirements that are prescribed in a specific environmental management Act relevant to the listed or specified activity in question.”

In accordance with section 24(2) the Minister defines activities which may not commence without environmental authorisation from the competent authority and on 21 April 2006, a new set of EIA regulations under Chapter 5 of the NEMA were promulgated and replaced the EIA regulations in terms of the ECA in 1997. This considerably changed the EIA process in terms of introducing time frames to make decisions, including the amendment and withdrawal of authorisations, defining the appeal process and the provision of two types of environmental assessments i.e. Basic Assessment process for smaller impact development or the Scoping/EIA process for developments with potentially more significant impacts.

Effective from the 03 July 2006, the Basic Assessment process must be followed for activities listed in Government Notice No. R386 of the 21 April 2006 (referred to as Listing Notice 1) (Republic of South Africa, 2006a) and a Scoping/EIA process must be applied when activities are listed in Government Notice No. R387 of 21 April 2006 (referred to as Listing Notice 2) (Republic of South Africa,

2006b). The process, in terms of making an application, document submission, public participation, review and decision making for both processes is detailed in Government Notice No. R385 of 21 April 2006 (Republic of South Africa, 2006c) under Chapter 3 Part 2 and 3 respectively.

Amendments to the NEMA EIA Regulations have been promulgated in 2010 and are contained in Government Notices No. R543, R544, R545 and R546 of 18 June 2010 (Republic of South Africa, 2010a, 2010b, 2010c and 2010d respectively). Since coming into effect, on the 02 August 2010, the EIA process has changed considerably in that three lists of activities are in place for which environmental authorisation is required. These lists, and the respective EIA process, have not been detailed within this research as the data set used in the research does not contain EIA applications submitted or reviewed under these Regulations and it was not considered essential to elaborate on them.

The reasons for the amendments to the Regulations are however fundamental and have been briefly outlined. Under the ECA EIA Regulations, the identified activities which required authorisation were expected (known) to have significant detrimental impact on the environment and much emphasis was placed on the nature of the activity that was being undertaken. As a result the extent of the activity was not considered and no thresholds (or boundaries, parameters) were provided in undertaking an activity. As a result the amendments to the EIA Regulations under NEMA included thresholds, and considered the nature, extent and location of the activity being undertaken. The 2010 NEMA EIA regulations required amendments to exclude activities that were being triggered by “implication” such as linear activities like the burning of firebreaks; clearly described terminology used in defining listed activities for example “derelict land”, “development footprint” or “watercourses”; provided realistic and practical thresholds; repealed listed activities related to the National Environmental Management Air Quality and Waste Acts; and, identified geographical sensitive areas per Province in which certain activities required authorisations.

2.5. The importance of EIA to land transformation

It is a legal requirement in South Africa to undertake an Environmental Impact Assessment (EIA) for activities which are deemed to have a significant impact on the environment. An EIA is a tool that assists decision making through the process of identifying, assessing and mitigating for impacts through public and authority consultation to ensure that development occurs in a sustainable manner (Department of Environmental Affairs and Tourism, 1998). In the province of KwaZulu-Natal, the Department of Agriculture, Environmental Affairs and Rural Development (DAEA&RD) is tasked with the responsibility of reviewing EIA applications for development and taking decisions.

A decision on an EIA application can result in the development proposal being approved, refused or partially being approved and refused subject to compliance with various conditions. Such a decision involves reviewing the application and supporting documentation (viz. a Basic Assessment Report, Scoping Report and Environmental Impact Assessment Report including various Specialist Study Reports) that are subject to a public and authority consultation process, given consideration to the National Environmental Management Act, Act No 107 of 1998 (NEMA), its principles, any relevant or applicable legislation, guidelines and policy documents available and the undertaking and findings of a site inspection. Such decisions are drafted by an assessing officer in the DAEA&RD and are often subject to a peer review and internal review process before being authorised by the authorising official.

The Competent Authority is guided by Section 38 of Government Notice No. R385 of 21 April 2006 with regards to the content when compiling an Environmental Authorisation (previously referred to as a Record of Decision under the ECA EIA regulations). As such an Environmental Authorisation must specify: -

- (a) the name, address and telephone number of the person to whom the authorisation is issued;
- (b) a description of the activity that is authorised;
- (c) a description of the property on which the activity is to be undertaken and the location of the activity on the property, or if it is –
 - (i) a linear activity, a description of the route of the activity; or
 - (ii) an ocean-based activity, the co-ordinates within which the activity is to be undertaken; and
- (d) the conditions subject to which the activity may be undertaken, including conditions determining –
 - (i) the period for which the environmental authorisation is valid, if granted for a specific period;
 - (ii) requirements for the management, monitoring and reporting of the impacts of the activity on the environment throughout the life cycle of the activity; and
 - (iii) the transfer of rights and obligations when there is a change of ownership in the property on which the activity is to take place.

Section 38 of GNR No. 385 of 21 April 2006 also states that an Environmental Authorisation may: -

- (a) provide that the authorised activity may not commence before specified conditions are complied with;
- (b) require the holder of the authorisation to furnish the competent authority with reports prepared by the holder of the authorisation or a person who is independent, at specified times or intervals –
 - (i) indicating the extent to which the conditions of the authorisation are or are not being complied with;
 - (ii) providing details of the nature of, and reasons for, any non-compliance with a condition of the authorisation; and

- (iii) describing any action, or to be taken, to mitigate the effects of any non-compliance or to prevent any recurrence of the non-compliance;
- (c) require the holder of the authorisation to furnish the competent authority with environmental audit reports on the impacts of the authorised activity on the environment, at specified times or intervals or whenever requested by the competent authority; and
- (d) include any other condition that the competent authority considers necessary for the protection of the environment.

Amendments to the NEMA and the EIA Regulations have been promulgated and are contained in the NEMA Amendment Act No. 62 of 2008 and Government Notices No. R543, R544, R545 and R546 of 18 June 2010. However, they have not been detailed within this research due to the time of coming into effect and as the data set does not contain EIA applications submitted or reviewed under these Regulations.

The use of EIA at an international level is well documented in the literature with Wood (1995) providing a comparative step-by-step review of international EIA procedures in the United States, the United Kingdom, the Netherlands, Canada, Australia and New Zealand, and Gilpin (1995) examining the role of EIA in decision making in Western Europe (Britain, France, Germany, Italy, Austria, Belgium), the Nordic countries (Denmark, Finland, Norway and Sweden), North America, Asia and the Pacific (China, Japan, Singapore, Taiwan).

In addition, the elements of the EIA process have been expounded upon in various studies and much literature is available to cover this aspect (for example: Wood, 1995; Shepard, 2005; Linde, 2006 and Aucamp, 2009). This research is concerned with the EIA decision being made and it was considered beyond the scope of the research to describe the process of an EIA, except to briefly

mention that whilst the process may vary between countries, the following steps are considered pertinent in an EIA (DEAT, 2002):

1. project screening: a process of determining whether or not a development proposal requires environmental authorisation usually at the concept stage of the proposal and to reflect what type of assessment is applicable;
2. scoping: a process of identifying significant issues, reasonable alternatives and the nature and extent of key issues that require assessment;
3. consideration of alternatives: involves the consideration of various courses of action to meet the same purpose and need of the development proposal e.g. alternatives site, layouts, designs, processes and the “no-go” or retain the status quo of the site action;
4. describing the project or development parameters: elaborating on the extent of development and defining the extent of the development footprint;
5. describing the environmental baseline: involves providing a report on the status of environmental parameters prior to development occurring usually to ascertain whether there is a difference in the environmental after an impact has occurred; and
6. the identification of key impacts, and an evaluation and an assessment of the significance thereof.

A fundamental facet in an EIA process is the public participation and authority consultation process. The resultant EIA statement comprises the above steps and is reviewed and decided upon by the competent authority with post decision making involving auditing of the conditions of the decision and monitoring.

Whilst within a South African context it may be argued that there are specific legislative basis for spatial planning e.g. the Development Facilitation Act, Act No. 65 of 1995 or the Municipal Systems Act, Act No. 32 of 2000, Claasens (2009) identified that there is a lack of integration in the various pieces of legislation that control spatial development and noted that specific aspects of

development proposals appear to be assessed in isolation rather than allowing for integrated environmental management. Based on the local setting this can be demonstrated in the following situation: a farmer who wishes to plant veld to kikuyu requires both a cultivation of land permit and an Environmental Authorisation, or may require both a water licence and an Environmental Authorisation to construct a dam. In addition, a right to develop permit or a waste licence may be required for various aspects of a development proposal. With a host of legislative requirements that require fulfilment an integrated approach in decision making is necessary to ensure that effective decision making is taken and incorporating planning initiatives into the EIA process is considered an ideal place to start.

2.6. Case studies of land use changes

Widespread conversion of land to non-agricultural uses has been documented in China with the National Survey of China's land resources indicating that in 1996, approximately 56% of land was occupied for non-agricultural purposes, 19% for transportation, nine percent for industry, nine percent for urban settlements and seven percent for other uses (cemeteries, military use and salt fields) (Ho and Lin, 2004). Xie et al. (2005) in their research in Wuxian City, China identified rapid urbanisation and population growth as key factors responsible for a loss in agricultural land.

Alig et al. (1998) reported that the two largest land use sectors in the United States of America (USA) are agriculture and forestry and whilst both sectors have lost land to urbanisation and infrastructural development, there is considerable historical record of exchanges between these two land use sectors. Research undertaken in the Muskegon River watershed in Michigan, USA revealed that the local and regional hydrology was altered and non-point source pollution had increased as a result of urban expansion (Tang et al, 2005). Furthermore, an analysis of land cover in Minnesota, USA over the period 1986

to 2002 showed an increase in urban areas and a decrease in agriculture, forests and wetlands (Yuan et al, 2005).

The abandonment of marginal agricultural land due to increasing urbanisation has been documented in Latin America by Cramer et al. (2007), and in Thailand, a decrease in the agricultural sector was experienced due to the economic boom of the 1990s (Coxhead and Plangraphan, 1999), and Rigg (1998) expressed that in South East Asia non-agricultural land use activities were increasingly being favored over agricultural activities.

In Tanzania, Soini (2005) identified population pressure, farming on marginal agricultural land, intensified agricultural practices and changes to water supplies as key reasons for the pursuit of non-agricultural activities and proposed that for land uses to complement each other an integrated approach with better planning is required to ensure that sustainable development occurs.

In their research on the northern fringe of the Swiss Alps, Schneeberger et al. (2007) found that the driving forces of landscape change could be attributed to political, economic, cultural, technological and natural or structural factors and indicated that this served as an important basis to control or direct any further changes in land uses. In contrast case study reviews around the world by Lambin et al. (2001) found that the causes of land use and land cover change were not as a result of population or poverty only, but rather *“people’s responses to economic opportunities as mediated by institutional factors”* (page 266) were responsible in driving land use and land cover changes.

In synthesis of the case studies presented it appears that changes in land uses occur predominantly from agricultural use to urbanisation and infrastructural development and are largely as a result of an increasing population’s pressure. This transformation of land to non-agricultural purposes also has impacts on functioning ecosystems (forests, wetlands and watersheds) and a potential loss

of biodiversity. In addition, the use of land for non-agricultural purposes whilst the population burgeons will have severe repercussions for food security.

2.7 Conclusion

The literature documents the concept of Environmental Impact Assessment, Sustainable Development, contextualised its emergence at the global scale and detailed the national legislative basis for its use. With the research focusing on the use of EIA decisions to determine land use change it was necessary to demonstrate the robustness of the EIA process in terms of its procedural requirements and to illustrate the effectiveness of EIA as a tool to identify, assess and mitigate significant environmental impacts. The review exemplifies the role of EIA in driving sustainable development and highlights cases studies of land use changes. Chapter 3 presents the study area and the methods used to achieve the aim and objectives of the research.

CHAPTER 3: BACKGROUND AND METHODS

3.1 The Study area

The study area is situated within the uMgungundlovu District Municipality which is positioned within the central portion of the KwaZulu-Natal province of South Africa (Figure 3.1). The seven local municipalities that comprise the uMgungundlovu District Municipality are Richmond, Mkhambathini, Msunduzi, Impendle, uMngeni, Mpofana, and uMshwathi. Two local municipalities, the uMngeni Municipality (Figure 3.2) and the Mpofana Municipality (Figure 3.3) were considered appropriate to undertake the research as they form part of the area in which the researcher was responsible for conducting official duties. Both uMngeni and Mpofana's economy is based on a strong agricultural resource base; however Mpofana is best regarded for its farms, and rural, countryside lifestyle whilst in recent times uMngeni has shown rapid urbanisation and growth in tourism.

With the Midmar Dam being situated in the uMngeni Municipality and the future Spring Grove dam being located within the Mpofana Municipality, the sites are located within an important water catchment region as they provide water to the greater eThekweni Metro and outlying areas. Both municipalities have considerable areas of conservation significance in terms of endemic and endangered flora and fauna species and, as such, play a critical role with respect to connectivity of important species habitats (grasslands, indigenous forests and wetlands). This also serves as an attraction to the Midlands in respect of tourism and recreation activities. With approximately 13% of South Africa's land surface being suitable for crop production and with just over 3% of this land being classified as high potential land, KwaZulu-Natal possesses nearly half of the high potential land with the Midlands producing a diverse range of agricultural produce as a result of its high agricultural potential and soils well suited to agriculture (KZN DAEA&RD, 2009). Moreover, a high degree of conflicting and competing land use pressures particularly between agricultural versus non-agricultural land uses have been noted in both municipalities (personal observation).

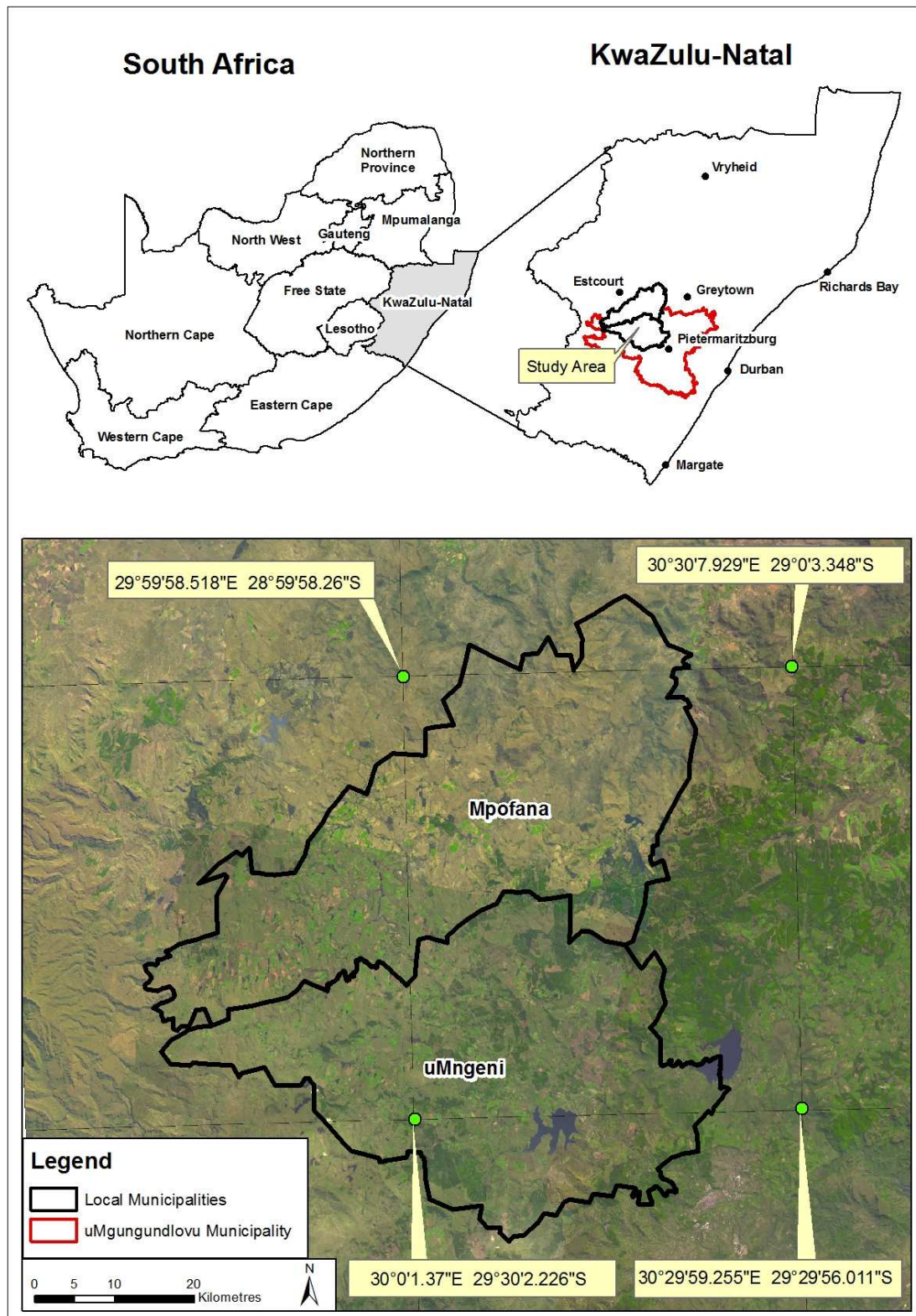


Figure 3.1: Context of study area.

The uMngeni and Mpofana municipalities share a common boundary and can be accessed via the R103 and the National Route (N3) and, according to the Provincial Spatial Economic Development Strategy (PSEDS), a primary corridor (referred to as the PC2) has been identified to run from eThekweni through to uMngeni. With Mpofana sharing a boundary with uMngeni the PC2 serves as a limited access, long distance route with the intention of attracting urban uses, and to protect existing tourism routes and environmental objectives. The Provincial Spatial Economic Development Strategy (Anon, undated) specifies that the economy of the uMgungundlovu District Municipality, in which the two Local Municipalities are situated, is dependent on manufacturing (22%), government services (16%), finance and business services (15%), wholesale, retail and tourism (14%), agriculture, forestry and fisheries (11%), and transport and communication (11%). Accordingly, initiatives within the agricultural, tourism, industry and services sectors must be prioritised and it may be inferred that the protection of high potential agricultural land for commercial production and the development of the cultural tourism potential must be recognised within the uMngeni and Mpofana Municipalities (Anon, undated).

3.1.1 uMngeni Municipality

The uMngeni Municipality is approximately 1 600 km² in extent and consists of 11 wards with a population of approximately 73 900 according to the 2001 Census (Municipal Demarcation Board, 2010) and an increased population of approximately 84 800 in the 2007 Statistics South Africa Community Survey. The uMngeni Municipality comprises of a mix of trade and manufacturing enterprises and is well known for its tourism attractions (Karkloof and Howick Falls and Midmar Dam), two golf courses (Bosch Hoek and Gowrie) and private schools (Michaelhouse and Treverton) (uMngeni Municipality, 2010). The uMngeni municipal offices are situated in the town of Howick and the Midlands Meander route encompasses parts of the municipality. Five salient spatial features of this municipality are noteworthy:

- Location to the N3 for access to Durban and Gauteng and international markets,
- an existing industrial base,
- good local infrastructure (roads, rail),
- agricultural production (predominately beef, dairy and vegetables) and forestry; and,
- tourism.

The hydrological importance of this area is emphasized as the headwaters of the Mngeni River are located within this municipality and the Impendle Municipality and the Midmar Dam, which is a major storage dam for the regional economy, is situated in uMngeni. In addition, the Mooi River forms a portion of boundary between the uMngeni and Mpofana municipalities.

The uMngeni Municipality includes several areas of indigenous forests, wetlands and Mistbelt vegetation that provide breeding sites and habitats for many threatened, red database and endemic species (Ezemvelo KwaZulu-Natal Wildlife, 2007). Located within uMngeni are the following protected areas; Midmar, Fort Nottingham, Doreen Clark, Queen Elizabeth Park, Mkhomazi State Forest and part of the Karkloof Nature Reserve, and, conservancies; Karkloof, Dargle, Balgowan and Ferncliffe.

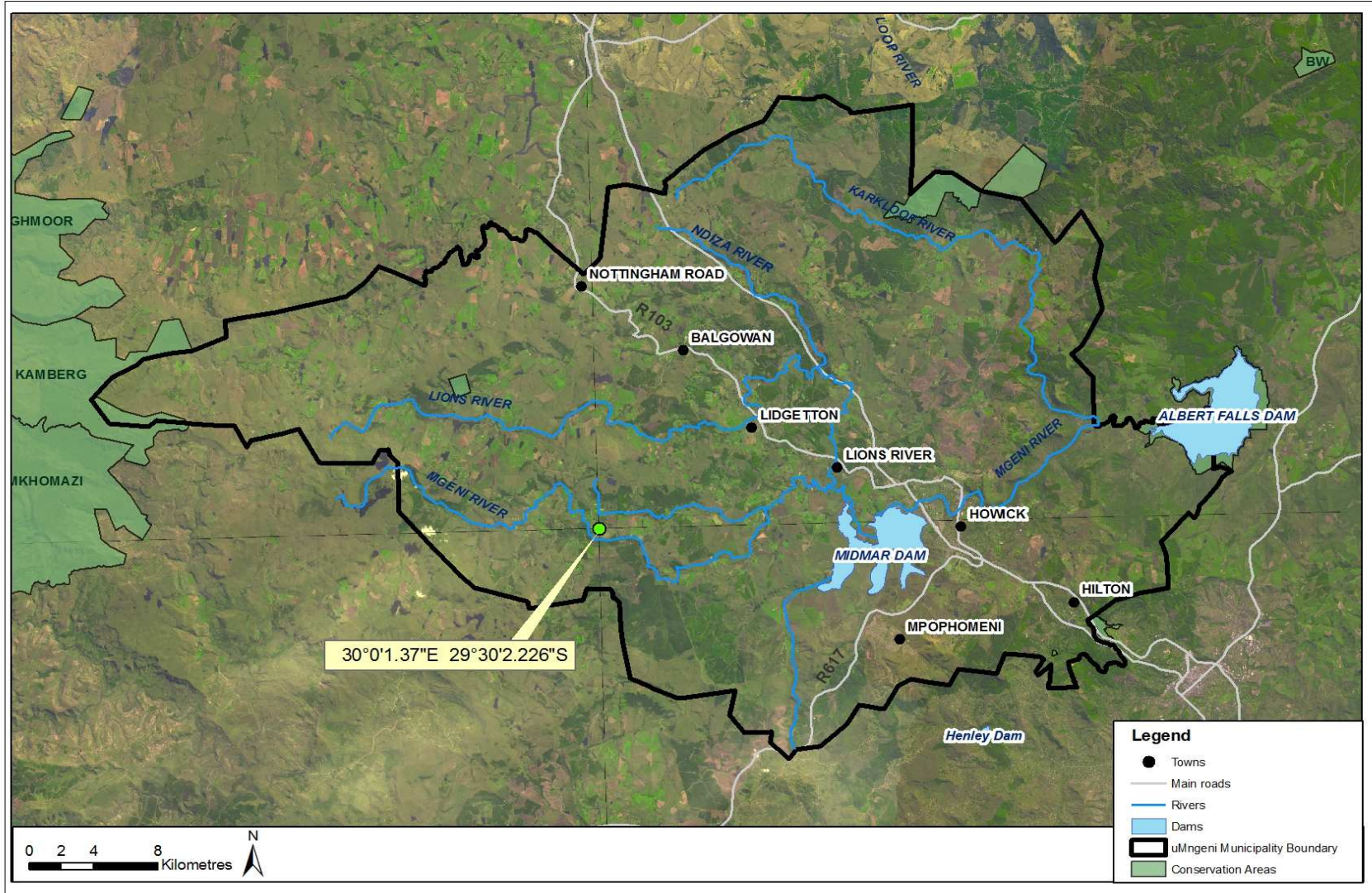


Figure 3.2: Location and extent of the uMngeni Municipality.

3.1.2 Mpofana Municipality

The Mpofana Municipality is similar in size to uMngeni, covers 1 700 km² and comprises four wards with a population of approximately 36 800 according to the 2001 Census (Municipal Demarcation Board, 2010) and a declined population figure of 31 500 in the 2007 Statistics South Africa Community Survey. A notable difference is that the population density experienced in Mpofana is less than half that of uMngeni.

The Mpofana municipal offices are located in the town of Mooi River and the area is predominantly a commercial agricultural sector (beef, horse studs and dairy, maize, potatoes and vegetables) with diverse natural habitat which is of critical importance for biodiversity protection (viz. Moist Midlands Mistbelt vegetation, the Karkloof butterfly, Oribi and the Wattled Crane). The area includes the Craieburn Dam, a textile industry and the Midlands Meander route with arts, crafts, hospitality accommodation and a number of leisure and tourism features (Mpofana Municipality, 2010).

According to the Municipalities Integrated Development Plan (Draft review of 2010/2011) the Spatial Development Framework lists its spatial features as being:

- Location to the N3 for access to Durban and Gauteng and international markets,
- tourism,
- grasslands and natural bush,
- agricultural production (beef, horse studs and dairy, maize, potatoes and vegetables); and,
- commercial forestry.

The Mpofana Municipality (2010) is characterised by agricultural landscapes (approximately 12% cultivated) and grasslands (82%) some worthy of conservation significance and commercial forestry (2%). Both the uMngeni and

Mpofana municipalities are easily accessible via the national route N3 and the R103 and are approximately 26km and 70km respectively from Pietermaritzburg which is the capital city of the Province. The area serves as an important area in terms of water harvesting as it contains the Mooi River and the Spring Grove Dam is to be built in this municipality as well.

According to the Systematic Conservation Plan (C-Plan) for KwaZulu-Natal, the Mpofana municipal area contains areas of conservation importance such as wetlands, rivers, breeding sites, threatened species red database animals and plants and endemic species and part of the Kamberg Nature Reserve and the uKhahlamba Drakensberg Park - World Heritage Site and buffers of the Special Case Area Plan form part of this study site (Ezemvelo KwaZulu-Natal Wildlife, 2007).

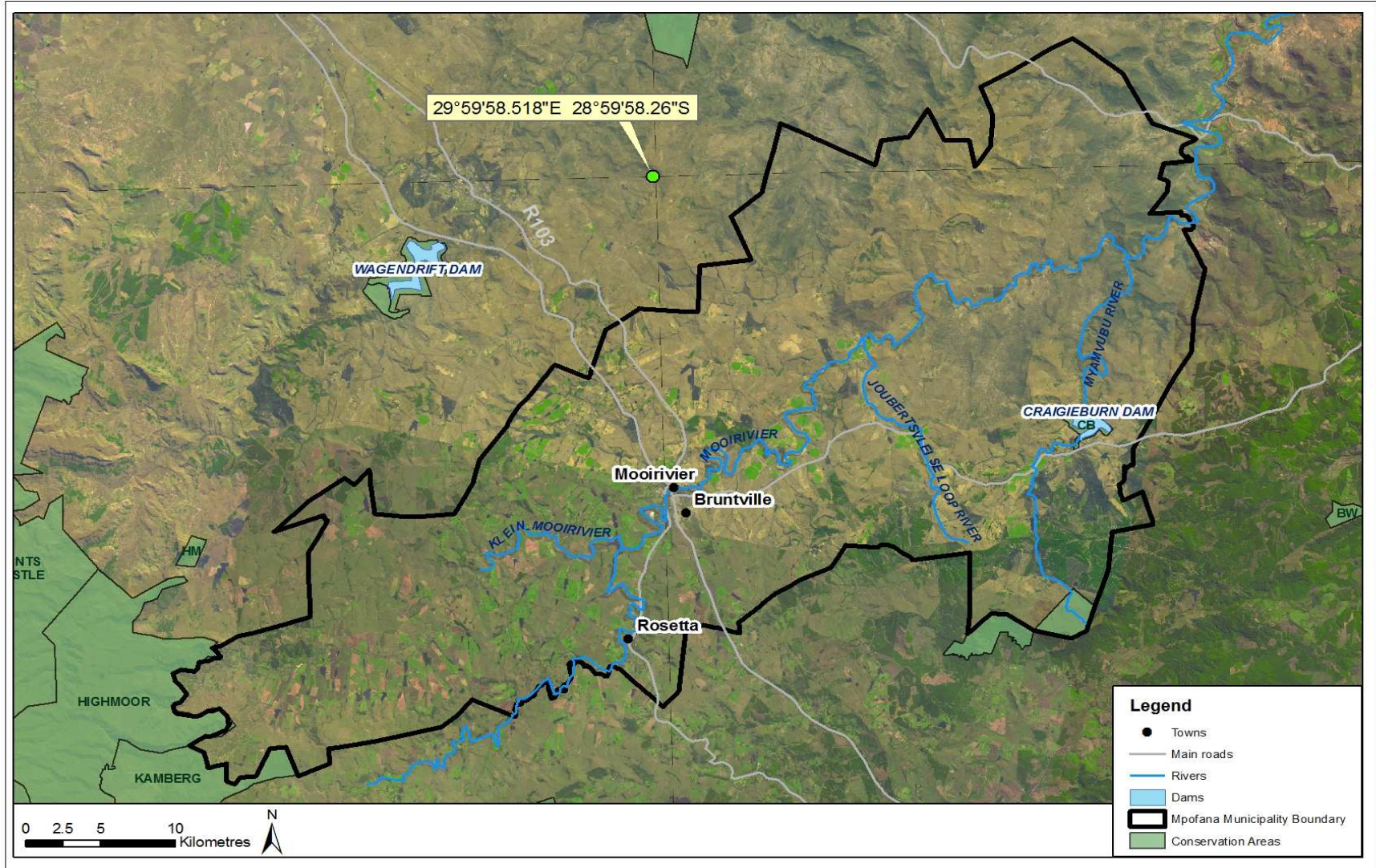


Figure 3.3: Location and extent of the Mpofana Municipality.

3.2 Data Acquisition

Section 11 of Government Notice No. R385 of 21 April 2006 requires the Competent Authority to keep a register of all applications received in terms of the NEMA EIA regulations and records of all decisions in respect of environmental authorisations issued. The DAEA&RD uMgungundlovu District EIA application register (Excel spreadsheet) was interrogated to obtain the information necessary for this research. The register consists of the following fields: EIA reference number, a project description, the date of receipt of the application, the type of application process being followed (Basic Assessment, Scoping/EIA, Exemption or Amendment), details of the environmental assessment practitioner, the date it was assigned to an assessing officer, the assessing officer's details, the status of the EIA application (whether it was approved, refused, or part approval and refusal, withdrawn, development commenced) and the date the application was finalised.

With the register containing information pertinent to reporting on the number of applications received and finalised and the status and progress of the EIA applications, it was necessary to locate individual EIA application files which were archived to verify the information and extract relevant information. Application forms and copies of EIA decisions (viz. Records of Decisions (RoDs), Environmental Authorisations (EAs), Exemptions, Withdrawals and Commencements) were obtained from archives and examined to verify information on the register and to collect information for this research.

The following information was extracted and recorded in an Excel spreadsheet:

- EIA reference number
- Description of Activity in terms of ECA or NEMA EIA 2006 regulations
- Relevant Municipality
- Property Description and farm name
- Map name
- Extent of property in hectares

- Extent of proposed development in hectares
- Geographic co-ordinates in degrees, minutes and seconds format (where available)
- Date of application
- Date of completion
- Type of decision issued
- Key decision factors in the EIA decision

Where latitude and longitude co-ordinates for the site were not available from the EIA decision or application form, the relevant topographical maps were examined to establish an approximate geographical reference. Ezemvelo KwaZulu-Natal Wildlife was consulted with, and provided information on GPS co-ordinates where available on certain applications (in an Excel spreadsheet format), as they were a commenting authority in the EIA process. It is likely that that a purposive sampling strategy was adopted in consulting with EKZNW as the GPS co-ordinates were deliberately acquired. Welman, Kruger and Mitchell (2005) regard purposive sampling as the most important type of non-probability sampling where “researchers rely on their experience to deliberately obtain units of analysis that the sample may be regarded as representative....” (2005, page 69). The software package ArcGIS 9.3 was used to map these points to illustrate the location of EIAs in each Municipality to obtain a spatial representation of authorised EIA applications.

3.3 Analysis

Information available in the EIA application form (for e.g. Project description, current land use or zonation) was used to determine the land uses prior and post an EIA decision and activities applied for under the EIA listing notices viz. GNR. No. R1182 of 5 September 1997 (ECA EIA regulations) and GNR No. R386 and 387 of 21 April 2006 (NEMA EIA regulations) were allocated a relevant land use. For example an EIA application was received in 2005 for the construction of a dam for irrigation purposes and a decision was granted for the construction of the

dam in 2007. In terms of the list of EIA activities under the ECA EIA regulations Item 1(j) would require authorisation:-

“The construction or upgrading of dams, levees or weirs affecting the flow of a river.”

Similarly under the NEMA EIA regulations the activity was listed as Item 1(m) of GNR No. 386 of 21 April 2006:-

“The construction of facilities or infrastructure, including associated structures or infrastructure, for any purpose in the one in ten year flood line of a river or stream or within 32 metres from the bank of a river or stream where the flood line is unknown, excluding purposes associated with existing residential use, but including - canal; channels; bridges; dams; and weirs;”

and Item 1(n) of GNR No. 386 of 21 April 2006:-

“The construction of facilities or infrastructure, including associated structures or infrastructure, for the off-stream storage of water, including dams and reservoirs, with a capacity of 50 000 cubic metres or more....”,

and Item 6 of GNR No. 387 of 21 April 2006:-

“The construction a dam where the highest part of the dam wall, as measured from the outside toe of the wall to he highest part of the wall, is 5 metres or higher or where the high-water mark of the dam covers an area of 10 hectares or more.”

Once the listed activities were identified in terms of the ECA or NEMA EIA regulations, a land use prior to the EIA decision and post the EIA decision was allocated. It was noted that where land has not been incorporated as part of a town planning scheme then the land use is zoned as Agriculture. Based on this premise and the information contained in the application forms, scoping and EIA

reports or the EIA decision, the most suitable land use category was identified. In the example regarding the construction of a dam above the land use prior to a decision being granted was that of veld (grassland) and a land use category of Agriculture was allocated. Following the EIA decision to grant approval for the dam the land use category was broadly categorized as Infrastructure and a sub-category of Infrastructure2 was identified. The use of numbering was to ensure that sub-categories for land uses were easily identifiable. For example, in the Infrastructure category land uses included telecommunication masts, dams, water supply schemes, roads etc. To be able to differentiate between certain types of Infrastructure each sub-category was identified by the allocation of numbers. All EIAs decided were examined and according to their listing within the ECA and NEMA EIA Regulations an appropriate land use was allocated to each EIA application (prior and post decision making). These categories of land uses are presented in Table 3.1.

Table 3.1: Categories of land uses.

Agriculture	
agriculture1	veld (grassland) to dams, pastures or any other crop i.e. cultivation of land
agriculture2	veld (grassland) used for agricultural use to residential
agriculture3	agricultural use expanded (concentration of livestock, poultry, pigs, abattoir)
agriculture4	veld (grassland) to afforestation
Conservation	
conservation1	expansion of existing conservation area and/or infrastructure
Infrastructure	
infrastructure 1	telecommunication masts, towers, radio and cellular communication networks
infrastructure 2	dams, weirs, channels, bridges, reservoirs
infrastructure 3	water supply schemes, water and sewage pipelines
infrastructure 4	roads, racing tracks
infrastructure 5	electricity transmission lines, sub stations
infrastructure 6	aircraft landing facilities
infrastructure 7	sports field, sports complex
infrastructure 8	railway lines
Institution	
institution1	education, school
institution2	hospital
institution3	cemetery
institution4	church
Mixed	
mixed1	commercial and industrial
mixed2	commercial, industrial and residential
Residential	
residential1	low income residential, low cost housing
residential2	middle to high income, residential estates and sub divisions
Commercial	
shopping complexes	landfills
community centers	effluent treatment
office parks	scheduled Atmospheric Pollution Prevention Act processes
casino	waste permit, waste license
Tourism	
chalets, self-catering	furniture manufacturing
resorts	water bottling
lodges	timber processing
hotels	CCA treatment plant
bed & breakfasts	wood pellet plant
caravan parks	truck stops
hospitality facilities	filling stations
home industry	above ground storage tanks
hobby farm	warehouses
conference centre	distribution centres
health spa/hydro	
wellness centre	
Mining	
quarry	
sand winning	
excavation, dredging	

A change in land use was acknowledged as a combination of two categories, so for the example used above in the construction of a dam i.e. prior to a decision being made the land was categorized as Agriculture1 and after a decision was made it was categorized as Infrastructure2. A change in land use category was derived by combining the two land use categories (viz. Agriculture1 Infrastructure2). With several changes in land uses occurring within a category, (for example different types of infrastructure included telecommunication masts, dams, water supply schemes, roads) similar land use changes were classed to illustrate key classes of land use categories viz.

- Agriculture to Tourism: The types of land uses occurring within this category include areas of veld or areas currently used for agriculture being transformed to chalets, bed and breakfasts etc.
- Agriculture to Agriculture: Land uses include the grazing of livestock, the growing of trees (forestry) and predominately a change from veld to cultivate land (crop production) or intensive production of poultry, eggs, livestock and any expansions thereof e.g. a piggery, broiler house.
- Agriculture to Residential: A distinction in this category is included to differentiate between low income, middle income to high income and residential estate developments.
- Agriculture to Other: Mostly changes on land currently in agricultural use to establish schools, cemeteries, churches and infrastructure, warehouses and timber processing plants etc.
- Expansion of land use within a category: Several expansions occurred within a land use category for example an increase in the footprint of a Bed and breakfast or school or land fill site and these activities were

classed separately and the category retained to illustrate whether they occurred more frequently in one or both of the municipalities.

- Change in Other land uses: A category retained to illustrate the minor and few occurrences where land uses changed from a quarry to a shopping centre or where a residential area was transformed to a casino etc. No obvious trends were noted in this category.

The key classes of land use change categories and the types of land uses occurring within each category are presented in Table 3.2.

Table 3.2: Key classes of land use categories.

Agriculture to Tourism	Agriculture to Agriculture	Agriculture to Residential
agriculture1 tourism	agriculture1 agriculture1	agriculture1 residential1
agriculture2 tourism	agriculture3 agriculture3	agriculture2 residential1
	agriculture4 agriculture4	agriculture2 residential2
		agriculture2 residential2
Agriculture to Other	Expansion within land uses	Change in Other land uses
agriculture2 conservation1	commercial commercial	commercial industrial
agriculture2 institution	conservation1 conservation1	commercial waste disposal
agriculture2 waste disposal	infrastructure infrastructure	conservation1 infrastructure
agriculture2 commercial	institution institution	industrial waste disposal
agriculture2 infrastructure	residential1 residential1	infrastructure commercial
agriculture2 industrial	residential2 residential2	institution commercial
	tourism tourism	mining institution
	waste disposal waste disposal	residential2 commercial
		residential2 infrastructure
		residential2 tourism
		tourism infrastructure

Bar graphs were compiled to illustrate the number of EIA applications received and completed; the types of decisions that were processed and the land use changes and extent of land use changes. The Key Decision Factor section (KDF) in EIA decisions (such as the RoD and EA) was reviewed and the factors with respect of why the decision was approved or refused for each application were collated in an Excel spreadsheet. The drivers of key land use changes and factors responsible for refusing EIA applications are presented in tables.

The flowchart (Figure 3.4) conceptualises the methods applied to the research and the objectives of the research.

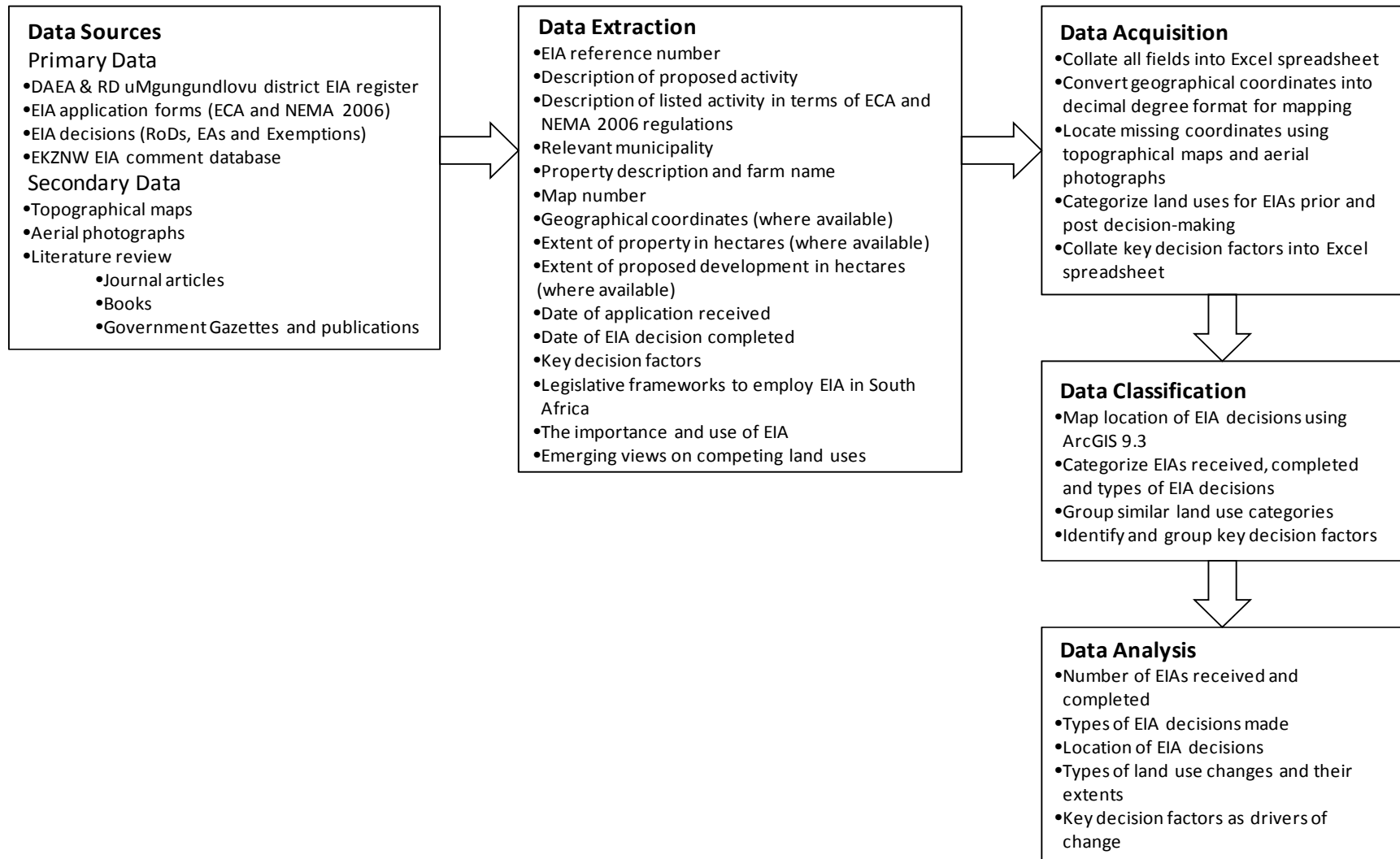


Figure 3.4: Conceptual flow diagram of methods applied to research.

3.4 Limitations

There are several assumptions and limitations in this research and the results must be considered with these limitations in mind. The key limitation to the dataset is that information provided by applicants on the EIA application forms were not completed in full, and where geographical co-ordinates were provided they have not been ground truthed. To overcome this limitation, the relevant site location maps provided by applicants were examined and approximate points (central property co-ordinates) were calculated. Incomplete or poor property description details and the use of common farm names (i.e. not the registered Title deed reference) limited the ability to locate properties. In addition applicants provided limited information with respect to the activity being applied for (i.e. extent, location on the farm) and some applications were excluded as they could not be located in archives.

3.5 Conclusion

This chapter described the study area and details the justification for choosing the two municipalities. It presents the research methods and conceptualises the methods used in a flowchart. Using information contained in application forms, key EIA documents, the EIA decision and the EIA regulations (ECA and NEMA) the land uses were categorized prior and post to EIA decision making. Changes in land uses were identified as a combination of the prior and post land use. The following chapter uses bar graphs and tables to present the findings of the research in respect of EIA decisions, their locality and the land use changes and their extent in the Mpofana and uMngeni municipalities.

CHAPTER 4: RESULTS

4.1 Introduction

This chapter presents the results and describes the findings of the research. To ensure an understanding of the results, the terminology used is explained prior to the results being presented. An Environmental Impact Assessment (EIA) decision can be compiled as a Record of Decision (RoD), an Environmental Authorisation (EA), a refusal, a withdrawal or a commencement. The term RoD and an EA refer to an EIA decision made in terms of the relevant EIA regulations applicable at the time viz. a RoD is issued for a decision made for an Environment Conservation Act, Act No.73 of 1989 (ECA) EIA application and an EA is issued for a decision made in terms of a National Environmental Management Act, Act no. 107 of 1998) (NEMA) EIA application. A refusal refers to the EIA decision (irrespective of it being a RoD or an EA) being refused in full or part. A withdrawal refers to an EIA application (ECA or NEMA) being withdrawn prior to a decision being issued. A commencement refers to an EIA application that has commenced with the proposed activity prior to a decision being issued. An exemption refers to a decision made on an ECA EIA application in which a provision of the EIA regulations were exempted - in most cases that of appointing a consultant or Environmental Assessment Practitioner from applying on the applicants behalf.

4.2 Quantifying EIA applications

This section presents the number of EIA applications received and decided upon on an annual basis over the duration of implementing EIA application in KwaZulu-Natal viz. 01 January 1999 to 31 March 2010 and describes the locality and types of decisions made within the uMngeni and Mpofana municipalities.

4.2.1 uMngeni Municipality

A total of 337 EIA applications were received and 332 EIA applications were completed (Figure 4.1).

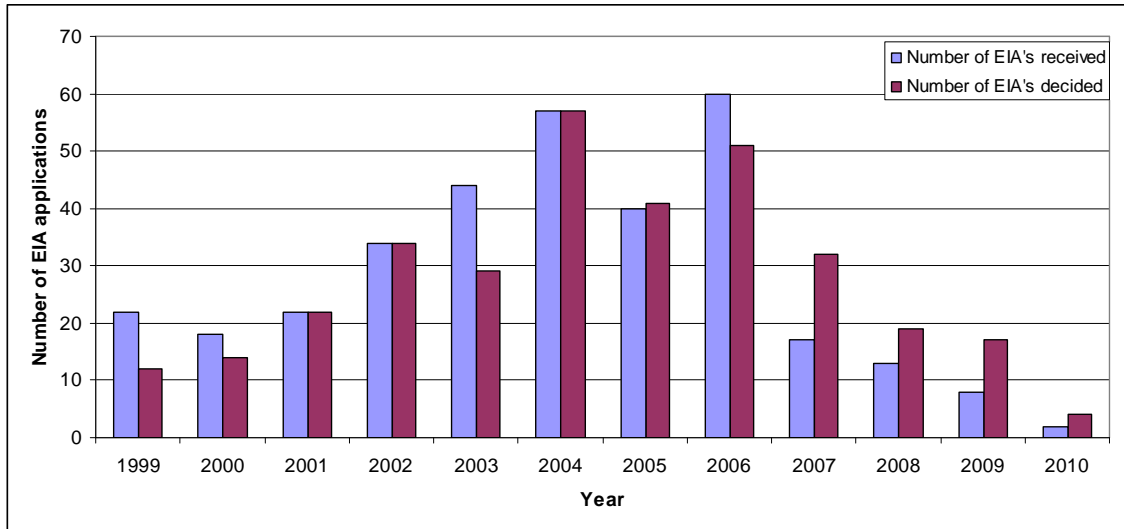


Figure 4.1: Number of EIA applications received and decided in uMngeni Municipality.

4.2.2 Mpofana Municipality

A total of 182 EIA applications were received and 178 EIA applications were completed (Figure 4.2).

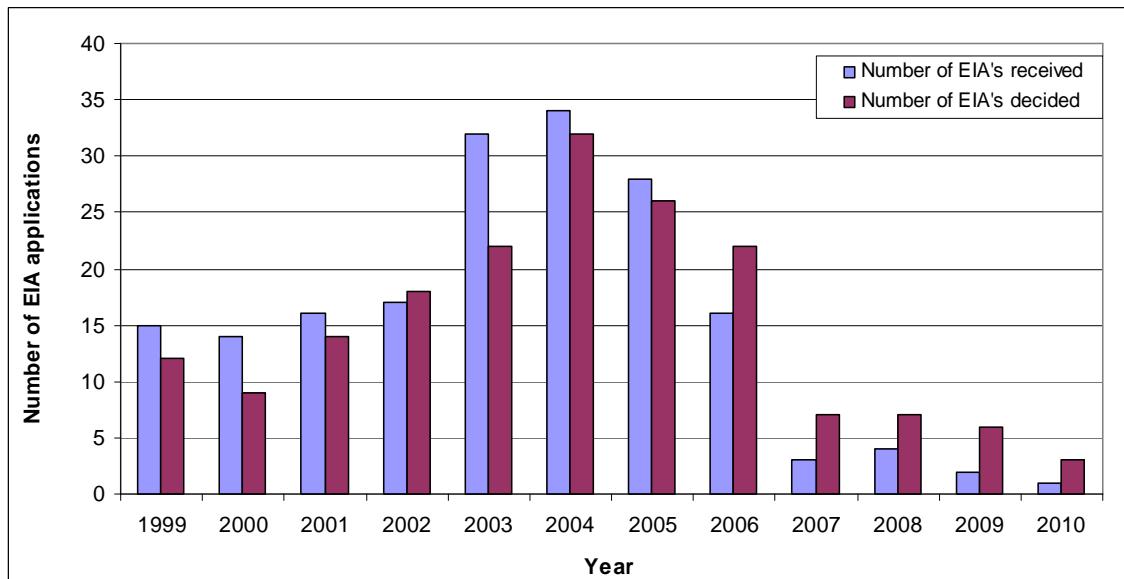


Figure 4.2: Number of EIA applications received and decided in Mpofana Municipality.

4.3 Location of EIA decisions in the uMngeni and Mpofana municipalities

Where the geographical co-ordinates for EIA applications (those decided) were available, their position was plotted to locate the EIA decisions in the municipalities. In Mpofana, the EIA applications authorised predominantly occur west of the town of Mooi River, while within uMngeni, the EIAs authorised occur throughout the municipality but tend to be clustered around the R103 and N3 (road network), secondary road networks and the Midmar dam (Figure 4.3). The applications appeared to be concentrated along the Midlands Meander route where farms and small holdings are being used for hobby farming. In the case of hobby farming it is noted that the farm or small holding is not used primarily for agricultural production but rather to indulge in hobbies and conduct activities such as the making of jewellery, furniture, wind chimes, cheese and artwork.

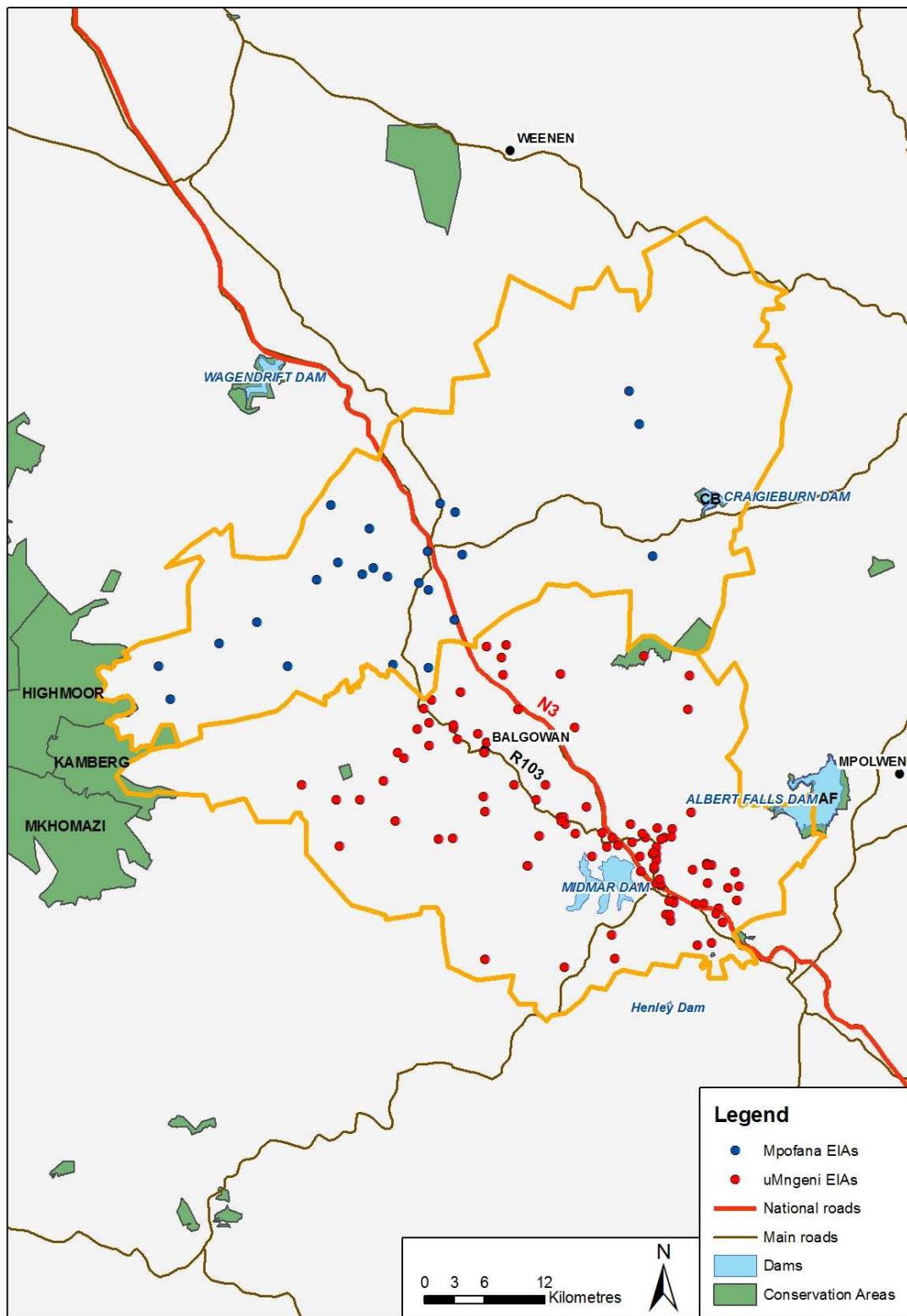


Figure 4.3: Location of EIA decisions in the uMngeni and Mpofana municipalities.

4.4 Types of EIA decisions issued

To demonstrate the types of EIAs issued it was necessary to exclude those applications that were currently in progress i.e. under review and which were not yet decided upon. In addition EIAs were excluded where there was insufficient information available on the EIA decision.

Within the uMngeni Municipality 141 applications were excluded i.e. seven applications were currently undergoing the EIA process and the type of decision issued was not available for 134 applications. Within uMngeni Municipality the types of EIA decisions issued were; 49 Exemptions, 56 Records of Decisions (RoD), 32 Environmental Authorisations, 37 Withdrawals, 19 Commencements and five Refusals (Figure 4.4). Within the Mpofana Municipality 89 applications were excluded i.e. five applications were currently in progress and an additional 84 applications were excluded as the type of decision issued was not available. The types of EIA decisions issued within the Mpofana Municipality were; 43 Exemptions, 11 Records of Decisions, six Environmental Authorisations, 25 Withdrawals, six Commencements and three Refusals (Figure 4.4).

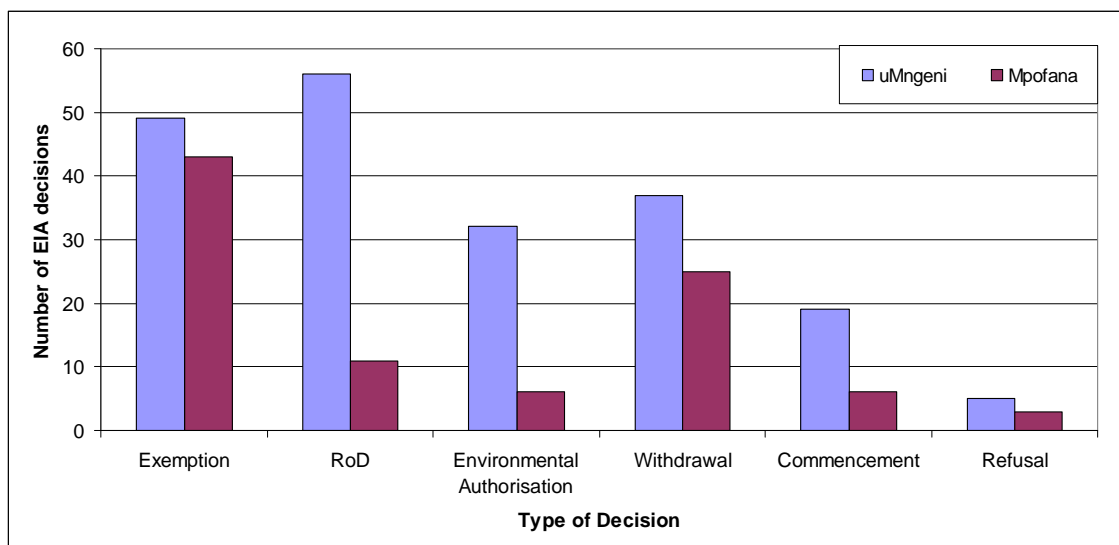


Figure 4.4: Number and type of decisions issued in uMngeni and Mpofana over the period 1999 - 2010.

The percentage of EIA decisions issued in the uMngeni Municipality were; 28% Records of Decisions, 25% Exemptions, 19% Withdrawals, 16% Environmental Authorisations, 10% Commencements and 3% of Refusals whilst the Mpofana Municipality issued 46% Exemptions, 27% Withdrawals, 12% Records of Decisions, 6% Environmental Authorisations, 6% Commencements (Figure 4.5).

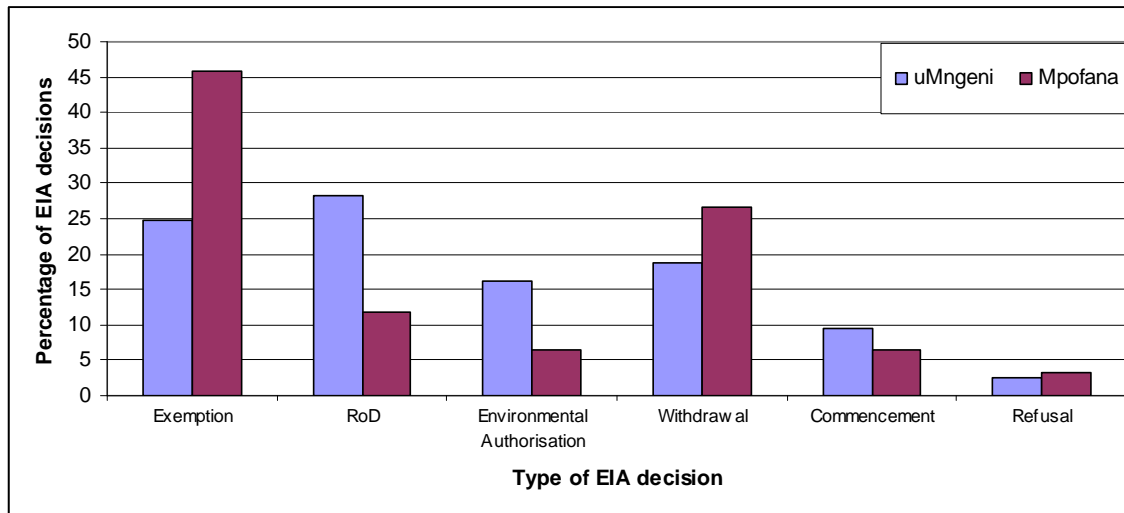


Figure 4.5: Percentage of EIA decisions issued in uMngeni and Mpofana over the period 1999 - 2010.

4.5 Changes in land uses

4.5.1 Agriculture to Tourism

The number of EIA decisions issued for a change in land use from Agriculture to Tourism in the uMngeni and Mpofana municipalities is shown in Figure 4.6. In the uMngeni Municipality there was an increase in the number of Agriculture to Tourism EIA decisions from 1999 to 2001, followed by a decline till 2004 and whilst an increase is noted in 2005, the number of EIA decisions drastically decline from 2006 onwards and in 2009 a null value was recorded as there were no EIAs decided for this land use category (Agriculture to Tourism) (Figure 4.6). There are a constant number of EIA decisions issued for a change in land use from Agriculture to Tourism in the Mpofana Municipality viz. three decisions per year in 1999, 2001 and 2002 and 2004; four decisions per year in 2000 and 2003; and, one decision per year in 2005 and 2007, with no EIA decisions issued from 2008 to 2010 in this category of land use change (Figure 4.6). In general the change in land use from Agriculture to Tourism appears to be greater in the uMngeni Municipality.

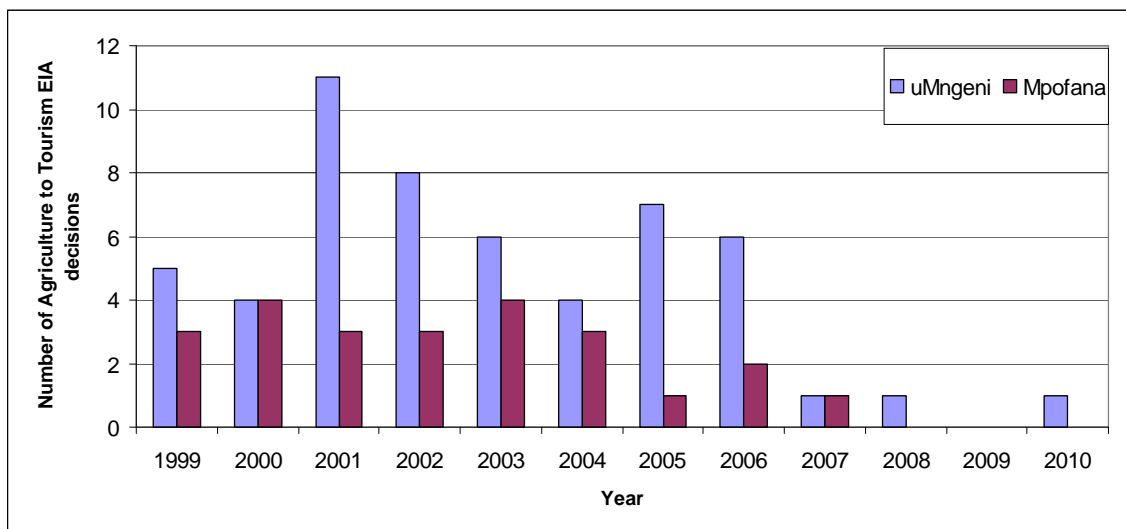


Figure 4.6: Change in land use from Agriculture to Tourism in uMngeni and Mpofana municipalities.

4.5.2 Agriculture to Residential

The number of EIA decisions issued for a change in land use from Agriculture to Residential in the uMngeni Municipality increased from 1999 to 2004, declined in 2005, increased in 2006 and a steady decrease was observed from 2007 onwards (Figure 4.7). The number of EIA decisions issued for a change in land use from Agriculture to Residential in the Mpofana Municipality increased from 1999 to 2005, decreased in 2006 and 2007, experienced slight increases in 2008 and 2009 and a decrease in 2010 (Figure 4.7). No EIA decisions were issued in this category (Agriculture to Residential) within Mpofana in 2000 and within uMngeni in 2001 and a null value was recorded. A notable trend in this land use category is that the Agriculture to Residential land use increased till 2004 for uMngeni and 2005 for Mpofana and then decreased thereafter for both municipalities.

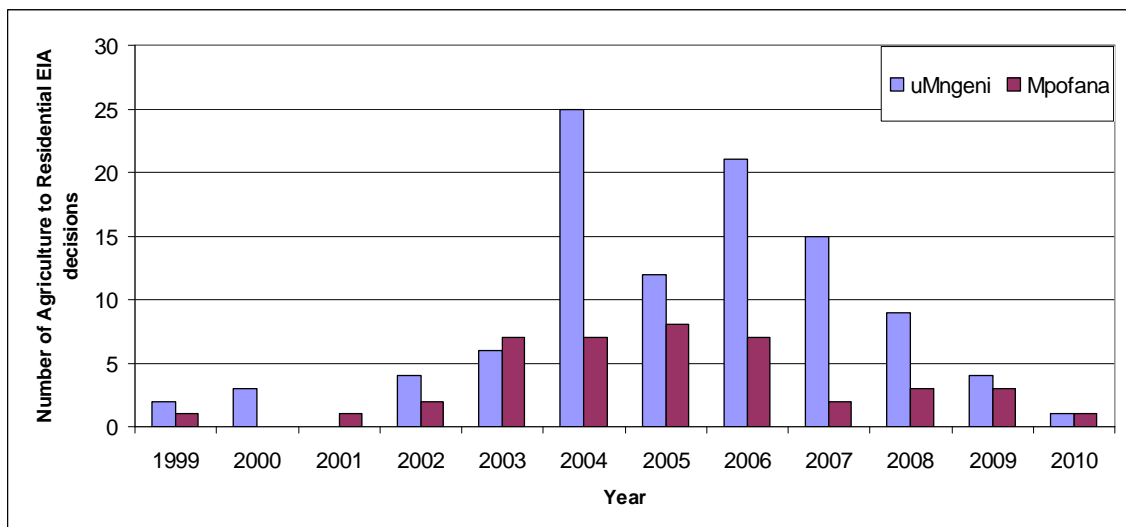


Figure 4.7: Change in land use from Agriculture to Residential in uMngeni and Mpofana municipalities.

4.5.3 Agriculture to Other land uses

Within uMngeni Municipality for the Agriculture to Other land use category a steady increase in the number of EIA decisions was reflected for the 1999 to 2001 period, with a decrease in 2002 and 2003. Nearly a twofold increase in this land use change is achieved in 2004 with a decline in 2005. In 2006 the land use change increases yet decreases in 2007 and 2008 with an increase in 2009 and another decrease in 2010 (Figure 4.8). The number of EIA decisions for Agriculture to Other land use over the period 1999 - 2010 in the Mpofana Municipality varied considerably. Whilst five decisions were issued in 1999, this figure was halved in 2000 and then trebled in 2001. A decrease in EIA decisions in this land use category was experienced in 2001 to 2003 with the most decisions being issued in 2004. There was a decrease in EIA decisions issued from 2005 onwards with the exception of 2008 (two decisions issued) and 2009 (no decision issued) (Figure 4.8). Whilst no obvious trend in this category is noticeable it appears that the uMngeni Municipality experienced greater change than the Mpofana Municipality in the Agriculture to Other land use category.

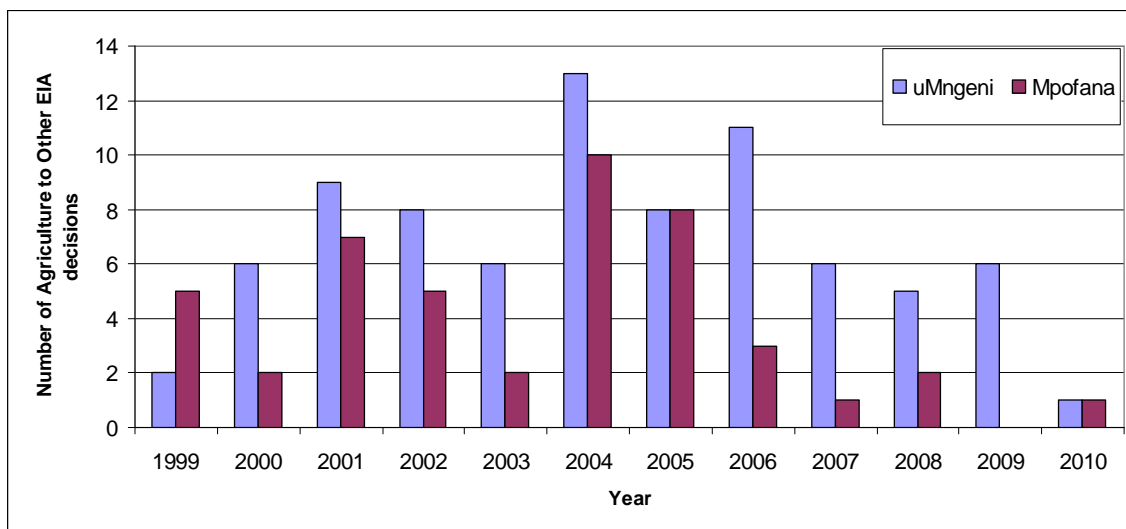


Figure 4.8: Change in land use from Agriculture to Other land uses in uMngeni and Mpofana municipalities.

4.5.4 Change in land use within Agriculture

A decrease in EIA decisions for a change in Agricultural use from 1999 to 2000 is noted with no change in agricultural land use in 2001 and a significant increase in year 2002 to 2004, decreasing in 2005 to remain as such in 2006, with a further decrease in 2007 and 2008, an increase in 2009 and a decrease in 2010 (Figure 4.9). Within the Agricultural to Agricultural land use category in Mpofana, one decision was issued per year in 1999 to 2001 and nine decisions per year in 2002 to 2004. A slight decrease and increase was noted in 2005 and 2006 respectively with a sharp decrease occurring in 2007. While no decision was issued in 2008, an increase followed by a decrease in decisions issued was experienced in 2009 and 2010 respectively (Figure 4.9). For both municipalities on average it is recognised that changes in land use within Agriculture were few until 2001, and increased notably in 2002 to remain relatively stable until 2005/6, upon which a decrease within Agricultural land use is noted thereafter.

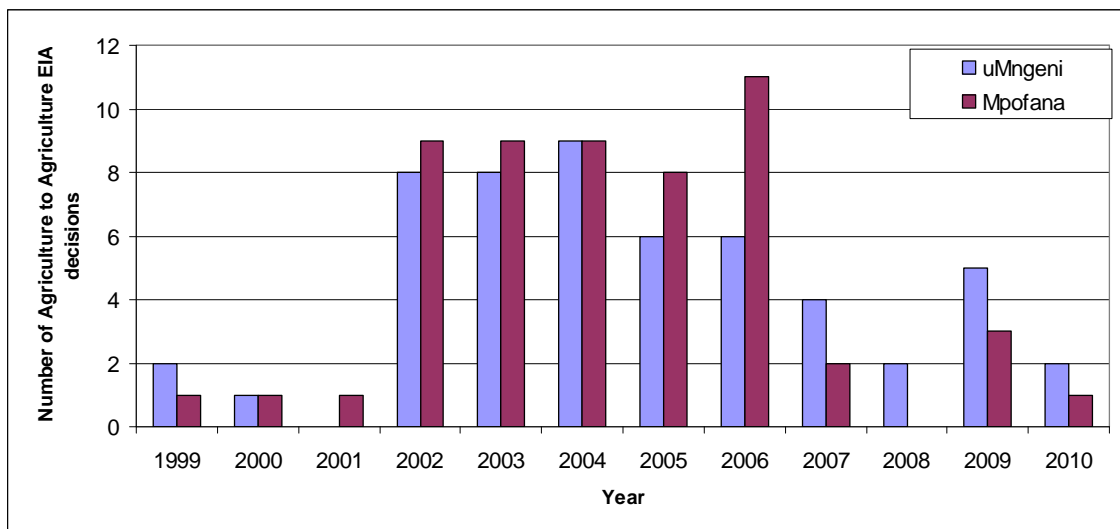


Figure 4.9: Change in land use within Agriculture in the uMngeni and Mpofana municipalities.

4.5.5 Expansion within land use

There were no EIA decisions issued in 1999, 2000, 2008 and 2010 in the Expansion within land use category for uMngeni Municipality and alternate years of increases and decreases were noticeable from 2002 to 2006 with a decline thereafter (Figure 4.10). For the years 1999, 2001, 2004 and 2005 there were two EIA decisions issued per year in the Expansion within land use category within Mpofana and no decisions were issued for this category in the year 2000, 2002, 2003 and 2006 to 2010 (Figure 4.10). Overall there does not appear to be any discernable trend except to note that the expansion within land uses occurred far more in uMngeni than in Mpofana Municipality.

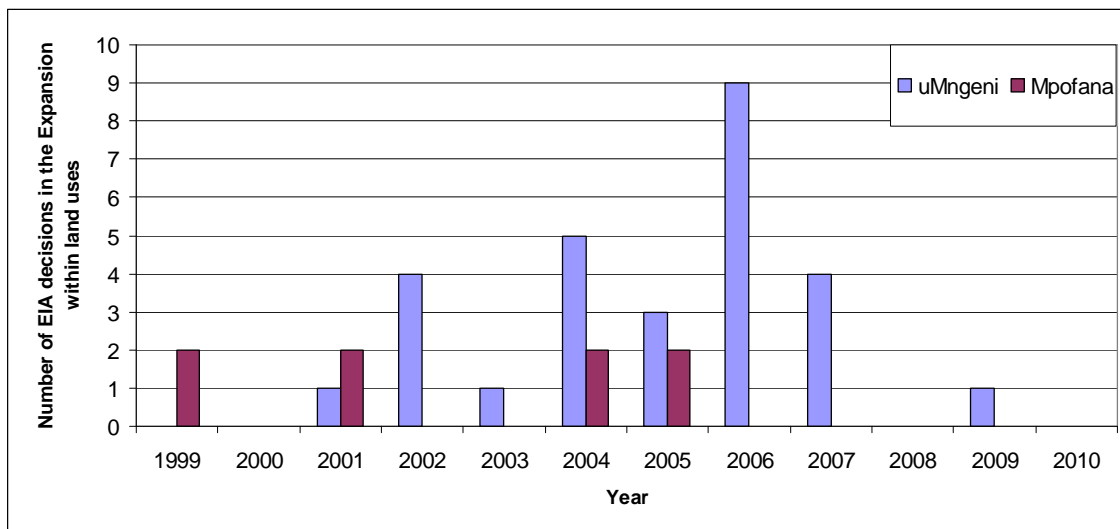


Figure 4.10: Expansion within land uses in uMngeni and Mpofana municipalities.

4.5.6 Change in Other land use

With the exception of 2000 and 2010 there has been a minimum of at least one to four EIA decisions made in the Change in Other land use category within uMngeni Municipality (Figure 4.11). In the Mpofana Municipality two EIA decisions were recorded in 2004 for the Change in Other land use category whilst nil values are noted for other years (Figure 4.11). There does not appear to be any obvious trend in the Change in Other land use category.

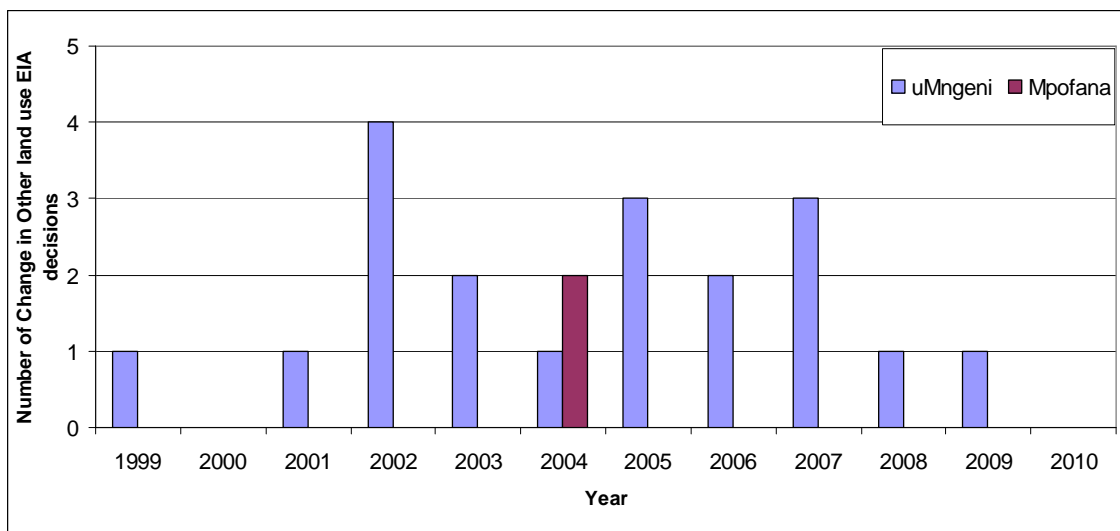


Figure 4.11: Change in Other land use decisions in uMngeni and Mpofana municipalities.

4.5.7 Overall land use changes within uMngeni and Mpofana municipalities

The percentage of change experienced in land use per key land use category was 30% for Agriculture to Residential, 24% for Agriculture to Other, 16% for Agriculture to Tourism and Agriculture to Agriculture respectively, 8% for Expansion within a land use category and 6% for Change in Other land use in the uMngeni Municipality (Figure 4.12). The land use change that experienced the greatest transformation over 1999 - 2010 in the Mpofana Municipality was Agriculture to Agriculture (31%) followed by 26% change in Agriculture to Other, 24% Agriculture to Residential, 14% Agriculture to Tourism, 5% for Expansion within a land use category and 1% for Change in Other land use (Figure 4.12).

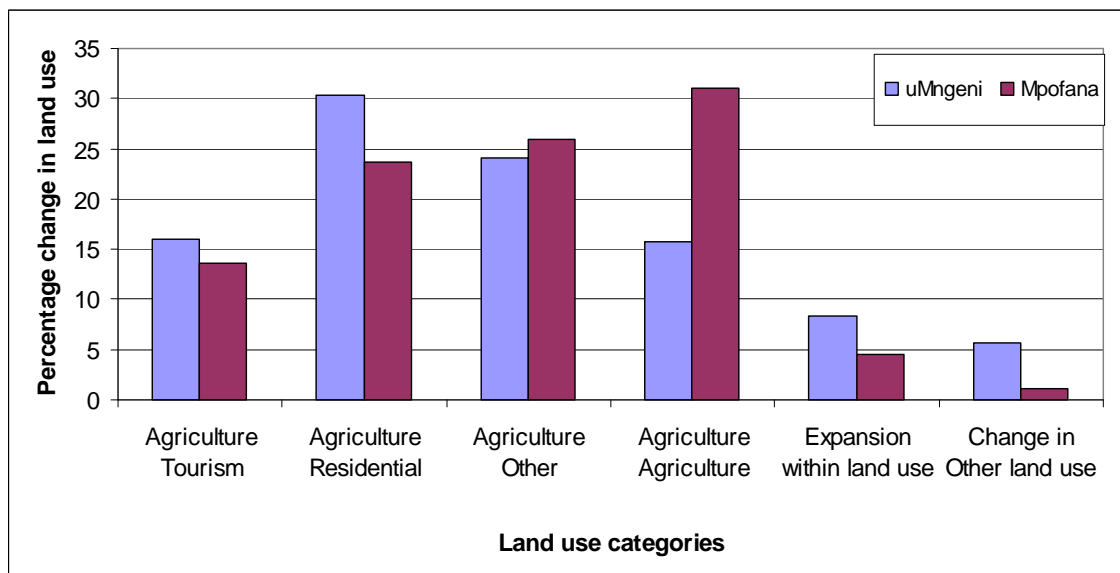


Figure 4.12: Percentage changes in land use categories for uMngeni and Mpofana municipalities.

4.6 Extent of land use changes

The extent of land use change was calculated by dividing the extent of the proposed development in hectares by the total extent of property (by cadastral boundary) in hectares.

4.6.1 uMngeni Municipality

The Agriculture to Residential land use category comprises the greatest change in extent of land use (49%), followed by the Agriculture to Other (19%), Agriculture to Tourism (18%), Agriculture to Agriculture (9%) and Expansion within land use (3%) (Table 4.1).

Table 4.1: Extent of land use changes within uMngeni Municipality 1999 - 2010.

Land Use Change Category	Total Extent of Property (ha)	Total Extent of Proposed Development (ha)	Proportional Percentage change in extent
Agriculture to Tourism	1 261	222	18
Agriculture to Residential	2 484	1 208	49
Agriculture to Other	2 053	394	19
Agriculture to Agriculture	10 038	909	9
Expansion within land use	1 995	53	3
Total	17 831	2 786	16

4.6.2 Mpofana Municipality

The Agriculture to Residential land use category comprises the most change in extent of land use (58%), followed by the Agriculture to Tourism (46%), Agriculture to Agriculture (8%), Expansion within land use (2%) and Agriculture to Other (1%) (Table 4.2).

Table 4.2: Extent of land use changes within Mpofana Municipality 1999 - 2010.

Land Use Change Category	Total Extent of Property (ha)	Total Extent of Proposed Development (ha)	Proportional Percentage change in extent
Agriculture to Tourism	1 820	838	46
Agriculture to Residential	1 899	1 100	58
Agriculture to Other	1 909	20	1
Agriculture to Agriculture	11 331	879	8
Expansion within land use	369	7	2
Total	17 327	2 843	16

The cumulative extent of land use change for the uMngeni and Mpofana municipalities are illustrated in Table 4.3 with the Agriculture to Residential category undergoing the greatest change (53%), followed by the Agriculture to Tourism (34%) and Agriculture to other (10%) and Agriculture to Agriculture (8%) categories.

Table 4.3: Extent of land use change in hectares for the uMngeni and Mpofana municipalities.

Land Use Change Category	Total Extent of Property (ha)	Total Extent of Proposed Development (ha)	Proportional Percentage change in extent
Agriculture Agriculture	21 369	1 788	8
Agriculture Other	3 962	414	10
Agriculture Residential	4 383	2 307	53
Agriculture Tourism	3 081	1 060	34
Expansion within land use	2 363	60	3
Total	35 158	5 629	16

4.7 Reasons for deciding EIA applications

The content of an EIA decision that has been approved or refused is specified in section 38 of GNR No. R385 of 21 April 2006. A key element of any EIA decision is the Key Decision Factors (KDF). As the term suggests, these KDFs refer to the reasons or findings after the review of the EIA which led the decision maker to approve or refuse the EIA application. One hundred and forty-four (144) approval and eight refusal EIA decisions (RoDs and EAs) which could be located in the uMngeni and Mpofana municipalities were examined and the key decision factors and rate of occurrence of each KDF in each EIA decision was recorded.

4.7.1 EIA decisions that were approved

The types of key decision factors contained within an approval decision and their frequency of use in EIA decisions for both Municipalities are presented in Table 4.4. Fifty-nine percent (59%) of EIA decisions were based on comments from Ezemvelo KwaZulu-Natal Wildlife and Amafa aKwaZulu-Natali (viz. content of Heritage Impact Assessments), 53% of EIA decisions were based on the findings of a public participation process and 44% can be attributed to the need and

desirability of the proposed activity. The comments of Macro Planning and the Soil Conservation section of the DAEA&RD, the objectives and requirements of relevant legislation, policies and guidelines, including s2; s24(7) and s28 of the National Environmental Management Act, 1998 (Act No. 107 of 1998) and the identification of no detrimental environmental impacts were taken into consideration for 42% of EIA decisions.

Table 4.4: Key decision factors contained in EIA decisions (approvals) within uMngeni and Mpofana municipalities.

Key approval decision factors	uMngeni	Mpofana	Total	Percentage
Ezemvelo KwaZulu-Natal Wildlife	60	25	85	59%
Amafa aKwaZulu-Natali	54	31	85	59%
Conducted a Public participation process	61	15	76	53%
Need and desirability	39	24	63	44%
NEMA s2, s24(7) & s28	47	14	61	42%
Macro planning and Soil Conservation	43	18	61	42%
No detrimental environmental impacts	44	16	60	42%
Department of Water Affairs	32	6	38	26%
Planning initiatives EMF, IDP, LUMS, SDF, SEA*	26	9	35	24%
Comment from Local and/or District Municipality	28	6	34	24%
No conflict in land use	24	8	32	22%
Investigation of Alternatives	23	6	29	20%
Services available, small size of development	15	12	27	19%
Environmental Management Plan	15	10	25	17%
Department of Transport, SA National Roads Agency, Traffic Impact Assessment	20	3	23	16%
Area to be transformed is disturbed, degraded	11	11	22	15%
KwaZulu-Natal Crane Foundation	11	9	20	14%
Department of Agriculture, Forestry and Fisheries	9	7	16	11%
Comment from neighbours	8	7	15	10%
Eskom	7	1	8	6%
Findings of various specialist studies	7	1	8	6%
Endangered Wildlife Trust	3	4	7	5%
Wildlife and Environment Society of South Africa	3	2	5	3%
Total number of EIA decisions reviewed	102	42	144	
* KEY:- EMF - Environmental Management Framework IDP - Integrated Development Plan LUMS - Land Use Management Scheme NEMA - National Environmental Management Act, Act No. 107 of 1998 SDF - Sustainable Development Framework SEA - Strategic Environmental Assessment				

4.7.2 EIA decisions that were refused

A review of eight refusal decisions located within uMngeni and Mpofana municipalities was undertaken (Table 4.5). The findings of key specialist studies are responsible for 88% of decisions being refused, 75% of decisions were refused as the proposed land uses were incompatible, and 63% of refusal decisions were attributed to comments from Ezemvelo KwaZulu-Natal Wildlife's regarding the biodiversity impacts and the consideration of incompatible planning initiatives respectively.

Table 4.5: Key decision factors contained in EIA decisions (refusals) within uMngeni and Mpofana municipalities.

Key refusal decision factors	uMngeni	Mpofana	Total	Percentage
Findings of various specialist studies	5	2	7	88%
Incompatible land use	3	3	6	75%
Ezemvelo KwaZulu-Natal Wildlife	5	0	5	63%
Incompatible planning initiatives EMF, IDP, LUMS, SDF, SEA*	2	3	5	63%
NEMA s2, s24(7) & s28	2	2	4	50%
Need and desirability	2	2	4	50%
Amafa aKwaZulu-Natali	4	0	4	50%
Department of Transport, SA National Roads Agency, Traffic Impact Assessment	4	0	4	50%
Department of Water Affairs	4	0	4	50%
Significant environmental, biodiversity impacts	1	2	3	38%
Macro planning and Soil Conservation	3	0	3	38%
Department of Agriculture, Forestry and Fisheries	2	1	3	38%
Alternatives insufficient or unavailable	0	3	3	38%
Conducted a Public participation process	3	0	3	38%
Services unavailable, inappropriate size of development	2	1	3	38%
Comment from Local and/or District Municipality	2	0	2	25%
Wildlife and Environment Society of South Africa	1	0	1	13%
KwaZulu-Natal Crane Foundation	1	0	1	13%
Environmental Management Plan	0	1	1	13%
Number of EIA decisions reviewed	5	3	8	
* KEY:- EMF - Environmental Management Framework IDP - Integrated Development Plan LUMS - Land Use Management Scheme NEMA - National Environmental Management Act, Act No. 107 of 1998 SDF - Sustainable Development Framework SEA - Strategic Environmental Assessment				

4.8 Summary

During the period 1999 - 2010, 337 EIA applications were received and 332 applications were completed in the uMngeni Municipality, whilst 182 EIA applications were received and 178 EIA applications were completed in the Mpofana Municipality. Development occurred throughout the uMngeni Municipality and tended to be concentrated along road networks (primary and secondary), the Midmar Dam and the Midlands meander route whilst in Mpofana Municipality development occurred west of the town of Mooi River.

The types of EIA decisions issued for both municipalities comprised of Exemptions, Record of Decisions, Environmental Authorisations, Withdrawals, Commencements and Refusals. More Record of Decisions (28%) and Exemptions (25%) were issued in the uMngeni Municipality whilst a greater percentage of Exemptions (46%) and Withdrawals (27%) were issued in Mpofana Municipality. The results identified key land use change categories as Agriculture to Tourism, Agriculture to Residential, Agriculture to Other, Agriculture to Agriculture, Expansion within land use and Change in Other land uses for both Municipalities. It was established that within uMngeni Municipality the predominant land use changes occurred in the categories: Agriculture to Residential (30%), Agriculture to Other (24%) and Agriculture to Tourism (16%), whereas in Mpofana Municipality the principal land uses changes were within the Agriculture to Agriculture (31%), Agriculture to Other (26%) and Agriculture to Tourism (14%).

The extent of land use changes (area in hectares) for both municipalities during the research period was a total of 2 307 ha converted from Agriculture to Residential (53%) and 1 060 ha of land transformed from Agriculture to Tourism (34%). The reasons for approving EIA decisions were based primarily on comments from Ezemvelo KwaZulu-Natal Wildlife, Amafa aKwaZulu-Natali, the findings of a public participation, the need and desirability of the development, the principles of NEMA and comments from Macro Planning and Soil

Conservation sections of DAEA&RD and no detrimental environmental impacts being identified in the EIA review process. The findings of specialist studies (viz. water quality, reserve determinations, geotechnical results, biodiversity, vegetation or agricultural assessments), incompatible land uses and planning initiatives and comments from Ezemvelo KwaZulu-Natal Wildlife were found to be the key reasons in refusing EIA decisions.

In conclusion, this chapter presented the number, spatial location and types of EIA decisions issued within the uMngeni and Mpofana municipalities for 1999 - 2010, key land use change categories were identified and their extents quantified and the reasons for approving and refusing EIA decisions were outlined. The following chapter will discuss the findings of the research and explore the significance of the research outcomes in relation to the literature reviewed.

CHAPTER 5: DISCUSSION

5.1 Introduction

This chapter discusses the findings of the research in respect to the expectations and general perceptions as outlined in the literature review.

5.2 Quantifying EIA applications

The number of EIAs received for both municipalities increased from 1999 to 2006, and decreased from 2006 to 2010. This can be attributed to the promulgation of new EIA regulations in 2006 under the NEMA Act which altered the listed activities for which Environmental Authorisation (a RoD) was required. When compared to activities being applied for under the ECA EIA regulations (between 1999 - 2006), the NEMA EIA regulations of 2006 made distinctions in the EIA assessment process (Basic Assessment or Scoping/Environmental Impact Assessment) to be followed when applying and introduced the concept of definitions and thresholds for listed activities. In essence, where an activity may have been listed (required Environmental Authorisation or a RoD) under the ECA EIA regulations, it may not necessarily have required such authorisation under the NEMA EIA regulations. As such, it can be inferred that the decrease in applications received after 2006 can be due to the refinement and robustness of the new NEMA EIA regulations in 2006.

Since 2006, there is a distinct change in the way EIAs have being conducted with there being a noticeable improvement in the EIA process. The public participation process and consultation process has become more prescribed with there being guidelines for advertising, notice boards etc, time frames for commenting on reports and the inclusion of people with special needs. In determining whether environmental authorisation is required the development proposal receives a screening with key issues and concerns being identified upfront so that applicants are aware of the process to be followed. Interestingly since 2006 there has been less cultivation of land applications' when compared to the ECA EIA regulations and more applications for residential estates, office parks and

warehouses (personal observation). Whilst this may appear to reflect an improvement in the local economy and a slightly pessimistic view in respect of food security, it is advisable to be cautious in this regard in the absence of necessary financial statements and figures etc. It must also be borne in mind that the cultivation of land activity included a prescribed threshold and that there is a possibility that applicants were not required to apply as they did not trigger the NEMA EIA regulations.

In addition, it is noteworthy to mention that in 2001, 2003 and 2006 the DAEA&RD experienced a recruitment of staff within the EIA component, a larger budget allocation and a new Departmental structure was established that comprised of distinct District offices for service delivery (DAEA&RD, 2007 and Felton, pers comm., 19 November 2009). The number of completed EIAs increased in the years after the capacity and skills of staff increased, budget allocations and changes to the Departmental structure.

From the findings it can be noted that in some years more applications were completed than those being received in that year. This is due to the review and consideration of applications from previous years being finalised after the year they were received in. This time lag illustrates that the applications received in any year were not necessarily finalised within that year but carried over into the following years especially if outstanding information or comments, specialist studies or public participation was still to be submitted on the applications. The research shows that more applications were completed in the uMngeni Municipality than in the Mpofana Municipality. This may be because the uMngeni Municipality received a greater number of EIA applications (337 applications or approximately 65%) than the Mpofana Municipality (178 applications or approximately 35%) over the duration of the research period. Furthermore it must be noted that with an increase in staff capacity and EIA review skills over the years, more applications could have been completed.

The type of decisions issued within the uMngeni Municipality comprise predominantly of Records of Decisions (RoD's) (28%) and Exemptions (25%) whilst the Mpofana Municipality issued more Exemptions (46%) and Withdrawal decisions (27%).

Whilst the content of an EIA decision is prescribed in the NEMA and associated EIA regulations, it is recognised that the structure of a Record of Decision and an Exemption vary slightly. As such similarities include:

- a description of the activity being applied for,
- the applicants postal contact details,
- the decision to approve or refuse the application,
- conditions and key decision factors,
- a validity period and the appeal process.

The RoD is a lengthier and more robust document that contains the following details:

- a comprehensive description of the activity applied for and its location (e.g. property details, map name and number, geographical co-ordinates),
- detailed contact particulars of the applicant and Environmental Assessment Practitioner who undertook the EIA,
- a summary of site visits undertaken,
- a list of key documentation assessed in the EIA review process (e.g. application forms, scoping and specialist reports, correspondence from interested and affected parties, comments from key authorities),
- a report that summarises the development site and receiving environment (e.g. its locality, current and past land uses, vegetation type),
- details in respect of the developers motivation or need and desirability, and
- the public participation process undertaken and a review of specialist studies submitted (e.g. geotechnical recommendations, wetland delineations and cultural or heritage findings).

RoDs were issued for EIA applications which were considered complex and contentious (viz. activities located in sensitive environments, socially complex and highly contested) or which were in progress for a lengthy period of time. An Exemption decision was issued for applications that were considered to be of a small to medium size and of low sensitivity. A withdrawal decision refers to an application (ECA or NEMA) being withdrawn prior to a decision being issued.

It is speculated that the withdrawal decisions (27% in Mpofana Municipality) may be attributed to change in legislation where activities were no longer deemed to require authorisation (i.e. not listed in the NEMA EIA regulations) or primarily as a result of applications having lapsed (i.e. the information required for decision making not being submitted timeously or at all) or requested to be withdrawn by the applicant as they did not wish to pursue the development (i.e. change in financial or social circumstances).

To illustrate the aspect of activities no longer being listed (requiring environmental authorisation) it is noted that many more changes in land use applications were received for review and decision making under the ECA EIA regulations for activities such as Bed and Breakfasts, lodges, chalets and self-catering units and studios to making furniture, jewelry or artwork (personal observation). The numbers of these applications were reduced with the promulgation of the new NEMA EIA regulations as these activities no longer required environmental authorisation. In addition fewer cultivation of land applications were received with the promulgation of the NEMA EIA regulations than were authorised under the ECA EIA regulations. This may mostly be as a result of the introduction of thresholds for the transformation or removal of indigenous vegetation (i.e. 3ha, 20ha or any size in an endangered ecosystem) and this allowed farmers to cultivate sections of farmland that fell below the requirements for environmental authorisation. At the same time the NEMA EIA regulations also contained a listed activity in respect of phased activities (i.e.

expansions or extensions exceeding the thresholds) and so whilst the initial activity did not require an environmental authorisation, the applicant was required to apply for phased activities. It is a personal view that the phased activity did not appear to be applied for under the circumstances.

The higher incidence of RoDs and Exemptions being issued in the municipalities is fundamentally as a result of the types of activities that were applied for. Where the applications were complex and contentious - RoDs were issued and in contrast where there were few concerns and no detrimental harm to the environment was envisaged in applications - exemptions were issued. Consequently it is postulated that in the period of earlier ECA decision making in which there were few concerns from an environmental perspective and where the public participation process was more prescribed, that more Exemption decisions were issued. For example with cultivation of land applications the prescribed key authorities from which comments were required to make a decision included Ezemvelo KwaZulu-Natal Wildlife, KwaZulu-Natal Crane Foundation, Amafa aKwaZulu-Natali and the DAEA&RD's Soil Conservation section. Where the comments from these authorities were submitted, an Exemption decision was compiled after the review process. Contrastingly, more RoDs were issued as the public participation process developed, and interestingly as staff compliments grew in the Department with there being a growing need for applying consistency and norms and standards in EIA decision making. Where more non-governmental organisations registered as interested and affected parties (I&AP's), or as the specifications for site notices and newspaper advertisements became more prescribed it became evident that a consistent review and decision making process was required. In the case of residential estate type developments, checklists and a guideline document was developed and agricultural assessments were requested to be undertaken to ensure that high potential soils were not being transformed. In addition with I&AP's raising concern in respect of service provision (e.g. water, electricity supply, sewage and solid waste disposal) geotechnical investigations or percolations tests were

required and even biodiversity assessments and traffic impact assessments were usually requested to be undertaken. With far more concerns being raised and the complexity of issues increasing in these types of applications RoD's were issued.

5.3 Location of EIA decisions

Based on a sample of EIA decisions where geographic co-ordinates were available, the position of the developments was plotted within the uMngeni and Mpofana municipalities in a GIS. In visualising the EIAs issued it was noted that the uMngeni Municipality experienced greater development pressure than the Mpofana Municipality with most development being concentrated along key transport routes (viz. the R103, N3 and secondary roads) and surrounding the Midmar Dam. Xie et al. (2005) reported that the use of Geographic Information Systems (GIS) to observe spatial patterns and explore relationships between land uses is important as the visualising of spatial trends and their rates can be used to develop models of land use changes. Moreover, the visualisation of changes in land use patterns can ensure that priority areas that are in need for specific consideration and which require or intervention are identified (Verburg et al, 2006).

This can be considered useful in the uMngeni and Mpofana municipalities where it was observed that there was an increasing trend in non-agricultural activities viz. residential (largely residential estates and high income), tourism (bed and breakfasts and self-catering) and other (mainly infrastructure - cellular masts, and water supply schemes). Essentially policy decisions can be taken based on the assessment of the cumulative impacts of these activities (land use changes) and their implications can further be investigated so that decision makers can take consistent decisions that are based on current information.

Yuan et al. (2005) advocated the collection of accurate spatial information to quantify and visualise the nature and extent of changing land uses and Tang et al. (2005) suggested that land use models be used to explore future land use

changes and their environmental impacts. Research conducted by Tulloch et al. (2003) in the Netherlands, UK and New Jersey (USA) has recommended the incorporation of geographic information systems with the use of farmland preservation policies to prevent abandonment of agricultural land use activities and to ensure sustainable farming. With there being support for the use of GIS, the application of GIS in the EIA review process can become a pivotal point in the decision making process.

5.4 Changes in land uses

The most significant change in land use for the uMngeni Municipality is from Agriculture to Residential with 30% of EIA decisions comprising this category and Agriculture to Other land uses (26%) and between Agriculture to Tourism and Agriculture to Agriculture (both 16%). In the Mpofana Municipality the predominant land use change occurs within Agriculture (i.e. Agriculture to Agriculture - 31%) followed by Agriculture to Other (26%) and Agriculture to Residential (24%). Key activities comprising the Agriculture to Other category included infrastructure (viz. cellular masts, dams, water supply schemes and roads) and the expansion of existing Agricultural land due to a change in crop for cultivation and the construction or expansion of poultry facilities, piggeries, dairies and abattoirs.

Whilst the Agriculture to Residential category comprised of low, middle and high income housing, residential estates and proposed subdivisions, there were more low income housing occurring in uMngeni and middle to high income and residential estates in Mpofana, with similar levels of subdivision occurring in both municipalities. With the Midlands Meander straddling both municipalities, the trend for a land use change from Agriculture to Tourism was noticeably greater in uMngeni than in Mpofana. In addition, with the Mpofana area being renowned for its high potential agricultural soils, the Agriculture to Agriculture change is in keeping with this premise. It can however be seen that there is a competition for land uses especially with regards to agriculture, infrastructure (services such as

providing water, sanitation and communication networks to people) or to provide a range of housing (low income, middle to high income and residential estates).

Verberg et al. (2006) identified that the abandonment of agricultural land for residential, industrial and recreational use was a key factor that caused the landscape to change in Europe. In contrast however, Gilg (2009) in his review on the perceptions of land use in England, revealed that the predominant use of land was for the production of food and raw materials. The reality of the situation is that a loss of biodiversity is being experienced so that land can be transformed either to agricultural use or residential use. It is therefore essential for us to plan to set aside areas of high biodiversity so that they are conserved in perpetuity, map out areas with high potential agricultural soils so that they are farmed and so the population is provided with food and similarly that people are provided with houses and infrastructure in key areas that do not encroach on the environment. The findings of this research appear to conform to the expectations as per documented literature.

5.5 Extent of land use changes

Within the uMngeni Municipality, the extent of land that has changed to a particular land use is greatest for the Agriculture to Residential category, followed by the Agriculture to Other and Agriculture to Tourism category - this appears to be aligned to the trend of a change in land use for the Municipality. However, within the Mpofana Municipality, the extent of land use change is predominantly Agriculture to Residential and Agriculture to Tourism categories with less land being changed to the Agriculture to Agriculture category. It can be argued that the agricultural expansions could have been intensive and that there were several decisions for piggeries and poultry units, however the footprint of agricultural development is far less than residential development. Where agricultural lands were not being used for the purpose of food production (i.e. abandoned) it was noted that additional activities such as 'part time' or 'hobby'

farming was being conducted (Verburg et al, 2006) and this is similar to the findings of this research.

In both municipalities it was observed that more land has been converted to residential and tourism use with several infrastructural developments (cellular communications, water supply, institutional, commercial and industrial) as compared to agricultural land uses. This finding is in keeping with the premise that there is an increase in non-agricultural land uses rather than agricultural land uses. The data demonstrates that there is a competition for land use particularly within agricultural land uses and from Agriculture to Residential land use between 2002 and 2006 in Mpofana Municipality. Similarly between 2004 and 2007 the uMngeni Municipality faced a similar pressure with the same land uses.

5.6 Reasons for deciding EIA applications

The Key Decision Factor section in an EIA decision presents the key findings and reasons that the DAEA&RD have come to in granting or refusing the application.

In reviewing a total of 144 EIA decisions that were approved within uMngeni and Mpofana municipalities over the period 1999 - 2010, critical elements were identified viz. there were a range of key decision factors that were used in deciding EIA applications, the rate at which they occurred during the period 1999 to 2010 and the frequency with which they occurred.

Key deciding factors in an EIA decision ranged from the content of comments from various key authorities, neighbours and interested and affected parties, the consideration of key elements in an EIA process (consideration of alternatives, a public participation process), findings of specialist studies and the consideration of NEMA principles and site visit findings. Comment from Ezemvelo KwaZulu-Natal Wildlife and Amafa aKwaZulu-Natali were considered in 59% of EIA decisions with 53% of EIA decisions containing the findings of the public participation process and 44% of decisions considering the need and desirability

of the proposal. The findings of a site visit, comment from Macro Planning and Soil conservation components of the DAEA&RD and the NEMA were taken into account for 42% of decisions. Although this demonstrates that the opinions of experts are being considered it must be noted that limited consultation or consultation with key Departments or authorities reduces the effectiveness of the EIA process in terms of ensuring that there is participative and consultative decision making.

Whilst the consideration of planning initiatives, comments from Local and/or District Municipality and the consideration of alternatives were noted in approximately 20-24% of decisions it is interesting to note that many of these decisions were those after 2006. Accordingly with a change in the EIA regulations and with emphasis on EIA public participation process and spatial planning, these factors began to emerge within decisions.

Within the uMngeni and Mpofana municipalities there were eight EIA decisions that were refused over the period 1999- 2010 and similarly whilst key comments from key authorities were used as KDFs - it was usually that these comments were not in support of the development as the key authority had identified concerns and considered the impacts to be significant. Essentially 88% of refusal decisions were based on the findings of various specialist studies (agricultural assessments, reserve water determinations, water quality, vegetation or faunal assessments and visual impact assessments), and 75% of refusals were on the basis of incompatible land uses. Ezemvelo KwaZulu-Natal Wildlife had alerted the DAEA&RD to the conservation status and significance of biodiversity elements on 63% of decisions that were refused and planning initiatives comprised 63% of refusal decisions. With refusal decisions it appears that the findings of specialist studies and the incompatibility of land uses and their spatial location play a key role in the EIA decisions.

5.7 Summary

The findings of the research conform to the expectations documented in the literature reviewed. The suggestion of competing land uses has been confirmed. Following which the predominant change in land use has been that of agricultural land being transformed to residential use (urbanisation) and the development of infrastructure and tourism.

CHAPTER 6: CONCLUSIONS

6.1 Conclusions

The aim of the research was to document the EIAs that were approved in the uMngeni and Mpofana local municipalities over the period 1999 - 2010, with a focus on observing the changes that have occurred in land uses.

During the period 1999 to 2010 a total of 337 EIA applications were received and 332 EIA applications were completed in the uMngeni Municipality and a total of 182 EIA applications were received and 178 EIA applications were completed in the Mpofana Municipality. The types of EIA decisions made consist of Records of Decisions, Environmental Authorisations, Exemptions, Withdrawals and commencements. The uMngeni Municipality issued the most RoD's (28%) and Exemptions (25%) and the Mpofana Municipality issued more Exemptions (46%) and Withdrawal (27%) decisions.

The key categories of land use changes are Agriculture to Tourism, Agriculture to Residential, Agriculture to Other uses, Agriculture to Agriculture, Expansion within land use and Change in Other land uses. In the uMngeni Municipality, patterns of land use change appear to be most significantly from Agriculture to Residential with 30% of EIA decisions comprising this category and Agriculture to Other land uses (26%), Agriculture to Tourism (16%) and Agriculture to Agriculture (16%). Within the Mpofana Municipality the predominant land use change occurred within Agriculture to Agriculture (31%), followed by Agriculture to Other (26%) and Agriculture to Residential (24%).

For both municipalities the Agriculture to Residential land use category experienced the greatest land use change as a total of 2 307 ha of agricultural land was transformed for residential use (53%). This was followed by a change in land use from Agriculture to Tourism where 1 060 ha was transformed (34% of land). Over the period 1999 - 2010 both municipalities have undergone a 16%

change in land use with regards to residential, tourism, infrastructure, and agricultural intensification.

In approving EIA decisions within both municipalities, the comment from Ezemvelo KwaZulu-Natal Wildlife and Amafa aKwaZulu-Natali accounted for 59% of key decision factors in EIA decisions with 53% of EIA decisions containing the findings of the public participation process and 44% of decisions considering the need and desirability of the proposal.

In refusing EIA decisions in both municipalities, 88% of refusal decisions were based on the findings of various specialist studies (agricultural assessments, reserve water determinations, water quality, vegetation or faunal assessments and visual impact assessments), 75% of refusals were attributed to incompatible land uses, 63% refusals were because of incompatible land use planning initiatives and 63% of EIA decisions contained key decision factors where Ezemvelo KwaZulu-Natal Wildlife had alerted the DAEE&RD to the conservation status and significance of biodiversity elements and did not support the application.

6.2 Recommendations

Based on the key findings of the research and the conclusions drawn, the following recommendations are made.

The keeping of accurate records of EIAs applied and decided on is critical to document changes in the environment as it will allow for decision makers to consider cumulative impacts and trends. In addition, good record keeping is important to the Compliance, Monitoring and Enforcement component in the DAEE&RD as monitoring compliance with the Conditions of the Environmental Authorisation or Record of Decision is a key element of the EIA process. Moreover, there should be a reliance on up-to-date records rather than institutional memory which can be lost at any given time and is unable to be

recovered. A consistent information or data management system, as required by NEMA, must be established to ensure that reliable information is being recorded so that reporting frameworks can be complied with and to assist the DAEA&RD in determining areas that require assistance for decision making in terms of resource and capacity and the development of norms and standard guidelines for decision making. Applicants must provide key fields of information specifically that of geographic co-ordinates on the required application forms and these must be recorded and verified by officials in the EIA review process. Moreover, the consistent recording of relevant data will allow for land use changes and development trends to be established at a provincial scale.

In addition, the resulting land use changes can form the basis for drafting and implementing policy with regard to the use of agricultural land for non-agricultural purposes, the selection of areas worthy for biodiversity conservation and for agricultural land reform.

It is essential to incorporate the use of a GIS to locate and view the proposed development as a visual representation prior or post to a site visit is helpful in understanding spatial relations of projects. The significance and importance of a mapping tool for EIA enquiries in terms of determining whether activities are listed or not and whether they require Environmental Authorisation is necessary. Moreover, various enquiries on attribute data can be queried and elements such as the proximity to watercourses and protected areas including their buffers allow decision makers to determine whether activities require authorisation or not.

6.3 Summary

In summary, the research documented that 332 EIAs were completed in uMngeni and 178 EIAs were approved in Mpofana Municipality over the period 1999 - 2010, the types of decisions issued in the same time period were Exemptions, Records of Decisions, Environmental Authorisations, Withdrawals, Commencements and Refusals. A greater percentage of Records of Decisions

(28%) and Exemptions (25%) were issued in uMngeni whilst Exemptions (46%) and Withdrawals (27%) formed the majority of decisions issued in Mpofana Municipality. Key land use changes that occurred over the research period were identified as Agriculture to Tourism, Agriculture to Residential, Agriculture to Other uses, Agriculture to Agriculture, Expansion within land use and a Change in Other land uses. Whilst the predominant land use change in uMngeni was that of Agriculture to Residential, the Agriculture to Agriculture category in Mpofana Municipality received the most change. However, the extent of change (in hectares) experienced for both municipalities was that of Agriculture to Residential - 53% change or 2 307 ha transformed.

In approving EIA decisions within both municipalities, comments from key authorities, the findings of a public participation process and the need and desirability of a proposal accounted for approximately 44 - 59% of key decision factors in EIA decisions that were approved. In refusing EIA decisions in both Municipalities, 88% of refusal decisions were based on the findings of various specialist studies and between 63 - 75% of refusals was attributed to incompatible land uses and incompatible land use planning initiatives.

In conclusion the research has documented the number and type of EIA applications received and finalised in the uMngeni and Mpofana municipalities over the period 1999 – 2010 and spatially defined the location of those EIAs which were decided. The type and extent of land use changes that have occurred in both municipalities over the duration of the research period have been determined and key factors responsible for the changes in land uses have been demonstrated. The research has identified the need for accurate record keeping of data and information pertaining to EIAs to ensure that cumulative impacts are identified, evaluated and monitored and to promote sustainable development. Moreover, the research has highlighted that the integration of spatial planning tools and initiatives are necessary to improve decision making in EIAs.

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