

*Balancing Ecotourism and Livestock Production-
Implications for Livelihoods and the Environment*

**A final project report
AHEAD Seed Grants Programme**

Submitted by

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All errors in this report remain the sole responsibility of the authors

1.0 Introduction

The area demarcated for the GLTFCA covers a variety of land uses. These include the protected areas, land under intensive irrigated agriculture, land under marginal agricultural production of a subsistence nature and settlement land for rural communities with complex diversified livelihood systems (Cumming et al., 2007). It is thus anticipated that some of these land use practices will be affected by the changes in the GLTFCA and emerging land use options such as ecotourism are expected to assume increasing importance. Such land uses would ensure sustainability of the protected area and promote conservation strategies that would yield socio-economic benefits for the adjacent rural communities (GLTP JMP, 2002). The opportunities for engagement in ecotourism by rural communities, some of which are already being exploited in some communities adjacent to the Kruger National Park (KNP), are likely to influence the existing land use patterns and livelihood systems. Agriculture could be affected through (i) changes in land use systems as communities put more land towards ecotourism projects (Alexander and McGregor, 2000, Mhinga, Undated, Spencely, 2006) (ii) higher wildlife-livestock interactions resulting in increased livestock depredation and crop losses and increased risk of disease transmission between wildlife and livestock (Kock, 2003, Bengis, 2003, Darkoh and Mbaiwa, 2002).

This project is aimed at contributing knowledge on the key issues of concern as the Greater Limpopo Transfrontier Conservation Area (GLTFCA) evolves. The project, which departs from the more common ecological and veterinary approaches to GLTFCA research addresses some of the key socio-economic concerns of rural communities adjacent to the KNP. The approach in the study emphasizes the importance of community engagement processes in analyzing the likely impacts of the GLTFCA on local livelihoods and existing land uses. The projects fits in well with the Thematic Area Four of the AHEAD Conceptual Framework which raises questions on scenarios for development in the TFCA, trade-offs between alternative landuses, and the associated social, economic, and environmental costs and benefits of current and alternative livelihood options. It has also been noted elsewhere that information on possible economic impacts of GLTFCA, alternative land use options and the related methodologies to gather and analyse such information is scanty in literature (Wolmer,

2003, Katerere, 1997). Such research, apart from benefiting local communities and influencing decisions making in the GLTFCA also contributes towards a larger global debate on the relationship between rural development and conservation, and the role of community based natural resource management.

2.0 Project Objectives

Funding was received from the AHEAD seed grants programme to finance two components of an ongoing larger PhD research study. The main objective of the PhD research is to develop, in consultation with stakeholders, a framework for evaluating land-use options and trade offs for improved livelihoods that combines socio-economic and bio-physical considerations.

The two specific objectives funded through the seed grant projects were to;

- Determine household income benefits of ecotourism through assessment of consumers' willingness to pay and communities' preferences for ecotourism projects
- Analyse the incentive structure to engage in specific economic activities and the trade offs for alternative scenarios of livestock and ecotourism as livelihood options in consultation with stakeholders through spatially explicit bio-economic modelling

3.0 Methods and study area

The case study area is Mhinga Traditional Authority in Thulamela Local Municipality of Limpopo Province, South Africa. The study follows the Describe-Explain-Explore-Design (DEED) framework of the Competing Claims Programme of Wageningen University (Giller et al., 2008) combining a range of analytical approaches that include land use modelling and choice modelling techniques.

3.1 Methods

Determine potential income benefits of ecotourism through assessment of tourist' preferences and willingness to pay ecotourism goods and services

Choice modelling is a method for valuing non-market goods which allows individuals to choose from alternative bundles of non market goods, which are described in terms of their attributes, and the levels that these take. Through this method it is possible to identify and value those goods and services provided by ecotourism which tourists would be willing to pay (WTP) for and which local residents are willing to provide and establish a demand for ecotourism goods and services.

Communities were engaged through focus group discussions, workshops and key informant interviews to determine the goods and services that they would like to provide to tourists for ecotourism development. We also discussed community interpretations of ecotourism and its role in rural development. The identified activities were then grouped into three categories, namely *accommodation*, *craft markets* and *village tours*, which were the main attributes of the choices used in developing the questionnaire for the survey. Questionnaires were administered in a survey to local and international tourists visiting the Kruger National park in December 2008-January 2009 and December 2009-December 2010. A pilot survey was conducted prior to the survey to enable identification of any problems with the questionnaire. Enumerators for the survey included a local school leaver, and KNP employees who have easy access to the tourists. A total of 324 tourists were interviewed from three camps; Skukuza, Punda Maria and Shingwedzi. Data were analysed using a conditional logit model, which enables determination of the extent to which the choices made depend on the attributes of the options presented.

Bio-economic modelling for analysing alternative land use options and related scenarios for rural development

This model is developed in General Algebraic Modelling Systems (GAMS) software. Information on the costs and benefits of various land use activities that include livestock production and ecotourism is used to analyse the trade offs between alternative land use options in the area. The land use options were identified through a series of activities that included workshops, focus group discussions, key informant interviews and review of secondary data. Community perceptions on rural development and their views on how this should take place in Mhinga and how land should be allocated were sought and these formed the basis of the assumptions made in constructing the bio-economic model. The biophysical limitations of the land were

established through use of secondary sources, and the services of a GIS expert were employed to map the area and provide information on current spatial structure of the Mhinga villages. The base model was developed and this exercise is continuing.

3.2 The study area

This study is situated on the north western side of Kruger Park and the adjacent communities i.e. adjacent to the Punda Maria gate of the KNP. The rural communities that this study covers fall under the Mhinga Tribal Authority which comprises 11 villages. The villages cover a surface area of about 20 000ha. and comprises communal grazing on unimproved pasture, some land under cropping and village settlements with an estimated 6880 households and 43450 people. The rainfall is low (400 to 600 mm per year) with long drought periods. The veld type is tropical bush and savannah type with a grazing capacity of between 11-13 hectares per livestock unit (AGIS, 2009).

The main land uses in the villages are crop and livestock production. Unemployment is estimated to be about 37% (DoL, 2006) in these villages and most of the households rely on social grants as the main source of livelihood (see table 1).

Table 1 Livelihood sources for households in Mhinga

Income Source/Activity	% household participating (n=540)
Crop farming	86.3
Livestock farming	60.9
Formal employment	28.9
Small businesses	9.4
Social grants	80.0
Remittances	11.1
Private pensions	2.0

¹The percentages add up to more than 100% as most households had more than one livelihood source

Agricultural production in this area is constrained by various challenges which include problems that arise as a result of outbreaks animal diseases and the damage to crops and livestock caused by damage causing animals (DCAs) such as lions and elephants. A key feature of the livestock production systems in this area are movement and marketing restrictions within the “redline zone” or FMD control area. The KNP and the surrounding areas are a declared FMD controlled area in terms of the Regulations pertaining to the Animal Diseases Act (NDA, 2000)



Figure 1. Small businesses in Mhinga



Figure 2 Mapping exercise for Mhinga villages



Figure 3 KNP boundary fence

4.0 Activities conducted

Table 2 shows the specific activities that were undertaken in this project and the intended purpose of these activities in contributing towards the project objectives.

Table 2 Specific activities completed

Activity	Purpose
12 focussed group discussions	<ul style="list-style-type: none"> ▪ Discussing scenarios for land use and development in Mhinga ▪ Identification of ecotourism alternatives ▪ Discussion on main issues at the wildlife/livestock interface ▪ Stakeholder identification
3 Community workshops	<ul style="list-style-type: none"> ▪ Discussing scenarios for land use and development in Mhinga ▪ Identification of ecotourism alternatives ▪ Discussion on main issues at the wildlife/livestock interface
Attendance of community spatial planning meetings	<ul style="list-style-type: none"> ▪ Two meetings attended to familiarise researchers with village land use planning processes
Questionnaire design for tourist survey	<ul style="list-style-type: none"> ▪ Preparation for data collection from tourists
Pre-test tourist questionnaire	<ul style="list-style-type: none"> ▪ Preparation for data collection from tourists
Training of research assistants to conduct tourist survey	<ul style="list-style-type: none"> ▪ Preparation for data collection from tourists
Tourist survey	<ul style="list-style-type: none"> ▪ Data collected from 324 tourists
Data entry and analysis	<ul style="list-style-type: none"> ▪ Analysis of tourist preferences
Preparation of first draft report on tourist study	<ul style="list-style-type: none"> ▪ Write up of results
Developing a base bio-economic model of land use in General Algebraic Modelling Software (GAMS)	<ul style="list-style-type: none"> ▪ To facilitate community engagement in exploring land use options
Mapping of current land uses in Mhinga	<ul style="list-style-type: none"> ▪ To establish bio-physical characteristics of the land and existing land uses. To facilitate parcelling of the land for spatially explicit modelling
Preliminary analysis of land use scenarios- first draft	<ul style="list-style-type: none"> ▪ Write up of results
Preliminary results presented at the Competing Claims for Natural Resources Annual Workshop in Zimbabwe	<ul style="list-style-type: none"> ▪ Preliminary sharing of results with experts
Preliminary results presented at the GLTFCA AHEAD Annual Meeting in Hazyview	<ul style="list-style-type: none"> ▪ Preliminary sharing of results with experts and other stakeholders



Figure 4 Training of facilitators before a workshop



Figure 5 Workshop to explore land use options



Figure 6 Discussion options for ecotourism development



Figure 7 Ranking land use options in future scenarios

4.1 Disciplines that participated in the project

This project involved a multidisciplinary team to facilitate more complete understanding of the issues. Specifically the following disciplines and specific researchers were involved;

- Public Health Veterinary- Professor Cheryl McCrindle, University of Pretoria
- Environmental Economics- Professor Ekko van Ierland and Dr Rolf Groeneveld
Wageningen University (with expertise in tourism studies)
- Agricultural Economics- Petronella Chaminuka, University of Limpopo and
Wageningen University

5.0 Project outputs

5.1 Capacity development

- A PhD student and lecturer at the University of Limpopo- This seed grant enabled significant progress towards completion of a PhD project which is due for submission to Wageningen University in the Netherlands in February 2011. Two research articles from this work will be submitted to peer reviewed journals.
- 1 Masters student from Wageningen University- An MSc student Odirilwe Abram Selomane conducted a preliminary study on tourist preferences and successfully completed his MSc at Wageningen University in November 2009. His work was partly supported by the seed grant.
- A local youth from Mhinga, Mr. Neth Chauke participated in this project and gained experience in translation and facilitating group meetings
- Several students from University of Limpopo who participated in this project gained experience in facilitating group meetings, administering questionnaires, conducting interviews and processing data

5.2 Academic Articles

Two research articles entitled '*Tourist preferences for ecotourism development in rural communities next to Kruger National Park: A choice experiment approach*' and

'Modelling land use alternatives in rural communities next to Kruger National Park' are currently under preparation and will be submitted to peer reviewed journals for publication. The draft versions of these articles were presented at the AHEAD meeting in 2010, and the Competing Claims Meeting held in Mushumbi Pools in Zimbabwe from 13-20 February 2010. A poster has also been prepared for presentation at the Savanna Scientific Network Meeting in Kruger Park to be held from 7-12 March 2010.

5.3 Facilitation of Community dialogue on rural development pathways

Through the workshops and focused group discussions that were held this project has facilitated dialogue and debates on land use options and pathways for rural development in Mhinga. The project provided a platform for interaction of different stakeholders to discuss land use in Mhinga, and will continue to do so.

6.0 Dissemination of results

The following activities to disseminate results have taken place;

- Presentations at the 2010 AHEAD forum
- Presentation at the Competing Claims for Natural Resources Programme workshop held in Mushumbi Pools, Zimbabwe from the 13-20th February 2010

The following activities to disseminate results are planned once the results are finalised;

- Presentation at Hlanganani Forum (Local Forum comprising KNP and community representatives)
- Presentation at two community workshops
- Through briefs of research results compiled and submitted to Traditional Authority, Department of Agriculture and other local players
- 2 Journal articles in international peer referred journals
- Presentation at an International conference

7.0 Evaluation of the project

The project did not manage to achieve all of the intended goals. The main goals not achieved and the reasons for the failure to achieve these goals are shown in table 3.

Table 3 Evaluation of planned activities and progress made

Activity planned	Result	Comment
Survey questionnaire design	Achieved	
Pilot survey	Achieved	
Revise questionnaire	Achieved	
Survey	Achieved	
Data entry	Achieved	
Data Analysis	Achieved	
Prepare ecotourism report	Partially completed - estimated was too short	The draft articles are being revised and will be submitted to peer reviewed journals by June 2010
Build bio-economic model	Partially completed - estimated was too short	
Submit mid-project report	Achieved	
Community workshops for scenario building	Partially achieved	The community engagement and processes are ongoing and will continue
Feedback on scenarios to community	Not done	The community feedback workshops are planned once results are finalised
Finalise bio-economic model	Partially achieved	A draft is available and will be finalised
Prepare community briefs	Not done	The community feedback workshops are planned once results are finalised
2 articles prepared for submission to peer reviewed journals	Partially achieved	The draft articles are being revised and will be submitted to peer reviewed journals by June 2010

8.0 Preliminary Findings

8.1 Overview of conflicts over land use at the interface

Conflicts on land and land based resources are exacerbated by the proximity of the villages to the KNP. The location next to the Punda Maria gate presents many opportunities for tourism related livelihoods for these villages. This however does not mean that agriculture, particularly livestock production assumes less importance as a livelihood means. This diversity of livelihoods has created competing claims on land from a large array of stakeholders and this makes research in this area a necessary tool to provide information and inform decision making by various stakeholders. Table 4 shows an overview of key stakeholders, their interests on land use as well as their ability to influence land use decisions in the area.

Table 4 Key stakeholders in Mhinga and their interests on grazing land

Stakeholder	Interest	Capacity to influence decisions on land use
Livestock farmers	Need land for cattle grazing, have problems with wildlife, feel threatened by tourism development	High, organized group
Crop farmers	Need more land for subsistence cultivation	Low, not organised
Youths and supporters of tourism	Needs land for tourism investment, seeking livelihoods diversification	High
Private tourism operators	Need land for building private lodges	Low
Ordinary villagers	Collect firewood and grass from grazing land, Need jobs from tourism development	Low because of different opinions

8.2 Ecotourism Development- main results

Communities had limited information on possible ecotourism projects that they could pursue. When asked about the possible ecotourism projects they could undertake the following were suggested;

- Crafting and bead making

- Traditional painting
- Pottery
- Sewing traditional clothing
- Traditional dancing
- Provide accommodation facilities

These were classified into three main categories: crafts markets, village tours and accommodation facilities which formed the basis of the options presented to tourists.

The preliminary results from tourists' interviews indicate that there is an interest in the village tours and the crafts markets, and there is no interest in staying in village based accommodation on the part of the tourists. Tourists avoided selecting options that included village accommodation, whilst the presence of tours and crafts in the option would increase the likelihood of the tourists selecting that option. Only 45% of the tourists would consider using accommodation facilities in the villages, even if there were comparable to KNP in standard and prices.

Both domestic and foreign groups expressed an interest in the tours and craft markets, and generally supported the view that both rural development and conservation are important. Table 5 and table 6 show tourist attitudes towards development of specific ecotourism goods and opinions on key statements suggested to them relating to the conservation and rural development debate.

Table 5 Pearson chi-square comparisons of tourist interest in purchasing ecotourism related goods and services grouped by nationality

	Foreign %			Local %			Pearson χ^2 p value
	Indifferent	Not Purchase	Purchase	Indifferent	Not Purchase	Purchase	
Accommodation with same standards and prices as KNP but in the villages	20	30	50	23	37	40	0.206
Accommodation facilities in villages with same standards and lower prices than in KNP	26	23	51	22	35	43	0.073**
3-4 hour village tour at an additional R150 if it was available	16	21	63	25	27	48	0.039**
Crafts from a craft market in the KNP	12	15	73	24	18	58	0.016**
Crafts from a craft market in the surrounding villages	17	10	73	22	22	56	0.010***
Traditional meal in the villages sold at the same price of a meal in the KNP	35	12	53	28	26	46	0.017**
Traditional meal in the village sold at a higher price than a meal in the park	41	27	32	24	52	24	0.000***
Food supplies outside KNP to support rural businesses with similar prices	31	10	59	22	24	54	0.010***

Significant at * 10%, ** 5% and ***1%

Table 6 Pearson chi-square comparisons of tourist opinions on rural development and conservation grouped by nationality

	Foreign %			Local %			Pearson χ^2 p value
	Indifferent	Agree	Disagree	Indifferent	Agree	Disagree	
When I visit KNP, I am only interested in wildlife	11	70	19	8	79	13	0.198
I am also interested in surrounding rural villages	25	64	11	25	48	27	0.003***
Tourism should contribute to development of surrounding communities	10	90	0	8	80	12	0.005***
Rural development is more important than conservation	32	14	54	29	18	53	0.683
Conservation efforts in KNP will not be sustainable if there is no rural development in surrounding communities	26	64	10	18	57	25	0.005***
KNP should only focus on nature conservation and leave other stakeholders to focus on rural development	38	27	37	21	36	43	0.006***
For me, rural communities are part of 'the holiday experience'	14	72	14	17	51	32	0.009***
The KNP should support rural development in surrounding villages	15	82	3	15	65	20	0.001***
I would pay more to engage in village tourism activities such as tours and crafting than the current KNP entrance fees	26	56	18	20	49	31	0.074**

Significant at * 10%, ** 5% and ***1%

8.3 Alternatives for land use and rural development- preliminary results

Community interpretations of the meaning of rural development focused on the improvement of infrastructure. When groups were asked to define rural development some of the responses given are as follows;

- *'Building extra schools, hospitals, multipurpose centers and sports facilities.'*
- *'Improving our roads'*
- *'Having basic needs such as water and shelter'*
- *'Having job opportunities'*



Figure 14 Road passing through one of the villages

When asked to rank preferred land uses, there were notable differences between the different age groups of community members. Groups comprising older members of the community ranked as most important in the future agricultural-based land uses such as livestock and crop farming, whilst the youths desired more land to be put under tourism and small business development.

Table 7 **Ranking for preferred use of land***

Land use alternative	Youth group 1	Youth group 2	Farmer group 1	Older persons group
Crop farming	4	4	2	1
Cattle	5	4	1	1
Shopping Centre	1	1	4	2
Small businesses	3	2	3	2
Hotels and Lodges	2	2	5	4
Game farms	2	2	5	5

*1- Is the most preferred use, 5 is the least preferred use

9.0 Conclusions

Although the project managed to complete most of the intended activities within the planned time frame, more work remains to be done, through this projects and other similar projects in the GLTFCA. This project is ongoing and the remaining activities including feedback to communities will be finalised by the end of 2010. Research needs that have been identified from findings in this project include the following;

- Detailed cost benefit analysis of tourism development
- Market research on the development of tourism in the GLTFCA
- Feasibility of sustainable game farming as a livelihood strategy by rural communities
- Livelihoods analysis and future livelihoods in the GLTFCA

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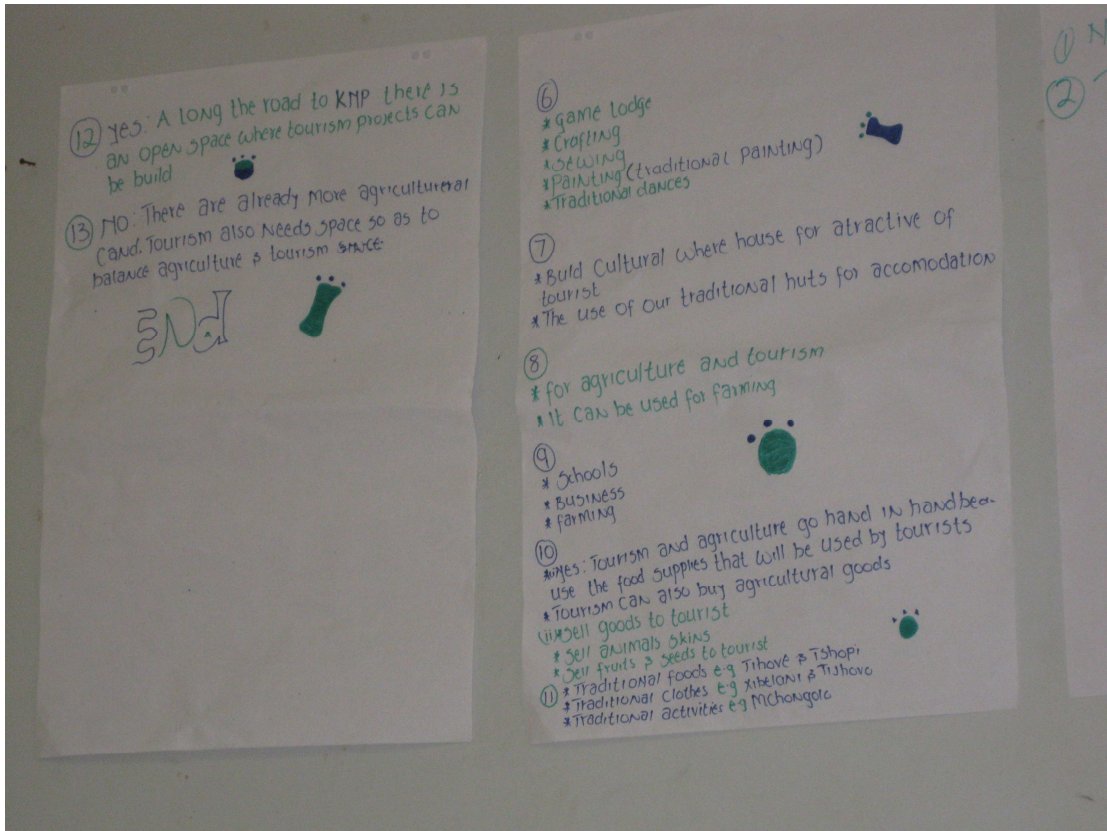


Figure 1 Youth opinions on the importance of tourism



Figure 2 Privately owned lodge in the village



Figure 3 Facilities in privately owned lodge in the village



Figure 4 Buffalos and elephants near Shingwedzi



Figure 5 Youths ranking desired land use alternatives



Figure 6 Illustrating contribution of different activities to household incomes



Figure 7 **Grass collection**



Figure 8 **Grazing area next to KNP**