

A participatory decision support tool to assess costs and benefits of tourism development scenarios

Application of the ADAPTIVE model to Greater Giyani, South Africa

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Alterra-rapport 1583, ISSN 1566-7197

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Alterra-rapport 1583

Alterra, Wageningen, 2007

ABSTRACT

Henkens, R.J.H.G., V. Tassone, R.S. De Groot, S. Grafakos & J. Luttik, 2007. *Towards a decision support tool to assess costs and benefits of tourism development scenario's; application of the ADAPTIVE model in Greater Giyani, South Africa*. Wageningen, Alterra, Alterra-rapport 1583. 80 blz.; 11 figs.; 12 tables.; 49 refs.

The tourism industry represents a thriving business and offers many opportunities for tourism development all around the world. Each development will have its economic, socio-cultural and ecological costs and benefits. Many of these are difficult to assess and to value, which often leads to unsustainable development characterised by short-term economic benefits and high costs on the long-term. The participatory integrated assessment decision support tool named ADAPTIVE and developed within this project, helps policy makers, spatial planners, park managers and other stakeholders to analyse all effects of potential development plans and aggregates them into a total monetary value for each scenario. The tool has been applied for illustrative purpose to the case-study area of Greater Giyani, South-Africa.

Keywords: decision support tool, ecosystem goods and services, integrated assessment framework, impact assessment, tourism costs and benefits, participatory approach, sustainable development.

ISSN 1566-7197

This report is available in digital format at www.alterra.wur.nl.

A printed version of the report, like all other Alterra publications, is available from Cereales Publishers in Wageningen (tel: +31 (0) 317 466666). For information about, conditions, prices and the quickest way of ordering see www.boomblad.nl/rapportenservice

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Preface

The Tourism and Environment Group (TE-group) is a group of professionals within the Wageningen University and Research Centre aiming to join forces and to integrate tourism knowledge and expertise in practice-oriented projects. This report is one of the results of this initiative produced as a cooperative effort between the Alterra Research Institute, The Environmental Systems Analysis Chairgroup, the Socio-spatial Analysis Chairgroup (which chairs the TE-group) and Wageningen International. The pleasant and fruitful cooperation among all partners surely stimulates future collaboration.

We are very thankful to Prof. James Blignaut and his team from Pretoria University for their knowledgeable feedback throughout the project, their help with the guidance of Wageningen University students and the arrangement of the workshop in Gawula village and interviews with interest groups from Pretoria and Limpopo Province. We are thankful to Dr. René van der Duim from Wageningen University, Socio-Spatial Analysis chairgroup, for the guidance given to Wageningen University students and for generously providing very useful comments throughout the project. We are also grateful to Mr. Nicholas Funda from Environmental Offset Investments for chairing the workshop so pleasantly. Henk Lette from Wageningen International provided useful feedback throughout the project. Last but not least we are grateful to the Wageningen students Chick Tassi Yunga and Jotte van Ierland for organising the workshop in Gawula and inviting all the local stakeholders. Without proper communication techniques available this must have been a big challenge!

A sustainable tourism development scenario is all about balancing the costs and benefits attributed to the economic, socio-cultural and ecological environment. In principle, one always hopes a development project will benefit all, meaning prosperous local communities, high biodiversity standards, a thriving economy and satisfied tourists having the experience of their lives. Although this sounds like a fairy tale, examples from other parts of the world have shown that it is more than a daydream. We hope that such a positive scenario will once also be true for the people living in our case-study area of Greater Giyani, South-Africa. We are very thankful to the local people for their hospitality and the co-operation that we and our students received during this project. We therefore hope that our project may contribute to their wish to develop sustainable tourism in the near future in their area.

Summary

The tourism industry represents a thriving business nearly all around the world and for many years to come. The World Tourism Organisation (WTO) expects the international tourism arrivals to double until 1.6 billion between now and 2020. This offers many opportunities for economic development. Especially in developing countries these developments can make the difference between poverty and prosperity. However besides the incentives for the economy, tourism development will also affect the socio-cultural and the ecological environment, often in a negative way. Facts have shown that many tourism developments can eventually be considered as unsustainable.

This has been the reason for the Wageningen University and Research Centre (WUR) to develop an integrated assessment framework and a decision support tool (DST) which can incorporate all or at least the main economic, socio-cultural and ecological costs and benefits involved. The DST developed in this project has been named ADAPTIVE and is an acronym for **Aid Decision Analysis for ParTicipatory Integrated Valuation of Ecotourism** scenarios. This DST helps policy makers, spatial planners, park managers and other stakeholders involved to analyse all effects of potential or available development scenarios and to aggregate them into a total monetary value for each scenario.

The main innovative aspect of the developed framework and decision support system is the incorporation of landscape function analysis into the whole process of project evaluation and its flexibility to integrate different types of data that provide different types of decision support outcomes in order to:

- 1) Stimulate stakeholder participation through an in-depth, structured and informative dialogue;
- 2) Quantify and value the main functions affected by the proposed development;
- 3) facilitate a transparent, structured and user friendly decision analysis process for identifying stakeholders' preferences, values and views that can be further used as a basis for consensus building;
- 4) Rank tourism development scenarios based on the Total Aggregated Value (the ADAPTIVE-model currently represents the only tool of its kind being able to do this, focussing on tourism).

WUR, in cooperation with the University of Pretoria, has applied ADAPTIVE to the case-study area of Greater Giyani, South-Africa. Three tourism development scenario's were analysed and discussed during a workshop in the region with local stakeholders in December 2006. Although the project budget did not allow the full integration of all necessary steps, the outcome illustrates the applicability and strength of the ADAPTIVE model.

1 Introduction

1.1 Problem statement

In the past 50 years humans have changed nature more rapidly and extensively than in any other comparable period of time (Millenium Ecosystem Assessment 2005). This has resulted in an unequal distribution of benefits and tremendous costs in terms of loss of biodiversity. The (inter)national tourism industry has had its share herein as well and its impact may increase as international tourist arrivals are expected grow at 4.1% annually to 1.6 billion in 2020, with the major source countries being North America, Europe and East Asia (website World Tourism Organisation 2007).

A substantial part of these tourists can be considered to be nature based, meaning all forms of tourism in which the main motivation of the tourists is the observation and appreciation of nature as well as the traditional cultures prevailing in natural areas (WTO 2002). In the early 1990s nature based tourism increased at an estimated rate of 10-30% annually and by 1997 it was accounted for an estimated 20% of total international travel (Millenium Ecosystem Assessment 2005).

Besides threats and consequential costs, the expected tourism development may as well offer many opportunities and benefits for (local) economies and consequently the protection of ecosystems. According to the Travel & Tourism Council (source WTTC website 2007), in 2006 travel and tourism generated US\$ 6.477,2 billion in economic activity, 10,3% of total global GDP and 234.305.000 jobs or 8.7% of total employment worldwide (source: www.wttc.org). Many countries consider tourism as an important economic factor while for a number of developing countries it even has a primary position in economic development strategies. According to the UN World Tourism Organisation (WTO 2004) tourism is a principal export for 83% of developing countries. Developing countries are attracting an increasing share of the international tourism market from 21% in 1973 to 42% in 2000. In 2000 almost 300 million international arrivals have been reported in developing countries, an increase of 95% since 1995.

In order to avoid 'killing the goose that lays the golden eggs' and to ensure tourism to be a sustainable source of income there is a need for sustainable tourism development strategies. This demands an integrated approach to assess the ecological, socio-cultural and economic values of tourism activities and their interactions with biodiversity and local communities. In order to support policy makers, spatial planners, park managers etc. in this process there is a strong need for an easy applicable decision support tool which helps them to sustain the natural resources, to protect biodiversity and to alleviate poverty.

1.2 Objectives

This study aims to:

1. develop a theoretical integrated assessment framework to analyse in monetary, quantitative and qualitative terms the costs and benefits of tourism activities:
 - This will improve the understanding of the interaction between tourism activities and biodiversity or local communities;
 - This will give better insights in the values of tourism development in order to attract sustainable financing for nature conservation and rural development;
- 2 develop a decision support tool to analyse tourism development scenarios thereby focussing on the Greater Giyani case study area in Limpopo Province South-Africa;
- 3 built a partnership between the Wageningen University and Research Centre and the Pretoria University aiming on:
 - the application and future development of the decision support tool at the Greater Giyani study area; as well as,
 - the future sustainable rural development of the Greater Giyani area, considering its potential for tourism, agriculture and natural development.

1.3 Operating procedure

1.3.1 Organisations involved

This project was a co-operation between several research institutes and chair-groups within the Wageningen University and Research Centre (hereinafter referred to as WUR):

- Alterra Research Institute, Wageningen (hereinafter referred to as Alterra);
- The Environmental Systems Analysis Chair group of Wageningen University (hereinafter referred to as ESA);
- The Socio-spatial Analysis Chair group of Wageningen University (hereinafter referred to as SRA); and
- Wageningen International (hereinafter referred to as WI).

The contingent of organizations from WUR cooperated with the South-African organisations:

- Pretoria University; and
- Environmental Offset Investments, a consultancy firm (hereinafter referred to as EOI).

1.3.2 Division of tasks and activities

Alterra had the lead in the project coordination and editing of the report. ESA has developed the integrated assessment framework and the decision support tool derived from it. ESA also guided students who collected data in the case study area of Greater Giyani. SRA supported ESA herein from its expertise on sustainable tourism development. WI provided the project group with feedback on meetings. Pretoria University coordinated the fieldwork in Greater Giyani as well as the interviews and workshops in South Africa. EOI chaired the workshop with local participants in Gawula, Greater Giyani, through its experiences as coordinators of the ARISE project in the same area (ARISE is an acronym for **A**frica's **R**ural **I**nitiatives for **S**ustainable **E**nvironments).

Following main activities can be considered:

- Literature research to develop an integrated assessment framework on tourism development which includes environmental impact assessment, multi-criteria analysis and cost-benefit analysis;
- Development of a decision support tool (DST) to determine the full costs and benefits (economic, socio-cultural and ecological) of tourism development scenario's;
- Student research in the Greater Giyani area in order to gather data on the economic, socio-cultural and ecological environment;
- Interviews with representatives of South Africa National Parks (SAN-Parks), tourism researchers of University of Pretoria, National Department of Environmental Affairs and Tourism (DEAT) in Pretoria and the private sector (tour-operators) in order to be able to develop feasible tourism development scenario's.
- A workshop in the village of Gawula, Greater Giyani in order to communicate the potential tourism development scenarios and to create a common understanding on the potential (tourism)development of the area and willingness to co-operate hereto.

1.4 Boundaries

The decision support tool focuses on the ecological, socio-cultural and economic factors involved in the development of sustainable tourism. Besides these three dimensions there's also the psychological dimension meaning the level of tourist satisfaction. After all tourism development should ensure a meaningful experience to the tourists. Tourist satisfaction however very much depends on personal taste, the tourism target group a person belongs to and ones expectations. This issue is considered to be of minor importance regarding the development of the DST and will therefore not be dealt with in this report.

Unfortunately the project was too small-scale to apply the decision support tool in full extend to the case study area of Greater Giyani. More data and stakeholder workshops are needed to really implement the tool. However, through assumptions

by the project team we believe the present output shows the potential and eloquence of the tool.

1.5 Bookmark

The following chapters 2, 3 and 4 can be read quite independent from each other.

- Chapter 2 gives an overview of all economic, socio-cultural and ecological costs and benefits associated with tourism development. This background information can be considered as a checklist to be able to fully assess the impacts of a given tourism development scenario on the economic, socio-cultural and ecological environment;
- Chapter 3 gives the theory behind the participatory integrated assessment framework including information on multi-criteria analysis (MCA) and costs-benefit analysis (CBA), much of which is available in the appendices 1 to 6;
- Chapter 4 describes the ADAPTIVE model to analyse eco-tourism scenarios based on the information in chapter 3. This is illustrated through the application of ADAPTIVE to the Greater Giyani case study area. The description of the case-study area and results of the workshop are therefore presented in chapter 4 as well.

2 An overview of tourism impacts

2.1 Introduction

Sustainable tourism development guidelines and management practices are applicable to all forms of tourism in all kinds of destinations. Sustainability principles refer to the environmental, economic and socio-cultural aspects of tourism development. A balance between these three dimensions is needed to guarantee long-term sustainability. In general sustainable tourism should (WTO 2004):

1. Ensure viable, long-term economic operations, providing socio-economic benefits to all stakeholders that are fairly distributed, including stable employment and income-earning opportunities and social services to host communities, and contributing to poverty alleviation;
2. Respect the socio-cultural authenticity of host communities, conserve their built and living cultural heritage and traditional values, and contribute to inter-cultural understanding and tolerance;
3. Make optimal use of environmental resources that constitute a key element in tourism development, maintaining essential ecological processes and helping to conserve natural heritage and biodiversity.

Sustainable tourism development requires the participation of all relevant stakeholders and strong political leadership to ensure wide participation and consensus building. It's a continuous process which requires constant monitoring of impacts and if necessary preventive and/or corrective measures.

Besides the three dimensions described above sustainable tourism development also includes so-called psychological issues meaning the level of tourist satisfaction. After all tourism development should ensure a meaningful experience to the tourists, raising their awareness about sustainability issues and promote sustainable tourism practices amongst them (WTO 2004). Tourist satisfaction however very much depends on the tourism target groups and their expectations. This issue is considered to be of minor importance regarding the development of the DST and will therefore not be dealt with in this report.

Next paragraphs describe the economic, socio-cultural and ecological costs and benefits that can be distinguished. This background information is needed to fully assess the potential impacts of a tourism development scenario on the economic, socio-cultural and ecological environment.

Much information below can be derived from the UNEP website (source: www.UNEP.org).

2.2 Economic environment

There are many hidden costs to tourism, which can have unfavourable economic effects on the host community. Often developed countries are better able to profit

from tourism than developing ones. Whereas the least developed countries have the most urgent need for income, employment and general rise of the standard of living by means of tourism, they are least able to realize these benefits. Among the reasons for this are large-scale transfer of tourism revenues out of the host country and exclusion of local businesses and products.

2.2.1 Economic costs from tourism

- *Leakages:* The direct income for a local area is the amount of tourist expenditure that remains after taxes, profits, and wages are paid outside the area and after imports are purchased; these subtracted amounts are called leakage. In most all-inclusive package tours, about 80% of the tourist expenditures go to international companies like airliners, hotel chains, the back home travel agent, and not to local businesses or local communities. In addition, significant amounts of income actually retained at destination level can leave again through leakage. Of each US\$ 100 spent on a vacation tour by a tourist from a developed country, only around US\$ 5 actually stays in a developing-country destination's economy (source: website UNEP 2007). There are two main ways that leakage occurs: import leakage and export leakage. Import leakage occurs when tourists demand standards that the host country cannot supply. Less-developed countries for instance often need to import food and drinks as local products are not up to the hotel's or tourist's standards, or the country simply doesn't have a supplying industry. This means that much of the income from tourism expenditures leaves the country again to pay for these imports. The average import-related leakage for most developing countries today is between 40% and 50% of gross tourism earnings for small economies and between 10% and 20% for most advanced and diversified economies, according to UNCTAD (United Nations Conference on Trade and Development).
Export leakage occurs for instance with foreign businesses that are often the only ones that possess the capital to invest in the construction of tourism infrastructure and facilities. As a consequence, an export leakage arises when overseas investors who finance the resorts and hotels take their profits back to their country of origin.
- *Enclave tourism:* Tourists often book for all-inclusive vacation packages. This reduces local businesses opportunity to earn income. When tourists remain for their entire stay at a resort or cruise ship which provides everything they need, than not much profit will be left for local people.
- *Infrastructure costs:* Tourism developers may want the government to improve the airport, roads and other infrastructure. This can cost governments and consequently the taxpayers a lot of money. Public resources spent on infrastructure may reduce government investment in other critical areas such as education and health.
- *Increase in prices:* Increasing tourism demand for goods and services will often cause an increase in prices. This will negatively affect local residents whose income does not increase proportionately. Tourism development and the related increasing demand in real estate may dramatically increase building costs and land values.

This not only makes it more complicated for local people to meet their basic daily needs, it can as well result in a dominance of outsiders in land markets and immigration. This complicates the economic opportunities for locals and it will eventually disempower them.

- *Economic dependence of the local community on tourism:* If a country or region becomes economically dependent upon one industry, it can put major stress upon this industry as well as the people involved to perform well. Over-reliance on the tourism industry, especially mass tourism, carries significant risks to tourism-dependent economies. Economic recession and the impacts of natural disasters such as tropical storms and cyclones as well as changing tourism patterns can have a devastating effect on the local tourism sector.
- *Seasonal character of jobs:* The seasonal character of the tourism industry creates economic problems for destinations that are heavily dependent on it. Problems that seasonal workers face include job and therefore income insecurity, usually with no guarantee of employment from one season to the next, difficulties in getting training, employment-related medical benefits, and recognition of their experience, and unsatisfactory housing and working conditions.
- *Other industry impacts affecting tourism:* Economic crises, like the Asian crisis that hit Thailand, Malaysia and Indonesia a few years ago, the SARS crisis or the crisis after 9-11 (war on terror), can be devastating to inbound tourism flows. The financial turmoil triggered a sharp fall in tourism flows to affected countries during 1997 and 1998.

2.2.2 Economic benefits from tourism

The main positive economic impacts of tourism relate to foreign exchange earnings, contributions to government revenues, and generation of employment and business opportunities. These are discussed briefly here; further information on economic contributions from tourism can be found at the World Travel & Tourism Council's home page (www.wttc.org).

- *Foreign exchange earnings:* Tourism expenditures and the export and import of related goods and services generate income to the host economy and can stimulate the investment necessary to finance growth in other economic sectors.
- *Contribution to government revenues:* Government revenues from the tourism sector can be categorised as direct and indirect contributions. Direct contributions are generated by taxes on incomes from tourism employment and tourism businesses, and by direct levies on tourists such as departure taxes. Indirect contributions are those originated from taxes and duties levied on goods and services supplied to tourists.
- *Employment generation:* The rapid expansion of international tourism has led to significant employment creation. Tourism can generate jobs directly through hotels, restaurants, nightclubs, taxis, and souvenir sales, and indirectly through the supply of goods and services needed by tourism-related businesses. According to the World Tourism Organisation, tourism supports some 7% of the world's workers (source: www.world-tourism.org).

- *Stimulation of infrastructure investment:* Tourism can induce the local government to make infrastructure improvements such as better water and sewage systems, roads, electricity, telephone and public transport networks, all of which can improve the quality of life for residents as well as facilitate tourism.
- *Contribution to local economies:* Tourism can be a significant, even essential, part of the local economy and it can be a way to alleviate poverty (see box 1). As the environment is a basic component of the tourism industry's assets, tourism revenues are often used to measure the economic value of protected areas. There are other local revenues that are not easily quantified, as not all tourist expenditures are formally registered in the macro-economic statistics. Money is earned from tourism through informal employment such as street vendors, informal guides, rickshaw drivers, etc. The positive side of informal or unreported employment is that the money is returned to the local economy, and has a great multiplier effect as it is spent over and over again. The World Travel and Tourism Council estimates that tourism generates an indirect contribution equal to 100% of direct tourism expenditures (source: www.wttc.org).

Box 1. Pro-poor tourism

According to the WTO(2004) there are at least seven ways in which the poor can benefit from tourism economically:

- *Employment:* measures can be taken to increase the level of employment of poor people within all kinds of tourism enterprises (hotels, resorts, transport companies, attractions and tourism services);
- *Supply of goods and services to tourism enterprises:* measures can be taken to maximise the proportion of visitor spending that is retained in the local community and to engage the poor in the supply chain process in order to increase the economic benefit to them;
- *Direct sales of goods and services to tourists:* measures can be taken to ensure that the poor earn more income by selling products and services direct to tourists; for example, by running food and fruit stalls, making handicrafts, or by providing guiding services, transport such as taxis and boats, and accommodation;
- *Establishing and running a tourism enterprise:* measures can be taken to stimulate that local people can run tourism businesses at individual or community level;
- *Tax or levy tourism income whose proceeds benefit the poor.* Revenues earned by national and local governments, including general income, business and development taxes, as well as more specific tourism-related charges such as airport taxes, bed taxes and visa fees, can be used for poverty alleviation;
- *Voluntary giving and support:* measures can be taken to increase voluntary support for poor communities by visitors or tourism enterprises;
- *Investment in infrastructure:* tourism development can require investment in new infrastructure, including roads, water and energy supply, sanitation and communications. With careful planning this may also bring net positive benefits to the poor in the locality.

2.3 Socio-cultural environment

The socio-cultural costs or impacts of tourism described here are the effects on host communities of direct and indirect relations with tourists, and of interaction with the tourism industry. For a variety of reasons, host communities often are the weaker party in interactions with their guests and service providers, leveraging any influence they might have. These influences are not always apparent, as they are difficult to measure, depend on value judgements and are often indirect or hard to identify.

The impacts arise when tourism brings about changes in value systems and behaviour and thereby threatens indigenous identity. Furthermore, changes often occur in community structure, family relationships, collective traditional life styles, ceremonies and morality. But tourism can also generate positive impacts as it can serve as a supportive force for peace, foster pride in cultural traditions and help avoid urban relocation by creating local jobs. As often happens when different cultures meet, socio-cultural impacts are ambiguous: the same objectively described impacts are seen as beneficial by some groups, and are perceived as negative - or as having negative aspects - by other stakeholders.

2.3.1 Socio-cultural costs from tourism

The socio-cultural costs mainly refer to change or loss of indigenous identity and values, culture clashes, physical influences causing social stress and ethical issues.

Change or loss of indigenous identity and values

Tourism can cause change or loss of local identity and values, brought about by several closely related influences. Some examples (source: www.UNEP.org):

- *Commodification*: Tourism can turn local cultures into commodities when religious rituals, traditional ethnic rites and festivals are reduced and sanitized to conform to tourist expectations, resulting in what has been called "reconstructed ethnicity." Once a destination is sold as a tourism product, and the tourism demand for souvenirs, arts, entertainment and other commodities begins to exert influence, basic changes in human values may occur. Sacred sites and objects may not be respected when they are perceived as goods to trade.
- *Standardization*: Destinations risk standardization in the process of satisfying tourists' desires for familiar facilities. While landscape, accommodation, food and drinks, etc., must meet the tourists' desire for the new and unfamiliar, they must at the same time not be too new or strange because few tourists are actually looking for completely new things. Tourists often look for recognizable facilities in an unfamiliar environment, like well-known fast-food restaurants and hotel chains.
- *Loss of authenticity and staged authenticity*: Adapting cultural expressions and manifestations to the tastes of tourists or even performing shows as if they were "real life" constitutes "staged authenticity". As long as tourists just want a glimpse of the local atmosphere, a quick glance at local life, without any knowledge or even interest, staging will be inevitable.
- *Adaptation to tourist demands*: Tourists want souvenirs, arts, crafts, and cultural manifestations, and in many tourist destinations, craftsmen have responded to the

growing demand, and have made changes in design of their products to bring them more in line with the new customer's tastes. While the interest shown by tourists also contributes to the sense of self-worth of the artists, and helps conserve a cultural tradition, cultural erosion may occur due to the commodification of cultural goods.

Culture clashes

Because tourism involves movement of people to different geographical locations, and establishment of social relations between people who would otherwise not meet, cultural clashes can take place as a result of differences in cultures, ethnic and religious groups, values and lifestyles, languages, and levels of prosperity.

The result can be an overexploitation of the social carrying capacity (limits of acceptable change in the social system inside or around the destination) and cultural carrying capacity (limits of acceptable change in the culture of the host population) of the local community.

The attitude of local residents towards tourism development may unfold through the stages of euphoria, where visitors are very welcome, through apathy, irritation and potentially antagonism, when anti-tourist attitudes begin growing among local people. Some examples (source: www.UNEP.org) how cultural clashes may further arise:

- *Economic inequality*: Many tourists come from societies with different consumption patterns and lifestyles than what is current at the destination, seeking pleasure, spending large amounts of money and sometimes behaving in ways that even they would not accept at home. One effect is that local people that come in contact with these tourists may develop a sort of copying behaviour, as they want to live and behave in the same way. Especially in less developed countries, there is likely to be a growing distinction between the 'haves' and 'have-nots', which may increase social and sometimes ethnic tensions.
- *Irritation due to tourist behaviour*: Tourists often, out of ignorance or carelessness, fail to respect local customs and moral values. When they do, they can bring about irritation and stereotyping. They take a quick snapshot and are gone, and by so acting invade the local people's lives.
- *Job level friction*: In developing countries especially, many jobs occupied by local people in the tourist industry are at a lower level, such as housemaids, waiters, gardeners and other practical work, while higher-paying and more prestigious managerial jobs go to foreigners or "urbanized" nationals. Due to a lack of professional training, as well as to the influence of hotel or restaurant chains at the destination, people with the know-how needed to perform higher level jobs are often attracted from other countries. This may cause friction and irritation and increases the gap between the cultures.

Physical influences causing social stress

The physical influences that the increasing tourism flow and its consequent developments have on a destination can cause severe social stress as it impacts the local community. Some examples (source: www.UNEP.org):

- *Resource use conflicts*: Resource use conflicts such as competition between tourism and local populations for the use of prime resources like water and energy because

of scarce supply. Stress to local communities can also result from environmental degradation and increased infrastructure costs for the local community - for example, higher taxes to pay for improvements to the water supply or sanitation facilities.

- *Cultural deterioration*: Damage to cultural resources may arise from vandalism, littering, pilferage and illegal removal of cultural heritage items. A common problem at archaeological sites is that poorly paid guards supplement their income by selling artefacts to tourists. Furthermore, degradation of cultural sites may occur when historic sites and buildings are unprotected and the traditionally built environment is replaced or virtually disappears.
- *Conflicts with traditional land-uses*: This especially happens in intensely exploited areas such as coastal zones, which are popular for their beaches and islands. Conflicts arise when the choice has to be made between development of the land for tourist facilities or infrastructure and local traditional land-use. The indigenous population of such destinations is frequently the loser in the contest for these resources as the economic value which tourism brings often counts for more.

As an example of how local people can suffer from tourism development, in coastal areas construction of shoreline hotels and tourist facilities often cuts off access for the locals to traditional fishing ground and even recreational use of the areas.

Ethical issues

Partly due to the above impacts, tourism can create more serious situations where ethical and even criminal issues are involved. Some examples (source: www.UNEP.org):

- *Crime generation*: Crime rates typically increase with the growth and urbanization of an area, and growth of mass tourism is often accompanied by increased crime. The presence of a large number of tourists with a lot of money to spend, and often carrying valuables such as cameras and jewellery, increases the attraction for criminals and brings with it activities like robbery and drug dealing. Repression of these phenomena often exacerbates social tension.
- *Child labour*: Many jobs in the tourism sector have working and employment conditions that leave much to be desired: long hours, unstable employment, low pay, little training and poor chances for qualification. In addition, recent developments in the travel and tourism trade (liberalization, competition, concentration, drop in travel fares, growth of subcontracting) and introduction of new technologies seem to reinforce the trend towards more precarious, flexible employment conditions. For many such jobs young children are recruited, as they are cheap and flexible employees.
- *Prostitution and sex tourism*: The commercial sexual exploitation of children and young women has paralleled the growth of tourism in many parts of the world. Though tourism is not the cause of sexual exploitation, it provides easy access to it.

2.3.2 Socio-cultural benefits from tourism

The socio-cultural benefits from tourism described below can arise only when tourism is practiced and developed in a sustainable and appropriate way. Involving the local population is essential. A community involved in planning and implementation of tourism has a more positive attitude, is more supportive and has a better chance to make a profit from tourism than a population passively ruled - or overrun - by tourism. One of the core elements of sustainable tourism development therefore is community development.

Some examples (source: www.UNEP.org) of socio-cultural benefits from tourism:

- *Poverty alleviation:* Tourism can contribute to positive developments, not just negative impacts (see box 1). It has the potential to promote social development through employment creation, income redistribution and poverty alleviation.
- *Tourism as a force for peace:* Travelling brings people into contact with each other and, as tourism has an educational element, it can foster understanding between peoples and cultures and provide cultural exchange between hosts and guests. Because of this, the chances increase for people to develop mutual sympathy and understanding and to reduce their prejudices.
- *Strengthening communities:* Tourism can add to the vitality of communities in many ways. One example is that events and festivals of which local residents have been the primary participants and spectators are often rejuvenated and developed in response to tourist interest.

The jobs created by tourism can act as a vital incentive to reduce emigration from rural areas. Local people can also increase their influence on tourism development, as well as improve their job and earnings prospects, through tourism-related professional training and development of business and organizational skills.

- *Facilities developed for tourism can benefit residents:* As tourism supports the creation of community facilities and services that otherwise might not have been developed, it can bring higher living standards to a destination. Benefits can include upgraded infrastructure, health and transport improvements, new sport and recreational facilities, restaurants, and public spaces as well as an influx of better-quality commodities and food.
- *Revaluation of culture and traditions:* Tourism can boost the preservation and transmission of cultural and historical traditions, which often contributes to the conservation and sustainable management of natural resources, the protection of local heritage, and a renaissance of indigenous cultures, cultural arts and crafts.
- *Tourism encourages civic involvement and pride:* Tourism also helps raise local awareness of the financial value of natural and cultural sites and can stimulate a feeling of pride in local and national heritage and interest in its conservation. More broadly, the involvement of local communities in tourism development and operation appears to be an important condition for the conservation and sustainable use of biodiversity.

2.4 Ecological environment

The quality of the ecological and rural environment is essential to tourism. Tourism's relationship with the environment however is rather complex. It involves many activities that can have adverse environmental effects. Many of these impacts are linked with the construction of general infrastructure like roads and tourism facilities such as accommodation (resorts, hotels, restaurants, shops etc.). The negative impacts of tourism development can gradually destroy the environmental resources on which it depends.

Negative impacts from tourism occur when it exceeds the environments carrying capacity. Uncontrolled conventional tourism poses potential threats to many natural areas around the world. It can put enormous pressure on an area and lead to impacts such as soil erosion, increased pollution, discharges into the sea, natural habitat loss, increased pressure on endangered species and heightened vulnerability to forest fires. It often puts a strain on water resources, and it can force local populations to compete for the use of critical resources.

On the other hand, tourism has the potential to create beneficial effects on the environment by contributing to environmental protection and conservation. It is a way to raise awareness of environmental values and it can serve as a tool to finance protection of natural areas and increase their economic importance.

2.4.1 Ecological costs from tourism

Many studies have shown the impact of recreation and tourism to the ecological environment (for an extensive overview see Liddle 1997). Ecological costs from tourism refer to depletion of natural resources, pollution, physical impacts and disturbance.

Depletion of natural resources

Tourism development can put pressure on natural resources when it increases consumption in areas where resources are already scarce.

- *Water resources:* Water, and especially fresh water, is one of the most critical natural resources. The tourism industry generally overuses water resources for hotels, swimming pools, golf courses and personal use of water by tourists. In the hot climate of the Mediterranean for instance tourists tend to spend (up to 440 litres a day) almost double the amount of what inhabitants of an average Spanish city use (source: www.world-tourism.org). This can result in water shortages and degradation of water supplies, as well as generating a greater volume of waste water.
- *Local resources:* Tourism can create great pressure on local resources like energy, food, and other raw materials that may already be in short supply. Greater extraction and transport of these resources exacerbates the physical impacts associated with their exploitation. Because of the seasonal character of the industry, many destinations have ten times more inhabitants in the high season as in the low season. A high demand is placed upon these resources to meet the high expectations tourists often have (proper heating, hot water, etc.).

- *Land degradation:* Important land resources include minerals, fossil fuels, fertile soil, forests, wetland and wildlife. Increased construction of tourism and recreational facilities has increased the pressure on these resources and on scenic landscapes. Direct impact on natural resources, both renewable and non-renewable, in the provision of tourist facilities can be caused by the use of land for accommodation and other infrastructure provision, and the use of building materials. Forests often suffer negative impacts of tourism in the form of deforestation caused by fuel wood collection and land clearing.

Pollution

Tourism can cause the same forms of pollution as any other industry: air emissions, noise, solid waste and littering, releases of sewage, oil and chemicals, even architectural/visual pollution. Some examples (source: www.UNEP.org):

- *Air pollution and noise:* Transport by air, road, and rail is continuously increasing in response to the rising number of tourists and their greater mobility. To give an indication, the World Tourism Organisation expects the number of international tourism arrivals to more than double in just 20 years time, from 0.7 billion in 2000 to almost 1.6 billion in 2020.

One consequence of this increase in air transport is that tourism now accounts for more than 60% of air travel and is therefore responsible for an important share of air emissions.

Transport emissions and emissions from energy production and use are linked to acid rain, global warming and photochemical pollution. Air pollution from tourist transportation has impacts on the global level, especially from carbon dioxide (CO₂) emissions related to transportation energy use. And it can contribute to severe local air pollution.

Noise pollution from airplanes, cars, and buses, as well as recreational vehicles such as snowmobiles and jet skis, is an ever-growing problem of modern life. In addition to causing annoyance, stress, and even hearing loss for it humans, it causes distress to wildlife, especially in sensitive areas. For instance, noise generated by snowmobiles can cause animals to alter their natural activity patterns.

- *Solid waste and littering:* In areas with high concentrations of tourist activities and appealing natural attractions, waste disposal is a serious problem and improper disposal can be a major despoiler of the natural environment - rivers, scenic areas, and roadsides.
- *Sewage:* Construction of hotels, recreation and other facilities often leads to increased sewage pollution. Wastewater has polluted seas and lakes surrounding tourist attractions, damaging the flora and fauna. Sewage runoff causes serious damage to coral reefs because it stimulates the growth of algae, which cover the filter-feeding corals, hindering their ability to survive. Changes in salinity and siltation can have wide-ranging impacts on coastal environments. And sewage pollution can threaten the health of humans and animals.
- *Aesthetic Pollution:* Often tourism fails to integrate its structures with the natural features and indigenous architectural of the destination. Large, dominating resorts of disparate design can look out of place in any natural environment and may clash with the indigenous structural design.

A lack of land-use planning and building regulations in many destinations has facilitated sprawling developments along coastlines, valleys and scenic routes. The sprawl includes tourism facilities themselves and supporting infrastructure such as roads, employee housing, parking, service areas, and waste disposal.

Physical impacts

Attractive landscape sites, such as sandy beaches, lakes, riversides, and mountain tops and slopes, are often transitional zones, characterised by species-rich ecosystems. The ecosystems most threatened with degradation are ecologically fragile areas such as alpine regions, rain forests, wetlands, mangroves, coral reefs and sea grass beds. The threats to and pressures on these ecosystems are often severe because such places are very attractive to both tourists and developers.

Physical impacts are caused not only by tourism-related land clearing and construction, but by continuing tourist activities and long-term changes in local economies and ecologies.

Some examples (source: www.UNEP.org) from physical impacts of tourism development and activities:

- *Construction activities and infrastructure development:* the development of tourism facilities such as accommodation, water supplies, restaurants and recreation facilities can involve sand mining, beach and sand dune erosion, soil erosion and extensive paving. In addition, road and airport construction can lead to land degradation and loss of wildlife habitats and deterioration of scenery.
- *Deforestation and intensified or unsustainable use of land:* construction of ski resort accommodation and facilities frequently requires clearing forested land. Coastal wetlands are often drained and filled due to lack of more suitable sites for construction of tourism facilities and infrastructure. These activities can cause severe disturbance and erosion of the local ecosystem, even destruction in the long term.
- *Marina development:* development of marinas and breakwaters can cause changes in currents and coastlines. Furthermore, extraction of building materials such as sand affects coral reefs, mangroves, and hinterland forests, leading to erosion and destruction of habitats. Overbuilding and extensive paving of shorelines can result in destruction of habitats and disruption of land-sea connections (such as sea-turtle nesting spots). Coral reefs are especially fragile marine ecosystems and are suffering worldwide from reef-based tourism developments.
- *Anchoring, trampling and other activities* may damage coral, vegetations and/or soil, eventually causing damage that can lead to loss of biodiversity and other impacts.

Wildlife disturbance

Wildlife viewing or just being a visitor will cause stress for animals and alter their natural behaviour. Habituation to the presence of visitors is a common process (Henkens 1998). However, many studies have shown that presence of visitors decreased the density of (breeding) birds and breeding success, which may have a substantial impact on the sustainability of local, regional or even national species populations (Spaans *et al.* 1996, Henkens 1998).

2.4.2 Ecological benefits from tourism

Previous paragraph described the negative impacts of recreation and tourism to the ecological environment. These are often direct impacts whereas benefits to the environment often act in an indirect way. Some examples (main source: www.UNEP.org):

- *Financial contributions:* Tourism can directly or indirectly contribute to the conservation of sensitive areas and habitat. For an overview of fund raising opportunities see Box 2.

Box 2: Raising funds for nature conservation.

The main methods used by protected areas to raise funds for nature conservation are (Font *et al.* 2004, Spergel 2001, Verwey & Man 2005):

- *Entrance fees:* fees charged per person or per vehicle, or a combination of both, for entrance and access to wetland areas;
- *User fees:* fees charged to visitors for undertaking specific recreational activities or for the use of specialised facilities within protected areas, subject to compliance with the area's regulations (e.g. for parking, camping, fishing, hunting, boating, diving, sports, photography etc.);
- *Concessions and leases:* contracts between managers of protected areas and business or individuals under which the businesses or individuals are permitted to operate within the area;
- *Direct operation of commercial activities:* provision of commercial goods and services (such as accommodation, guiding, specialised rental equipment, food sales or merchandising of clothing, crafts and souvenirs, for example);
- *Taxes:* levies on certain goods, services or transactions that provide funds for national or local governments, and that are used to support the conservation of protected areas;
- *Volunteers and donations:* volunteers are persons who offer their services to a protected area of their own free will and without payment (except, in some cases, to cover their basic living expenses); donations are gifts or money, or in some cases goods and services, that are donated to support the conservation of wetland areas.

- *Improved environmental management and planning:* Sound environmental management of tourism facilities and especially hotels can increase the benefits to natural areas. But this requires careful planning for controlled development, based on analysis of the environmental resources of the area. Planning helps to make choices between conflicting uses, or to find ways to make them compatible. By planning early for tourism development, damaging and expensive mistakes can be prevented, avoiding the gradual deterioration of environmental assets significant to tourism.
- *Environmental awareness rising:* Tourism has the potential to increase public appreciation of the environment and to spread awareness of environmental

problems when it brings people into closer contact with nature and the environment. This confrontation may heighten awareness of the value of nature and lead to environmentally conscious behaviour and activities to preserve the environment.

- *Protection and preservation:* Tourism can significantly contribute to environmental protection, conservation and restoration of biological diversity and sustainable use of natural resources. Because of their attractiveness, pristine sites and natural areas are identified as valuable and the need to keep the attraction alive can lead to creation of national parks and wildlife parks.
- *Alternative employment:* Tourism can provide an alternative to development scenarios that may have greater environmental impacts, like activities of slash and burn in purely agricultural scenarios.

3 Theoretical Integrated Assessment Framework

3.1 Introduction

In order to make balanced decisions about tourism development, an integrated approach is needed to deal with tourism in relation to issues like loss of biodiversity and poverty. It is also essential to integrate the economic, socio-cultural and ecological dimensions in order to make choices that provide long-term sustainable solutions.

Figure 1 shows an Integrated Assessment framework to analyse tourism development scenarios. The main steps included in this framework are:

1. Environmental Impact Assessment: §2.4 provides an overview of potential negative (costs) and positive (benefits) impacts to the ecological environment;
2. Function analysis: in this step ecosystem characteristics (ecological processes and components) are translated into functions which provide specific ecosystem services. These services should be quantified in appropriate units (biophysical or otherwise), based on actual or potential sustainable use levels. (see §3.2);
3. Function Valuation: in this step, appropriate criteria and indicators of ecosystem services identified in step 2 are selected (see §3.3);
4. Analysis of costs and benefits: Appropriate indicators and consequent costs and benefits will be quantified in both the appropriate value-units (economic, socio-cultural and ecological indicators) as well as monetary values (see §3.4);
5. Multi-criteria Analysis / Trade-off analysis: these analysis will bring all costs and benefits expressed in different measurement units (qualitative, quantitative, monetary) into one common unit, will allow the elicitation of stakeholder preferences and determine all trade-offs involved in development scenarios (see §3.5);
6. Policy analysis & decision-making: insight into the policy processes and management objectives is essential to set the stage for a discussion of what kind of valuation is needed (*e.g.* to assess the impact of past or ongoing interventions, or to analyse trade-offs of planned development options);
7. Scenario-development: the former steps will eventually lead to a sustainable tourism development scenario which shows an optimal balance of the economic, socio-cultural and ecological impacts on the environment.

Involvement of stakeholders is essential in all steps. Therefore, early in the process, the main stakeholders should be identified to determine the main policy and management objectives, to identify the main relevant services and assess their value, and to discuss trade-offs involved in development scenarios.

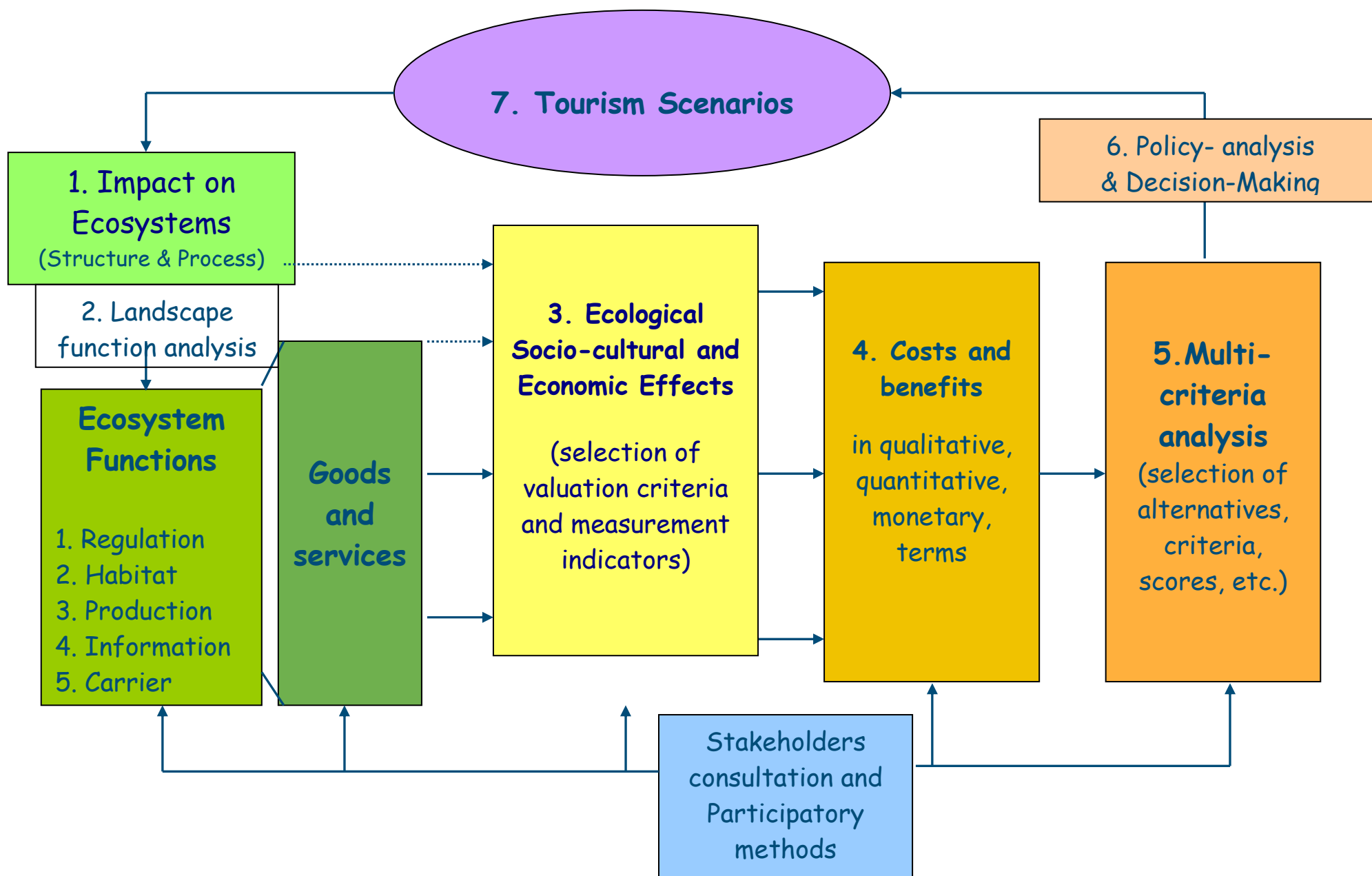


Figure 1: Integrated assessment framework

3.2 Function Analysis

Direct impacts on the environment should be translated into effects on the provision of ecosystem, or landscape functions and associated goods and services. De Groot et. al. (2002) defines ecosystem functions as the capacity of natural processes and components to provide goods and services that satisfy human needs, directly or indirectly. Ecosystem services represent the benefits that human populations obtain, directly or indirectly, from ecosystems (Millennium Assessment, 2003, 2005).

A wide range of ecosystem functions and their associated goods and services have been referred to in literature (e.g. Costanza *et al.* 1997; Daily *et al.* 2000; Millennium Ecosystem Assessment 2003), often using different classification schemes. In this report, ecosystem functions are grouped into four primary categories (Table 1).

Table 1: Typology of Ecosystem (Landscape) Functions, Goods and Services (adapted from de Groot et al, 2002 and Millennium Assessment, 2005).

Ecosystem Functions		Short Description	Biophysical Indicators (examples of ecosystem properties providing the good or service)	Goods and Services (examples)
Provisioning	Production functions	Resources from unmanipulated ecosystems	Biomass (production and stock) Biochemical properties Etc.	Fresh water* Food (e.g. fish, bush meat) Raw materials (wood, fodder) Etc.
	Carrier functions	Use of space to (enhance) supply resources or other goods and services	Depending on the specific land use type, different requirements are placed on environmental conditions (e.g. soil stability and fertility, air and water quality, hydrology, topography, climate, geology, etc)	Cultivation (e.g., agriculture, plantations, aquaculture) Energy conversion (e.g. wind, solar) Mining (ore, fossil fuels, etc.) Transportation (esp. on waterways) Etc.
Regulation Functions		Direct benefits from ecosystem processes	Role of ecosystems in bio-geo chemical cycles (e.g. CO ₂ / O ₂ balance, hydrological cycle) Role of vegetation & biota in removal or breakdown of nutrients and toxic compounds Physical properties of land cover Population control through tropic-dynamic relations Etc.	Climate regulation Maintenance of soil fertility Etc. Waste treatment (e.g. water purification) Maintenance of air quality Water regulation (e.g. buffering runoff) Erosion prevention Storm protection & flood prevention Biological control (of pests and diseases); Pollination Etc.
Habitat Functions		Maintenance of biodiversity and evolutionary processes	Presence of rare/endemic species; species diversity, etc Reproduction habitat for migratory species	Refugio for wildlife Nursery function (for commercial species)
Cultural & Amenity Functions		Non-material benefits	Landscape (or ecosystem) properties with aesthetic, recreational, historic, spiritual, inspirational, scientific or educational value	Enjoyment of scenery (e.g. scenic roads) Eco-tourism and recreation Heritage value/cultural landscapes Spiritual or religious sites Cultural expressions (use of landscapes as motive in books, film, painting, folklore, advertising, etc). Research & education

**Strictly speaking, fresh water is not "produced" but constantly recycled. Because water is an important (essential) resource, the storage of water is seen as separate from water-purification which often underlies different processes (e.g. cleaning of rainwater by vegetation or microbial activity in water) and often takes place in different compartments of the landscape.*

3.2.1 Provisioning functions

Provisioning functions comprise functions that supply “physical services” in terms of resources or space. This category has been divided into two classes: production and carrier functions. *Production functions* reflect resources produced by natural ecosystems, for example the harvesting of fish from the ocean, pharmaceutical products from wild plants and animals or wood from natural forests. *Carrier functions* reflect the goods and services that are provided through human manipulation of the natural productivity (e.g. fish from aquaculture or timber from plantations). In these cases, the function from nature is the provision of suitable substrate or space for human activities, including agriculture, mining, transportation, etc.

3.2.2 Regulation functions

Regulation functions result from the capacity of ecosystems and landscapes to influence (“regulate”) climate, hydrological and bio-chemical cycles, earth surface processes, and a variety of biological processes. These services often have an important spatial (connectivity) aspect; e.g. the flood control service of an upper watershed forest is only relevant in the flood zone downstream of the forest.

3.2.3 Habitat functions

Habitat functions comprise the importance of ecosystems and landscapes to maintain natural processes and biodiversity, including the refugio and nursery functions. The refugio function reflects the value that landscape units have to provide habitat to (threatened) fauna and flora, the nursery function indicates that some landscape units provide a particularly suitable location for reproduction and thereby have a regulating impact on the maintenance of populations elsewhere.

3.2.4 Cultural and amenity functions

Cultural and amenity functions relate to the benefits people obtain from landscapes through recreation, cognitive development, relaxation, and spiritual reflection. This may involve actual visits to the area, indirectly enjoying the area (e.g. through nature movies), or gaining satisfaction from the knowledge that a landscape contains important biodiversity or cultural monuments. The latter may occur without having the intention of ever visiting the area. These services have also been named ‘information functions’ (as in de Groot 1992).

3.3 Function Valuation

The impact of each tourism scenario should be evaluated according to a number of economic, social and ecological valuation criteria (see table 2). There is no specific

set of valuation criteria that can be universally used. The criteria chosen should have a direct relevance to the objective of the study, should be formulated in a clear way and selected according to the availability of data. Each valuation criteria is measured by using measurement indicators. Indicators can provide useful information about conditions and trends of sustainable development. Moreover they can provide useful input to management and policy choices. Indicators should be easy to interpret also by non-specialists, in this way they can facilitate communication between different stakeholders (World Bank 2002).

It is possible to distinguish between state indicators, performance indicators and use indicators: state indicators describe the landscape properties (“functions”) providing a given good or service, for example the stock and reproduction rate of a certain fish population. The performance indicator would then describe the capacity of the function to provide the good or service on a sustainable basis (e.g. the potential maximum sustainable harvest level of the fish population); the use indicator, finally, describes the actual (current) use made of the good or service, in the case of the fish-example the actual amount of fish harvested (which may be more or less than the sustainable use level) (see for further information De Groot & Hein 2005). The distinction among the different types of indicators goes beyond the scope of this report. Table 2 gives a set of general indicators for each valuation criteria.

Table 2: Valuation criteria and (examples of) measurement indicators.

Valuation Criteria	Description	Measurement Indicator	Method
Economic valuation criteria (TEV)			
Stock Value	Economic value of available stock of ecosystems goods and services not traded (and therefore not generating (direct) income)	- Available stock in Euro/yr	- Market price
Direct (consumptive) use Value	Ecosystems provide directly to human beings a variety of goods that can be traded: ex. food (fruits, herbs, vegetables), water, wood, textiles, medicines, livestock, etc.	- Average income local community in Euro/yr <i>and</i> - Average income other than local community in Euro/yr	- Market price
Direct (non consumptive) use Value	Ecosystems provide directly to human beings a variety of services: ex recreation, research, education, etc.	- Average income local community in Euro/yr <i>and</i> - Average income other than local community in Euro/yr	- Market price
Indirect use Value	Several indirect benefits are provided by ecosystems to human beings: ex. carbon sequestration; flood prevention; storm protection; water supply	- Benefits to society in Euro/yr	-Indirect market valuation methods such as avoided costs method, contingent valuation method, etc.
Non use value	This includes the value that people derive from the knowledge that something exists (even if they never plan to use it) and the value derived from the desire to pass on values to future generations	- Benefits in Euro/yr	-Indirect market valuation methods such as contingent valuation method and conjoint analysis.

Valuation Criteria	Description	Measurement Indicator	Method
Socio-cultural valuation criteria			
<i>Employment</i>	(use of) Ecosystem services provide opportunity for employment	<ul style="list-style-type: none"> - Average n. people employed within local community/yr - Average n. people employed other than local community/yr 	- Statistical bureau
<i>Heritage value</i>	Importance of nature as reference to personal or collective history and cultural identity.	<ul style="list-style-type: none"> - surface historic sites, features and artefacts/ area - No. of people “using” ecosystems for cultural heritage and identity/area/yr - N. historic sites, features and artefacts/area - N. designated cultural landscapes/area - N. of cultural traditions and knowledge/area 	- field work, interviews
<i>Spirituality value</i>	Importance of nature in symbols and elements with sacred, religious and spiritual significance.	<ul style="list-style-type: none"> - Surface sacred sites or features/area - No. of people “using” ecosystems for their spiritual value/area/yr - No. of sacred sites/area 	- interviews
<i>Wellbeing</i>	Effect of nature on peoples’ well being	<ul style="list-style-type: none"> - health (esp. mental) - safety - gen. sense of well being 	- interviews
Ecological valuation criteria			
<i>Naturalness/Integrity</i>	Degree of human presence in terms of physical, chemical or biological disturbance.	<ul style="list-style-type: none"> - n. of key species present/ area - quality of air, water, and soil - % of min. critical ecosystem size 	- field work or data from environmental institutes, universities , etc.
<i>Diversity</i>	Variety of life in all its forms, including ecosystems, species & genetic diversity.	<ul style="list-style-type: none"> - number of ecosystems/ area - number of species/ area 	<ul style="list-style-type: none"> - satellite photos - field work or data from environmental institutes, universities , etc.
<i>Uniqueness/rarity</i>	Local, national or global rarity of ecosystems and species	<ul style="list-style-type: none"> - number of endemic species/ area 	- field work or data from environmental institutes, universities , etc.
<i>Resilience</i>	Sensitivity of ecosystems to human disturbance and capacity for renewability	<ul style="list-style-type: none"> - energy budget (GPP/NPP) - complexity in food chain levels 	- expert judgement base on studies done in the area

Next to selecting measurement indicators it is necessary to identify the existing relation between measurement indicators and goods and services (see table 3). This is important because in order to estimate the value of measurement indicators it is necessary to have a full overview of the ecosystems functions, goods and services that need to be taken into account when doing the estimation.

Monetary valuation of ecosystem services

Some authors consider cultural values and their social welfare indicators as a sub-set of economic values. Others state that in practice economic valuation is limited to efficiency and costs-effectiveness analysis. This is usually measured in monetary units, disregarding the importance of for example spiritual values and cultural identity which are in many cases closely related to ecosystem services. In this report economic and monetary valuation are therefore treated separately from socio-cultural valuation, whereby it is emphasized that economic, socio-cultural and ecological values all have their separate role in decision making and should be seen as essentially complementary pieces of information in the decision-making process.

Numerous studies have assessed the economic value of ecosystems (e.g. Hartwick 1994; Barbier *et al.* 1997; Asheim 1997; Costanza *et al.* 1997; Daily 1997; Pimentel & Wilson 1997; Hamilton & Clemens 1999) and the concept of Total Economic Value (TEV) has become a widely used framework for looking at the utilitarian value of ecosystems. This framework typically disaggregates TEV into two categories: use values and non-use values.

Use values

Use values are composed of three elements: direct use, indirect use and option values. Direct use value is also known as extractive, consumptive or structural use value and mainly derives from goods which can be extracted, consumed or enjoyed directly (Dixon & Pagiola 1998). Indirect use value is also known as non-extractive use value, or functional value and mainly derives from the services the environment provides (Dixon & Pagiola 1998). Option value is the value attached to maintaining the option to take advantage of something's use value at a later date. Some authors also distinguish Quasi Option value which derives from the possibility that even though something appears unimportant now, information received later might lead us to re-evaluate it (Dixon & Pagiola 1998).

Non-use values

Non-use values derive from the benefits the environment may provide which do not involve using it in any way, whether directly or indirectly. In many cases, the most important such benefit is existence value: the value that people derive from the knowledge that something exists, even if they never plan to use it. Thus people place value on the existence of blue whales or the panda, even if they have never seen one and probably never will. However, if blue whales became extinct, many people would feel a definite sense of loss (Dixon & Pagiola 1998). Bequest value, finally, is the value derived from the desire to pass on values to future generations (i.e. our children and grand-children).

The (relative) importance people attach to many of the values listed in the sections above, and their associated services, can be measured using money as a common denominator.

Monetary or financial valuation methods fall into three basic types, each with its own repertoire of associated measurement issues (see Appendix III):

- 1) direct market valuation;
- 2) indirect market valuation; and
- 3) survey-based valuation (i.e. contingent valuation and group valuation).

If no site-specific data can be obtained (due to lack of data, resources or time) *benefit transfer* can be applied (i.e. using results from other, similar areas, to approximate the value of a given service in the study site). This method is rather problematic because, strictly speaking, each decision-making situation is unique, but the more data that becomes available from new case studies, the more reliable benefit transfer becomes. See table 3 for an example of monetary values calculated for Bushbuckridge Communal Area.

Table 3. Total (Economic) value of Bushbuckridge Communal Area: comparison of actual and restored situation (source: adapted from Blignaut & Moolman 2006).

		Actual		Restored
	Area in Ha (or % of study area) ¹	Total value (M.US\$)	# people employed	Total Value (US\$/ha)
Value of the standing stock²	184.301	575,68	n/a	3.123,72
- Mammals	idem	28,72	n/a	155,74
- Vegetables	idem	546,96	n/a	2.967,98
TEV (flow values)				
1 Direct Use Value	idem	130,69		709,6
1a Direct (Cons.) Use value ³				
- Fuel wood		3,50	?	18,96
- Timber		4,41		24,01
- Crafts		51,22		278,22
- Medicinal		47,11		255,38
- Edible fruits, herbs & veget.		1,51		8,19
- Thatch		0,61		3,19
- wild animals (trade & hunt) ⁴		4,3		23,4
- other (reeds, sticks, grass brushes, birds, etc.) ⁵		0,0		0,0
1b Direct (non-cons) use value				
- tourism ⁶		18,09	?	98,25
2 Indirect Use Value	idem	13,16		71,43
- honey production		0,85		4,56
- carbon sequestration		12,31		66,87
3 Non-use Value⁷	idem	11,25		60,83
- option, bequest & existence		11,25		60,83

¹ Would be good to indicate spatial distribution of the “value” in question

² The [hypothetical] value of standing stock of all tradable plant and animal species, in case they would be harvested completely (Blignaut & Moolman, 2006);

³ Based on primary household surveys ...for own use and/or traded outside the market ...; sustainable harvest was conservatively assumed to be 1% of biomass production

⁴ Assuming restriction to 50% of new births to ensure sustainable use levels

⁵ Not allowed anymore after restoration

⁶ Incl. “passive tourism”(landscape appreciation), adventure tourism (eg hiking) and eco-tourism

⁷ Based on WTP study for conservation

3.4 Analysis of costs and benefits

Scenarios are evaluated by scoring indicators (see table 4). For each scenario and for each indicator the costs and benefits will be assessed in monetary, quantitative and/or qualitative terms according to the type of information needed and available. This information is necessary in order to perform a multi-criteria analysis. Scoring requires careful data collection. Data should be collected from trusted sources in order for the analysis to be reliable. However, depending on the budget available for carrying out the study, a good balance should be found between quality of data and actual costs for collecting them. Data collection should be cost effective.

3.5 Multi-Criteria Analysis

Table 4: Example of input table to be used for the multi-criteria analysis

Functions	Valuation criteria	Measurement indicator	Unit	Tourism Scenario		
				A	B	C
Economic valuation						
Production	Stock value	Available stock in Euro/yr	Euro			
	Direct (consumptive) use value	Average income local community in Euro/yr	Euro			
		Average income others than local community in Euro/yr	Euro			
Information	Direct (non consumptive) use value	Average income local community in Euro/yr	Euro			
		Average income others than local community in Euro/yr	Euro			
Regulation	Indirect use value	Benefits to society in Euro/yr	Euro			
All functions	Non use value	Benefits to society in Euro/yr	Euro			
Information and Production	Employment	Average n. people employed within local community/yr	n.			
		Average n. people employed others /yr	n.			
Socio-cultural valuation						
Information	Heritage value	surface of historic sites, features, artefacts/ study area	Ha			
		n. of people using ecosystems for cultural heritage and identity/ study area /yr	n.			
	Spiritual value	surface sacred sites or features/ study area	Ha			
		n. people who attach religious significance to ecosystems/ study area /yr	n.			
	Mental health	Sense of well being	+/-			
Ecological valuation						
Habitat	Naturalness/integrity	n. key species/present/study area	n.			
Regulation		Quality of air, water and soil	+/-			
Habitat	Diversity	n. ecosystems/ study area	n.			
		n. species/ study area	n.			
Habitat	Uniqueness	n. endemic species/ study area	n.			
Habitat	Resilience	Complexity in food chain level	high/low			

The data provided according to the previous steps will be inputs to be used for the multicriteria analysis.

Multi-criteria analysis (MCA) is a tool to compare a mix of economic, socio-cultural and ecological costs and benefits of development scenarios (see Appendix 2 for details). In addition to TEV (see table 4) also other factors need to be taken into account such as: employment, cultural and other wellbeing factors and ecological aspects.

There are several existing multi-criteria methods that can be used in order to bring the available economic, socio-cultural and ecological costs and benefits express into different units into a common unit, to elicit the preferences of stakeholders for ecosystems functions and to identify the scenarios that generate more benefits. The selection of the multicriteria method depends very much on the specific case under analysis, the context of the study, the assumptions made, the level of sophistication of the analysis, the budget available, etc.

4 Practical application of ADAPTIVE in case-study Greater Giyani

4.1 Introduction

Former chapters gave an overview of tourism impacts (chapter 2) and described general aspects of, and the idea behind, the integrated assessment framework (chapter 3) which takes into account economic, social and economic dimensions when making tourism choices. This chapter describes a practical method which can be relatively easy applied to evaluate eco-tourism scenarios on economic, socio-cultural and ecological aspects. The method includes the ADAPTIVE model which has been developed based on the theoretical integrated assessment framework.

ADAPTIVE is an acronym for **Aid Decision Analysis for ParTicipatory Integrated Valuation of Ecotourism** scenarios. This model has been developed within the Environmental System Analysis Chair group of Wageningen University. The name ADAPTIVE very well represents the character of this decision support tool as it is adaptive in terms of:

- it is flexible to incorporate different types of measurement scales and data;
- it can perform both a Multi Criteria Analysis and Cost Benefit Analysis;
- it can provide different types of outcome (valuation, ranking, workshop platform).

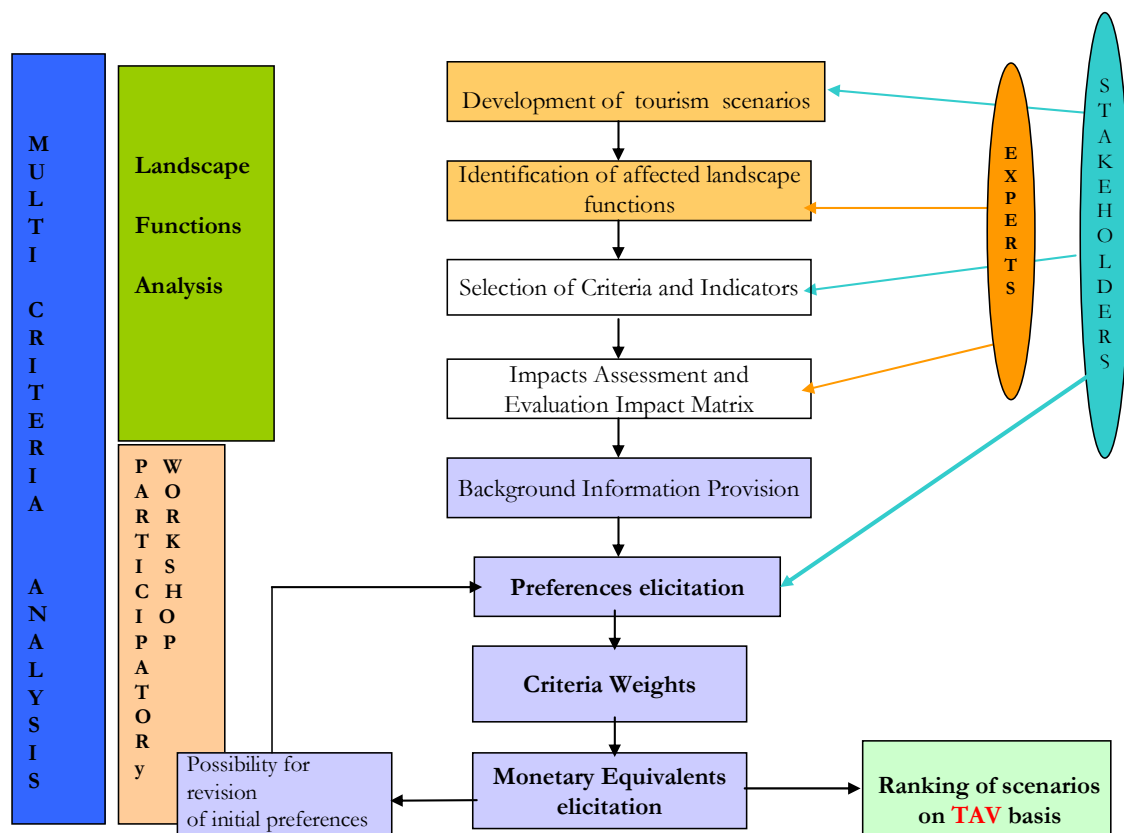


Figure 2. Steps to be taken for the application of ADAPTIVE and in order to achieve ranking of tourism development scenarios on basis of a total aggregated value (TAV).

The main steps and aspects of the method will be discussed hereunder displaying how ADAPTIVE may be utilised during a participatory workshop (see also figure 2). This will be illustrated in the context of the Greater Gyani case study area in South Africa.

This chapter starts with some general background information on the present economic, socio-cultural and ecological environment of Greater Gyani. This background information should be considered as the minimum of what is needed to be able to valuate eco-tourism scenarios during expert en stakeholder-workshops. Within the context of this project it was unfortunately not possible to undertake these workshops. So from §4.4 onwards the data used are rather hypothetical. However, despite this omission the authors believe that the information presented is sufficient to illustrate the usability of ADAPTIVE.

4.2 Description of the study area Greater Gyani

Reason to select Greater Gyani as a case-study area lies in the application of the ARISE project in the same area and the participation of Pretoria University herein. ARISE is an acronym for **A**frica's **R**ural **I**nitiatives for **S**ustainable **E**nvironments. This project aims to halt the degradation of the rural area thereby alleviating poverty. Tourism development has been regarded to be a logical follow-up step in this initiative. The present project may support the realization of this goal.

The study area is situated in the north-eastern part of South Africa (figure 3). The Greater Gyani Local Municipality (GGLM) is one of the five local municipalities that belong to the Mopani District Municipality in Limpopo Province. The only town in the GGLM is Gyani. The study area lies in the North-Eastern part of GGLM. The town of Gyani is located just outside the study area hereinafter referred to as "Greater Gyani" (figure 4).



Figure 3. The map of South Africa and the location of the study area.

The study area measures approx 450 km² (see yellow lined polygon in figure 4). It borders the Kruger National Park (KNP) in the east. The case study area consists of thirteen villages named: (1) Muyexe, (2) N'wakhuwani, (3) Mhlava, (4) Thomo, (5) Khakhala, (6) Homo-North, (7) Homo-South, (8) Mapayeni, (9) Gawula, (10) Mathathi, (11) Vuhehli, (12) Ndindani and (13) Hlomela (see figure 4 for their location).

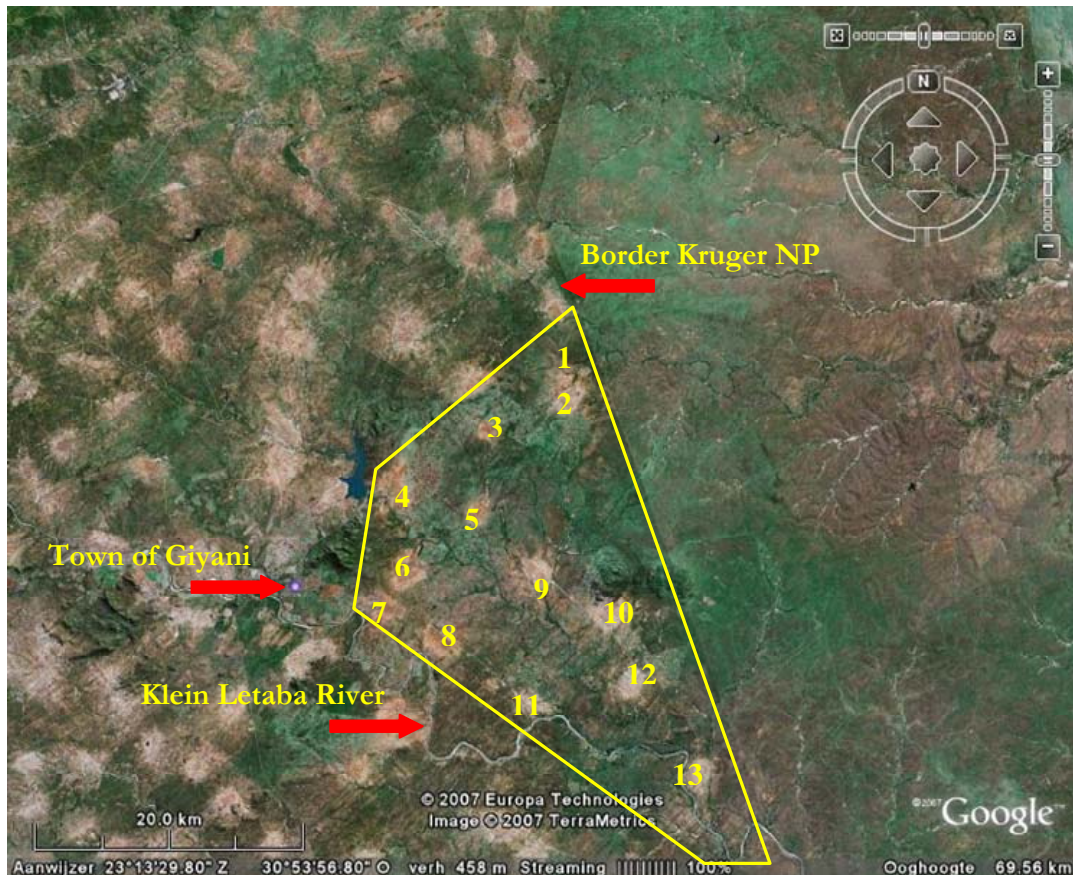


Figure 4. Case study area of Greater Giyani (yellow lined polygon) including 13 villages (see text for names) and its wider surroundings. The right part of the picture, without 'dots' of villages resembles the Kruger National Park. Its border is forms a sharp contrast with the communal land to the left.

The following information on the economic, socio-cultural and ecological environment has (mainly) been derived from the Greater Giyani Local Municipality Integrated Development Plan for 2005 and 2006. It should be noticed that "Greater Giyani" is just part of this wider area. However, the conditions between Greater Giyani and GGLM are generally similar which means that the information for GGLM may be adapted for Greater Giyani as well.

4.2.1 The economic environment

Economic development in GGLM is low. Factors like geographical location (distance to markets), shortage of skills, poor infrastructure, climatic conditions and

diseases (HIV, malaria and tuberculoses) have a negative influence on the economic growth. As a result the number of unemployed people increased from 50.7% in 1996 to 60.4% in 2001. The official unemployment level in Greater Giyani is probably even worse as these data also include jobs in Giyani town, where most economic activities take place.

The economic activities in Greater Giyani mainly refer to small-scale agriculture like growing of maize, vegetables, tomatoes and livestock (beef). Small scale services and transport and retail development are other ways to make a living.

The municipality has been said to have potential for conservation and tourism development due to its (still) existing natural and cultural heritage. The potential market for processing of natural products like Mopani worms and Marula fruit may be developed in line with the tourism development.

4.2.2 Socio-cultural environment

The level of education in the study area is relatively low. Some 22.6% in the age group of 5 to 24 never attended school (data 2001), while 74.4% only attended primary school. Only a small part of the population attended follow-up educational institutions like preschool (2.1%), college (0.5%), technical school (0.1%), the Adult Education Centre (0.1%) or even university (0.1%). Factors contributing to the low educational situation are the low accessibility to schools and poverty which hampers people's ability to afford further education. In contribution to that the area lacks proper infrastructures on many basic facilities. Some examples:

- The transportation system is underdeveloped. Street names are missing. Some 44% of the people go to work or school by foot. Heavy rainfalls in January-May 2000 damaged almost the whole road network within the municipality. Most of the roads and bridges need rehabilitation and maintenance;
- The current water infrastructure is inadequate to supply water to all villages within the municipality;
- Bad sanitation is a major problem. It causes groundwater pollution and health problems. In 2001 some 55% of the population had no sanitation facilities at all;
- In 2001 some 34% of the households were still not connected to electricity;
- There's only one solid waste disposal site. This site does not adhere to the requirements of the Department of Environmental Affairs and Tourism. Littering and illegal dumping are major problems particularly in Giyani town. Own dump sites cause health problems;
- Many people are not properly housed which especially becomes a problem during the rainy season;
- Some of the villages have no health facilities at all, making that (diseased) locals have to travel long distances. HIV/ AIDS is a major problem in the area;
- The present police forces are inadequate to ensure sufficient safety to residents (and potential tourists). Crime however is not a major problem at the moment.

Tribal structures are strong and the local chiefs, each village has one, are very influential. The social cohesion among families is very strong as well. This is illustrated by numerous joint ceremonies, like rain prayer events or female and male initiation ceremonies which can be considered as the maturity starting point.

Regular meetings between the village chiefs occur though this does not lead to intensive cooperation between the villages. The social structure at the municipal level is therefore quite instable.

4.2.3 Ecological environment

To date no baseline information (GIS-based) is available with regard to the landscape, topography, climate or the flora and fauna of the area. The area can generally be considered as classic low savannah with stands of acacia, like in the neighbouring Kruger National Park. Though quite natural and green areas with attractive (bird)species are still available, the study area also shows severe signs of degradation, especially around the villages. It's not so hard to understand that the rural rehabilitation initiative named ARISE choose Greater Giyani as a project area. The environmental impacts mainly refer to informal settlements and influx of people from other villages due to poverty, unemployment, population growth and urbanization elsewhere. This leads to increased ecological impacts which are obviously going beyond the ecological carrying capacity at some locations. Some examples of major ecological impacts are:

- Water pollution caused by littering and overflow of sewage. Illegal dumping in the Klein Letaba River of informal business is an additional negative aspect;
- Deforestation as a result of firewood collection for daily cooking. It also occurs due to forest fires, which are a result of poaching or uncontrolled burning of forests. Overgrazing halts the rejuvenation of forests;
- Soil erosion is a result of poor land use planning and management, overgrazing, deforestation and field and forest fires.

4.3 Development of tourism scenarios

In order to come up to more or less feasible tourism development scenario's or visions for the region of Greater Giyani stakeholder interviews have been held as well as a workshop for the inhabitants of the local villages.

4.3.1 Stakeholder interviews and workshop

Interviews

A series of interviews with stakeholders were held between November 23rd and 25th, 2006. The questionnaires (appendix 7) were sent in advance to enable people to prepare for the interview. The stakeholders were divided in five clusters:

- Cluster 1: University of Pretoria Professors in tourism and rural development;
- Cluster 2: SAN-parks managers in tourism development, resource use and community development;
- Cluster 3: Department of Environmental Affairs and Tourism (National Government) professionals in tourism development and resource use;
- Cluster 4: Limpopo Provincial Government – Professionals in tourism and the project manager of ARISE;
- Cluster 5: A range of different tour operators.

The overall objective of the meetings was to find synergies through liaison among various stakeholders groups. The ultimate goal was to find visions for feasible tourism development scenarios and to come to a common rural development objective for Greater Giyani.

Workshop

On November 28th, 2006 a stakeholder workshop was held in the village of Gawula. The workshop was chaired by a representative of Environmental Offset Investment (EOI) which also manages the ARISE project. The workshop was attended by 41 participants, representatives from: the district, the municipality, HOMU Travel Authority, the ANC, traditional healers from Thomo, the Thomo traditional council, SANCO, Tirghuinzi Arts project, the disabled community as well as the chief from Kahkala and villagers from Hlomela, Mahlathi, Gawula and Mapayini. Unfortunately nearly all village chiefs attended a separate meeting, which was scheduled after the date and time of the stakeholder workshop had been set.

The general purpose of the workshop was to provide preliminary feedback on the students' research so far, and to obtain further information to improve the project. The potential scenarios, based on the interviews, were presented and discussed in order to observe common interests and preferences among the local community.

The workshop was a success in that way that there were actually no negative responses for the moment. All stakeholders present accepted the fact that they needed to co-operate between the villages if tourism development for Greater Giyani would become feasible at all.

The interviews and workshop have lead to the set up of three potential development scenarios or visions (see table 5). It's actually not a matter of choosing one of the scenarios but it's more a development process going from scenario 1, to scenario 2 to scenario 3. Key factors in this development process are the willingness of the local village chiefs to co-operate in the (tourism) development within the whole of Greater Giyani, the support from policy makers and land use-managers (like SAN-Parks which manages the Kruger NP) and the ability to find sufficient funding.

Table 5: Potential Tourism Development Scenarios for Greater Giyani

Scenarios	Description
Scenario A	No tourism development Current situation without any development of tourism products
Scenario B	Domestic tourism development focusing on leisure and recreation Development of the area for leisure and recreation, mainly for local and regional residents living in the cities nearby.
Scenario C	Tourism development including linkage with Kruger NP Application of the whole range of sustainable tourism products. Products development for leisure and recreation for residents living nearby as well as development for tourists coming from or going to the Kruger National Park through the Giyani gate.

4.3.2 Scenario 1: No tourism development for the whole of Greater Giyani

Some private tourism development is ongoing like the African Ivory Route. However, these small-scale developments are not expected to benefit the local villages very much.

Without tourism development within the whole area of Greater Giyani the focus has to be on other development options like sustainable ways of agriculture, basically through a continuation of the ARISE project. New initiatives might be implemented like biogas from livestock (and human) excrements. This might diminish or even exclude the need for firewood, an issue which currently has a major degrading impact on the environment (see figure 5).

The scenario without tourism development could be true if:

1. local villages have no interest in tourism development;
2. local villages cannot agree to cooperate on a joint tourism development plan for the whole of Greater Giyani (cooperation is essential as only the variety of attractions in and around each of the villages will makes tourism development feasible);
3. provincial policy makers do not support tourism development in Greater Giyani.

Indicative feasibility of scenario 1

From the experiences with the interviews it can be concluded that provincial policy makers are willing to develop tourism within Greater Giyani. From the experiences within the workshop it can also be concluded that all representatives of the villages were very much willing to cooperate in tourism development, as it could be one of the few options to improve their lives. However, most village chiefs were not present at the workshop. As they're having a strong influence on future developments, this questions the feasibility of broad support for a tourism development plan covering the whole region. Whether or not the area may undergo tourism development very much depends on the willingness of the village chiefs to co-operate, even if some villages may benefit more then others.



Figure 5. The area left is fenced through the ARISE-project aiming to recover from overgrazing, as can be seen on the right side (picture R. Henkens).

4.3.3 Scenario 2: Domestic tourism development focusing on leisure and recreation

Some one million residents are living within a few hours or less travelling from Greater Giyani in cities like Polokwane (also known as Pietersberg), capital of Limpopo Province (see figure 3). This offers opportunities for the development of domestic tourism products. Development within this scenario focuses on leisure and recreation products for the more sportive and adventurous tourists like weekend programmes on hiking, biking, horse riding, camping, kayaking on the Letaba-river (figure 6), donkey-cars etc.

Reintroduction of non-dangerous wildlife, like antelopes, would improve the wildlife-experience and attraction of the area, while it would as well improve the species range of distribution (figure 7).

This scenario excludes the opening of the Giyani gate for tourists, presently a ranger gate for Kruger National Park. The nearest tourism gate is relatively far away (approx 100 km) which makes the attraction of tourists from the Kruger NP less feasible.



Figure 6. The Letaba River outside Kruger NP attracts all sorts of wildlife which offers opportunities for kayaking or biking along its shores (picture J. Blignaut).

This scenario, focusing on domestic tourism development, could be true if:

1. there is indeed a serious demand for domestic tourism products in the cities around Greater Giyani;
2. local villages agree to cooperate on a joint development plan for domestic tourism products (leisure and recreation) in their region;
3. provincial policy makers support the development of domestic tourism products in Greater Giyani;
4. the conditions, like anti-poaching control, are there to reintroduce non-dangerous wildlife species, like antelopes, in the area.

Indicative feasibility of scenario 2

The interviews with local tourism entrepreneurs confirm that South Africans (black and white) love to spend time in the bush during weekends and holidays. Besides enjoying nature and landscape they're very much into sportive activities. Market research would be needed to analyse the customer demand and to determine the type and number of products to be developed.

The SAN-Parks representative supported the idea to reintroduce antelope species to the area on the condition that the causes for their present absence (like poaching) would have been overcome.



Figure 7. Reintroduction of non-dangerous wildlife species in Greater Giyani, like these impala's in Kruger NP, will increase the attractiveness of the area for tourism (picture R. Henkens).

4.3.4 Scenario 3: Tourism development including linkage with Kruger NP

Part of the study area of Greater Giyani, approx. 8000 ha, borders the Kruger NP. This area looks very similar to the adjacent Kruger NP, as it is hardly used by the local communities for livestock grazing or firewood collection (figure 8). This area can be considered as 'change money'. It might be included within the Kruger NP in change of turning the Giyani ranger gate nearby into a tourism gate. As Kruger NP receives between 1 and 2 million visitors each year, this would create huge potential for the villages in Greater Giyani (figure 9). Even if only a small proportion of the tourists leaves the park for the attractions developed in Greater Giyani.

All kinds of tourism products which add to the Kruger experience might have potential to be developed in Greater Giyani, like:

- tourism lodges which are different from the expensive 5-star lodges in Kruger NP;
- home stays with the local people, as there are no opportunities within Kruger NP to get a taste of local cultures; also products on cultural history might be developed
- camping between the wildlife as Kruger NP only offers fenced campsites;
- sportive attractions like hiking, biking and kayaking on the Letaba-river as in Kruger NP it is almost not allowed to leave the car or walk without an armed guide due to dangerous wildlife.



Figure 8. A potential of 8000 ha of communal land (left) might be incorporated within the Kruger NP in change of turning the Giyani ranger gate (right) into a tourism gate thereby creating substantial opportunities for tourism development within Greater Giyani (pictures R. Henkens).

This scenario focusing on the whole range of potential tourism products could be true if:

1. the local communities indeed agree to include their communal land within Kruger NP in change of opening the Giyani gate;
2. Kruger NP management is willing to open the Giyani gate in change of incorporating communal land within Kruger NP;
3. there is indeed a substantial tourism demand for tourism products from Greater Giyani as described above;
4. provincial policy makers support the development of leisure and tourism products in Greater Giyani;
5. conditions are there to reintroduce non-dangerous wildlife species in Greater Giyani (no poaching!).



Figure 9. Visiting rural villages or even home stays at the other side of the Kruger fence adds a cultural dimension to the Kruger experience (picture R. Henkens).

Indicative feasibility of scenario 3

From the interviews it became clear that SAN Parks, which manages the Kruger NP, was not against the idea to open the Giyani gate. They still aim to enlarge the protected area of Kruger NP, among others to meet the goal to have 10% of South-Africa's nature officially protected (Millennium goal). SAN Parks as well supports the idea to help the local poor people around the park from the perspective that it's good policy to stay friends with their neighbours.

Locals as well were not against the idea to join their communal land with Kruger NP as long as they were still able to use it for subsistence values. SAN-parks on the other hand would never allow access of livestock anymore within the communal land. It will be part of future negotiations between representatives of the communities and SAN-Parks to come to an agreement.

For other issues please see *indicative feasibility of scenario 2*, as scenario 3 is only considered to be a follow-up of scenario 2.

4.4 Identification of affected functions, valuation criteria and measurement indicators

Table 4 in chapter 3 provides an overview of landscape functions, valuation criteria and measurement indicators. The most affected functions, criteria and indicators should be selected by experts, for instance through workshops. However, this was not possible within the context of this project. The expected most affected functions, criteria and indicators within Greater Giyani have therefore been selected by the project team (table 6).

It's clear from the information described in §4.2 that poverty can be considered a keyword when speaking about Greater Giyani. Pro-poor tourism development may fight poverty. It's obvious that an economic indicator like 'revenues' and a socio-cultural indicator like 'sense of well being' can be considered to be important indicators for Greater Giyani. As pro-poor tourism development may replace or decrease activities that are having a major negative impact on the ecological environment (like grazing), the tourism development may as well affect and improve ecological regulation processes in soil and water.

Units of measurement have been chosen to illustrate the ADAPTIVE model but it should be stressed that different type of criteria information might be incorporated.

Thus, criteria and indicators information can be included within the model for any type of measurement scale that has been used, like:

- Quantitative: euros, hectares, number of species etc.;
- Qualitative: cardinal scale (-1/+1; -3/+3; 0/7, etc.), ordinal scale (Low/Moderate/High) or binary (Yes/No) etc.

Table 6: Landscape functions, criteria, indicators and measurement scales

Pillars of sustainability	Functions	Criteria	Indicators	Measurement scale	Unit of measurement
Economic	Production Function	Direct Use Value	Revenues	Quantitative (Monetary)	x1000 Euros / year
Socio - cultural	Information Function	Mental Health	Sense of well being	Qualitative	"- 2 / +2"
Ecological	Habitat Function	Diversity	Species / ecosystems	Qualitative	"- 2 / +2"
	Regulation Function	Naturalness	Quality of air, water, soil	Qualitative	"- 2 / +2"

4.5 Impact assessment and evaluation impact matrix

After identifying the expected affected landscape functions and selecting the evaluation criteria and measurement indicators, the next step is to assess the impact of each scenario on the economic, socio-cultural and ecological environment. The impact assessment can be based on:

- experts' projections or judgments;
- available data and/or on relevant studies or field work;
- simulation through modelling.

Assumptions

By the assessment of expected impacts it's assumed by the project team that a Sustainable Tourism Development Strategy (STDS) will be implemented in Greater Giyani. It's assumed that:

- The ARISE project, which fights environmental degradation will finish in some years;
- The creation of new jobs will replace present ways to make a living, like from livestock grazing. This will lower the present unsustainable impact of grazing and will allow for recovery of the rural area;
- The STDS implements good management and awareness rising programs to prevent spending of tourism revenues on unsustainable issues like additional livestock (which would increase grazing pressure);
- The STDS also prevents further influx from residents from other villages who may get attracted by the tourism development and new job opportunities in Greater Giyani;
- The STDS finds alternative solutions for unsustainable impacts like collection of firewood when cooking for tourists.

- The STDS includes a proper zonation plan of the area which is needed to keep it attractive for visitors. This may increase the biodiversity of natural areas and may as well lead to reintroduction of antelope species.

Based on these assumptions the expected impacts per scenario 1, 2 and 3 are summarized in the tables 7, 8 and 9.

Table 7. Expected costs and benefits within scenario 1: No tourism development plan for the whole of Greater Giyani

Pillars of Sustainability	Expected Impacts	
	Costs	Benefits
Economic	Some private tourism development is funded from outside Greater Giyani and most profit will as will leak outside the area. Without a STDS for Greater Giyani as a whole, the communities have to focus on other options. Job opportunities will however remain limited and poverty will remain wide spread.	Some small-scale private tourism development will be continued, like exploitation of the African Ivory route. This may offer some revenues from labouring the accompanying resort.
Socio-cultural	Lack of future perspectives and new job opportunities will negatively affect the feeling of well-being. Ongoing environmental degradation will as well decrease the sense of well-being	Prevention of a STDS for the area is expected not to have any major socio-cultural benefit.
Ecological	Continuation of the present situation is relatively unsustainable though ARISE improves land management. Ongoing environmental impacts like from overgrazing and firewood collection however may not stop the environmental degradation of the area.	Prevention of a STDS in the area is expected not to have any major ecological benefit. Especially if compared to the ecological costs at present.

Table 8. Expected costs and benefits within scenario 2: Domestic tourism development focusing on leisure and recreation

Pillars of Sustainability	Impacts	
	Costs	Benefits
Economic	Tourism development is not expected to have any major economic costs	The domestic tourism development is relatively small scale. It will only benefit some directly, while others stay relatively poor. Moderate increase of revenues to the local economy.
Socio-cultural	Most locals are still restricted to livestock grazing and farming. Their sense of well-being may get worse if new job opportunities within neighbouring families create feelings of jealousy. These are however considered to be minor socio-cultural costs.	New job opportunities will increase the sense of well-being for some through increased revenues. It may as well increase the sense of well-being for all, as developments show that it is possible to make a better life in their own area.
Ecological	Tourism development is not expected to lead to any major ecological costs.	Much of the area will remain degraded as most villagers need to stay to their present jobs. Biodiversity increases in well-managed natural parts, while re-introduced antelope species can be considered a benefit.

Table 9. Expected costs and benefits within scenario 3: Tourism development including linkage with Kruger National Park

Pillars of Sustainability	Impacts	
	Costs	Benefits
Economic	Tourism development is not expected to have any major economic costs	Relatively high influx of revenues to the area as leisure and tourism offer substantial job opportunities, directly as well as indirectly through supply of local produced food products.
Socio-cultural	None of the villages will equally benefit from the tourism development. Some will benefit more then others due to their tourism potential (attractions) or logistic reasons. This may create a feeling of jealousy and create friction between villages.	All local village communities will directly or indirectly benefit from tourism development. Though some more then others, all communities will be better able to fight poverty and to increase their sense of well-being.
Ecological	Too many visitors on the long term may disturb wildlife and natural processes. Compared to the more or less degraded situation at the moment, this can still be considered as a minor impact.	Due to substantial other job opportunities, locals have to rely less on livestock grazing to make a living. This may halt the degradation of the area and allow natural regulation processes and habitats to recover. This will result in an increased biodiversity within the area.

Table 10: Evaluation Impact Matrix

Evaluation Impact Matrix								
Pillars of Sustainability	Functions	Criteria	Indicators	Measurement Scale	Unit of Measurement	Scenarios		
						A	B	C
Economic	Production	Direct Use Value	Revenues	Monetary	Euros/year (x1000)	10	100	300
Socio-cultural	Information	Mental Health	Sense of well being	Qualitative	"- 2 / +2"	-1	1	2
Ecological	Habitat	Diversity	Species / ecosystems	Qualitative	"- 2 / +2"	-1	1	2
	Regulation	Naturalness	Quality of air, water, soil	Qualitative	"- 2 / +2"	0	1	1

The combination of costs and benefits in the tables 7, 8 and 9 will lead to a certain economic, socio-cultural and ecological impact. These will be expressed in quantitative or qualitative values as expressed in the evaluation impact matrix (table 10). These values are only hypothetical as they have been assessed by the project team. However, it reflects the information given in the tables 7, 8 and 9.

4.6 Elicitation of Stakeholders' preferences

§ 4.6.1 will describe the weighting method according to the SWING methods. Other type of weighting techniques could be integrated to the model as well, though this depends on specific case and decision context circumstances.

4.6.1 Application of the SWING weighing method

Box 3: The simple SWING method

Preferences of stakeholders in simple SWING method are expressed as relative values v_i , with $v_i = 10$ attributed to the most important criterion (the first swing from worst to best performance) and $v_i < 10$ assigned in a decreasing order to the other criteria from the second most important to the least important criterion. This relative value scale v_i is then transformed to normalized weights w_i . Normally in Swing method stakeholders' preferences are expressed in relative values, attributed 100 to most important criterion. In order to reduce the cognitive burden upon stakeholders, the attributed value to the most important criterion has been reduced to 10.

Indirect monetization is based on the assumed equivalence of the stakeholders' relative preferences, relating the weight calculated for each impact to the weight of the criterion in monetary terms, both expressed on the corresponding impact scale.

Participants of the workshops will be required to express their preferences on the relative importance of different evaluation criteria. The elicitation of their preferences will be based on a Multi Criteria Decision Analysis weighting method which is called "Swing" (see Box 3). By the use of the Swing weighting method, factors of relative importance of criteria and their monetary equivalents can be determined in the presence of at least one criterion expressed in monetary terms.

Weights derived from Swing method play the role of scaling factors in the sense that they relate performances in one criterion, to the performances of all other criteria. This means that by assigning weights of relative importance, stakeholders implicitly determine how many units in one criterion they are willing to give up (trade off), in order to improve the performance of another criterion by one unit. So, if the weight of criterion **a** is double the weight of criterion **b**, then the stakeholder values 10 units on criterion **a**, the same as 20 units on criterion **b**.

For example:

Indicators and ranges (differences between worst and best performance) have been developed for each of the criteria. After that participants will be asked to give their views on the relative importance of a change from worst to best for each of the criteria, holding the others constant. This will lead to the trade off coefficients in swing method.

It is required to have one of the criteria expressed in monetary terms, e.g. the economic criterion, which is measured by the indicator “revenues”, in euros. Any other criteria can be translated into a monetary equivalent/Euro terms by using the coefficient. Hence, if a change from worst to best in e.g. “quality of air, water, soil” is 2 times more important for the respondents, than a change from worst to best of the economic criterion “revenues”, and if the change of this economic criterion was valued at 100 thousand euros, then the “change in quality of air, water, soil” is worth $2 \times 100 = 200$ thousand euros (in terms of importance to the stakeholders).

Stakeholders can always reformulate their preferences and decide for their final preferences according to the obtained weights and their monetary equivalents that their preferences reveal. This can be assisted by an excel programme which automatically will perform calculations on weights, monetary equivalents and total aggregated values of alternative tourism scenarios.

4.6.2 Set up of a workshop applying ADAPTIVE

This section describes the set up of a workshop to score and rank the indicators. As this type of stakeholder workshop was not possible within the project we present ranks and scores based on best judgement by the project team.

1. During a workshop first step is to provide background information to stakeholders regarding the project, the different development scenarios and the selected functions, criteria and indicators (§4.3 and table 6). Then, change in performance of every indicator will be presented and explained, when going from worst performance level to best performance level (table 7, 8 and 9).
2. Stakeholders can then look at the benefits that a shift in the performance (from worst to best) of one indicator would imply (table 11). Based on this they may score the importance of the criteria based on the preference of shifting its indicator from worst to best. With this analysis stakeholders can score criteria by being aware of what this means in terms of costs and benefits.

Elicitation of preferences will be performed by the following steps:

3. The exercise will first be explained to all, the worst and best performance level of each scenario will be presented to the stakeholders;
4. Then the stakeholders will be divided in small groups (each group will have a representative), each group will work with a computer, on the screen of each computer a table like table 11 will be shown;
5. Stakeholders are first asked to discuss about their individual values and preferences (each person can express by brainstorming his initial preferences in order to foster independent thinking), then they are asked as a group to come to an agreement and to fill in the two columns, now indicated with blue letters in table 11.
 - a) They will first **rank** criteria (ranking is just a warming up before scoring and will help to stimulate discussion) then
 - b) They will **score** them (using scale 0-10) by being aware of the costs and benefits that a change in performance of every indicator representing a criterion implies. The most preferred criterion (to be moved from its

worst to best performance) will be assigned with 10 points. Then stakeholders are required to score the second most preferred swing (moving from worst to best) criterion to express the relative importance in comparison to the most preferred swing criterion. Thus, they are required to assign <10 points to the second most preferred criterion.

6. Within each group stakeholders are invited to discuss about the values and preferences. Once stakeholders fill in the required information (ranking of criteria and score of criteria, in blue letters in table 11, they automatically get some results in the following columns. The following columns provide monetary equivalents of the benefits gained (based on stakeholder preferences) when shifting from worst to best performance. The monetary equivalents are an expression of the choices (preferences) of stakeholders.

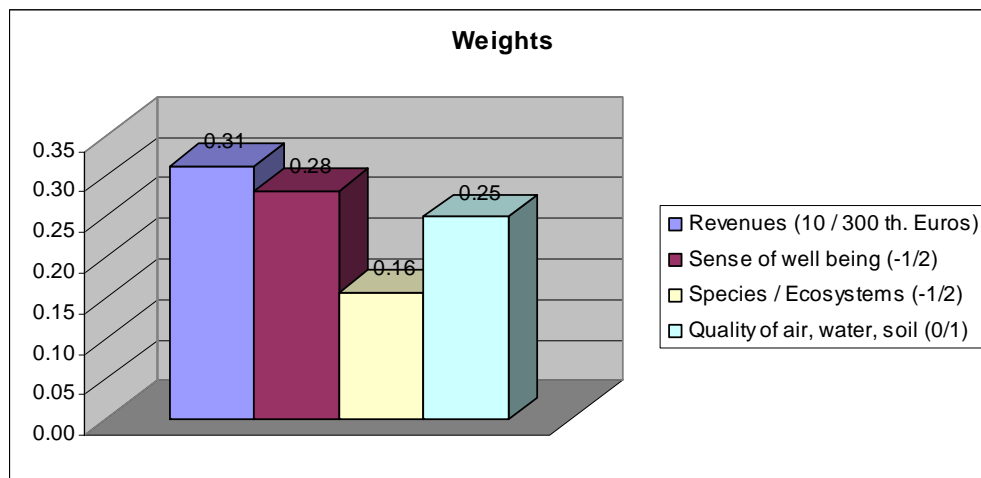


Figure 10: Derived Weights of criteria

7. Once they see the monetary equivalents they can for another time revise their preferences and change the scores assigned. Once within each group the choice is made, then the representative of each group can present/provide the results to the whole group.
8. The divergence of preferences (between sub – groups of stakeholders) on weights (see figure 10) and their respective monetary equivalents of criteria will raise an in depth and informative dialogue between stakeholders and will yield important information about social trade-offs and values of certain landscape functions and services.
9. Stakeholders will always have the opportunity to reformulate their initial judgements and thus to converge and agree after a thorough discussion on the final selection and agreement on criteria weights and their respective monetary equivalents which consequently will provide the Total Aggregated Value of each tourism scenario. In case that consensus or compromise cannot be reached, the results will reflect the divergence of stakeholders' values, the range of this divergence and will identify conflicting objectives between stakeholders. By identifying the conflicting objectives and diverse values of stakeholders on certain aspects and criteria we can further proceed to the development of more acceptable tourism scenarios and improvement of those that have been elaborated.

Table 11: Elicitation of preferences

Elicitation of Preferences													
Pillars of Sustainability	Functions	Criteria	Indicators	Measurement Scale	Unit of Measurement	Worst Performance	Best Performance	Difference (Improvement) moving from Worst to Best	Rank the criteria (by order of preference)	Score the criteria (0 - 10)	Weights	Monetary Equivalents (*1000 Euro) per unit	Monetary equivalent of potential benefit
Economic	Production	Direct Use Value	Revenues	Monetary	th. Euros / year	10	300	290	1	10	0.31	1	350
Socio-cultural	Information	Mental Health	Sense of well being	Qualitative	"- 2 / +2"	-1	2	3	2	9	0.28	87.0	261.0
Ecological	Habitat	Diversity	Species / ecosystems	Qualitative	"- 2 / +2"	-1	2	3	4	5	0.16	48.3	145.0
	Regulation	Naturalness	Quality of air, water, soil	Qualitative	"- 2 / +2"	0	1	1	3	8	0.25	232.0	232.0

4.7 Ranking of scenarios

Table 12 and figure 11 show the results by using ADAPTIVE. Table 12 presents the monetary value (costs and benefits) for every indicator and every scenario. This is done for every indicator, by multiplying the monetary equivalents per unit (see table 11) for the score assigned for that indicator, under each Scenario, according to the Evaluation Impact Matrix (see table 10). It's clear from table 12 that the economic, socio-cultural and ecological environments improve most under scenario C. No wonder that the total aggregated value of scenario C is highest as well. Scenario B still represents a positive development, in contrary to scenario A which even represents a negative trend.

If this information would be the output of a real workshop then the conclusion would be to choose for scenario C. This means that the Sustainable Tourism Development Strategy should focus on the whole range of tourism products in order to attract domestic tourists from neighbouring cities as well as (mainly) foreign tourists from Kruger National Park.

Table 12: Results per scenario

Pillars of Sustainability	Functions	Criteria	Indicators	Unit of Measurement	Scenario		
					A	B	C
Economic	Production	Direct Use Value	Revenues	th. Euros / year	10	100	300
Socio-cultural	Information	Mental Health	Sense of well being	th. Euros / year	-87	87	174
Ecological	Habitat	Diversity	Species/ ecosystems	th. Euros / year	-48	48	97
	Regulation	Naturalness	Quality of air, water, soil	th. Euros / year	0.0	232	232
Total Aggregated Value (sum)					-125	467	803

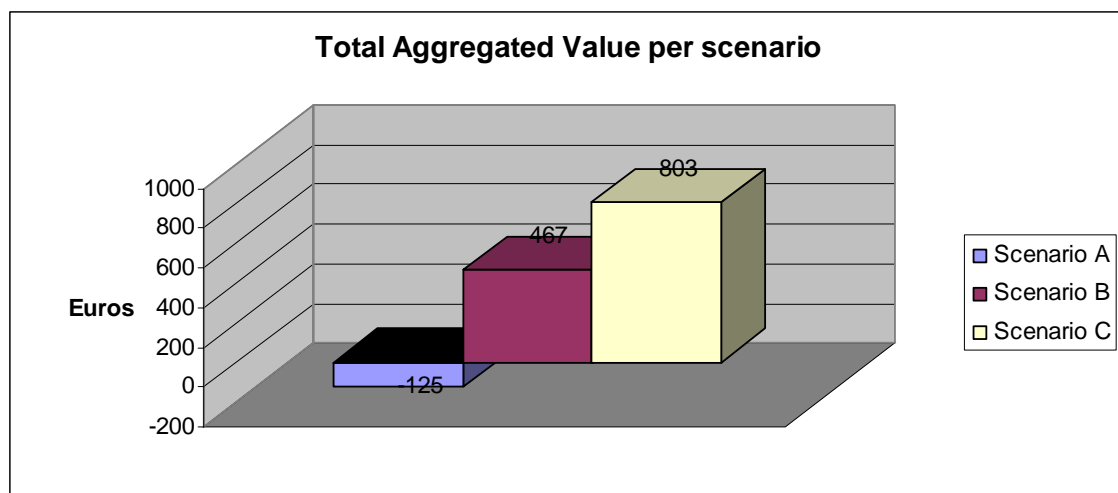


Figure 11: Total Aggregated Vale per scenario

5 Conclusions and recommendations

The ADAPTIVE decision support tool

MCA for valuation purposes has been tested in different applications demonstrating a new promising direction of participatory valuation. The main innovative aspect of this developed framework and decision support system is the incorporation of landscape function analysis into the whole process of evaluation and its flexibility to integrate different type of data and provide different types of decision support, like:

- Stimulate stakeholder participation through an in-depth, structured and informative dialogue;
- Valuation of certain criteria / functions;
- A transparent, structured and user friendly decision analysis process for identifying stakeholders' preferences, values and views that can be further used as a basis for consensus building workshop;
- Ranking of tourism development scenarios on Total Aggregated Value, for which ADAPTIVE currently represents the only tool focussing on tourism studies.

Recommended improvement of ADAPTIVE

A sensitivity analysis should be incorporated to ADAPTIVE in order to improve the reliability and comprehensiveness of the model. This would explore the effects of changes in inputs (impact assessment, weighting preferences – monetary equivalents) on the outputs (ranking of scenarios based on TAV). This would show the robustness of the results but it would also provide further insight and additional information to stakeholders, decision makers, practitioners etc.

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Appendix 1 Glossary for Multi - Criteria Decision Analysis and ADAPTIVE tool

- **Assessment:** a critical evaluation and analysis of information relevant for decision making. Estimates officially the value of an action, for instance, assessment of the damage done by a specific impact.
- **Consensus:** General opinion or agreed decision. Processes that seek to generate a consensus often focus on generating wise solutions that meet the needs and perspectives involved in the process, rather than compromise or deal-making.
- **Criterion:** One of a number of measures against which options are assessed and compared in a multi-criteria analysis model for the degree to which they achieve objectives.
- **Decision support tools:** Methods to combine the valued impacts of a project or decision into a single measure in order to assist the decision making process.
- **Decision support system:** A system, usually computerized, dedicated to supporting decisions regarding a specific policy problem.
- **Ecosystem Services:** describe the benefits that ecosystems provide to people.
- **Evaluation:** The process of examining options and assessing their relative merits.
- **Evaluation Impact or Performance matrix:** A matrix or table setting out the impact or performance of each option according to each of the evaluation criteria by which options are to be judged.
- **Impact assessment:** A process that identifies, predicts and assesses the consequences of a project or policy.
- **Monetary valuation:** Estimation in monetary terms of the value of environmental services and goods.
- **Multi - criteria analysis or multi - criteria decision analysis (MCA or MCDA):** A group of appraisal techniques which make the options and their contribution to the different criteria explicit, and all require the exercise of judgement. Formal MCA techniques usually provide an explicit relative weighting system for the different criteria and lead to a ranking of options.
- **Objectives:** The purposes which a policy wishes to achieve in areas of concern.
- **Options:** Ways of achieving objectives. Options might be policies, programmes, projects, schemes, scenarios, systems, or anything else about which a decision is needed.
- **Public Participation:** Involving stakeholders in the decision making process. The degree of involvement and influence can vary greatly, leading to many classification schemes for public participation.
- **Scaling factors:** weighting factors that they relate performances in one criterion, to the performances of all other criteria.
- **Scenario:** An internally consistent story about one way in which the future could unfold.

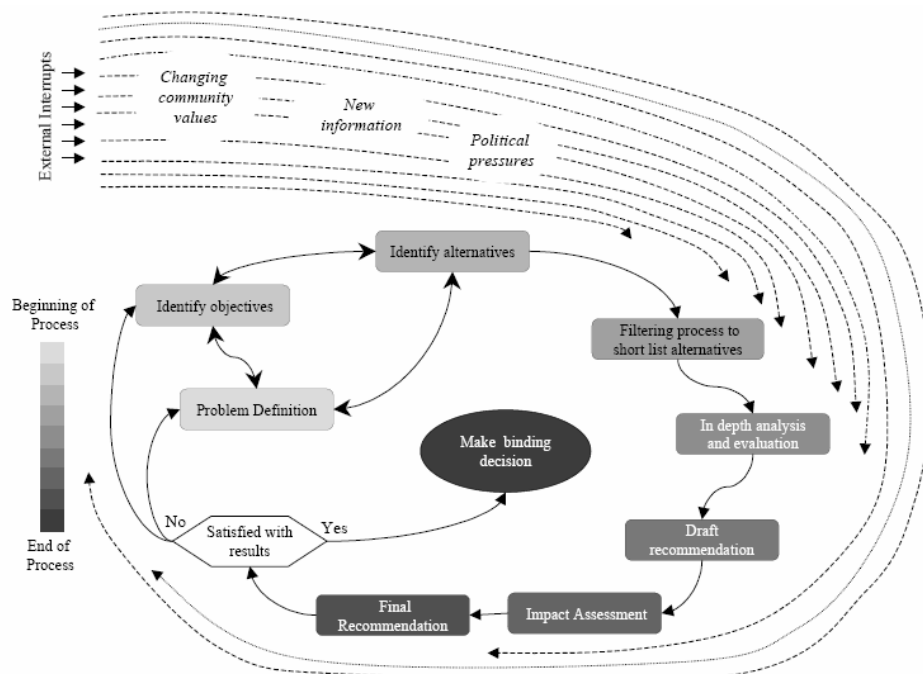
- **Sensitivity Analysis:** The process of changing the value of one element in an analytical model, whilst retaining the original value of all other elements to determine the influence that that element has on the overall analysis.
- **Stakeholders:** The actors who are directly or indirectly affected by a decision / policy and who could affect the outcome of a decision making process regarding that policy or are affected by it.
- **Swing weighting:** A method of eliciting relative weights on different criteria. Swing weighting requires judgements of the swing in preference from worst – to- best performance on one criterion as compared to the worst -to-best swing on another criterion. The judgements are made by considering the difference between the worst and best positions, and how much that difference matters. Swing weighting results in ratio scale numbers that reflect the relative importance of the criteria.
- **Total Aggregated Value (TAV):** The sum of all marketed and non marketed benefits associated with a policy scenario including the economic, social and ecological value of changes of ecosystem services.
- **Total Economic Value (TEV):** The sum of all marketed and non-marketed benefits associated with an ecosystem or environmental resource, including direct, indirect, option and existence values.
- **Uncertainty:** State of knowledge where there is confidence in the completeness of the defined set of outcomes, but it is acknowledged that no valid theoretical or empirical basis exists to assign probabilities to these outcomes.
- **Valuation:** The practice of estimating monetary values for goods and services provided by ecosystems.
- **Value:** This is how much a product or service is worth to someone relative to other things (often measured in money). It can be either an assessment of what it could or should be worth (valuation), or an explanation of its actual market value (price).
- **Weights or weighting factors:** Priorities or preferences attached to criteria in MCDA. Usually specified by the stakeholder / decision maker in order to indicate the relative importance of each criterion.
- **Workshop:** A small collection of people who share a goal and perform various tasks, with the help of an impartial individual who facilitates the accomplishment of the group's tasks.

Appendix 2 Environmental Decision-making: process and tools

The decision-making process

Choices about tourism management and development have an important impact on nature and people. Therefore particular importance should be given to the decision-making process.

There are several ways to describe the decision making process. According to Hajkowicz (2000) (see figure below) decision making starts with defining the problem and stakeholders involved, identifying the goals and the possible ways or alternatives or scenarios to address the problem. These steps however are not rigidly applied but they are inter-related and influence one another (e.g. knowing about possible alternative can help to identifying the goals and vice-versa). Decision-making has a cyclical nature and is influenced constantly by many unforeseen and unpredictable factors such as political factors, new information, change of value within the community which should be taken into account while defining the problem, selecting alternatives, etc. Then according to feasibility, budget availability, interest of stakeholders, etc. the alternatives should be screened. The chosen alternatives are then analyzed in depth in order to have a full overview of their characteristics. Then their potential effectiveness to address the problem should be assessed and their impact on society, on the environment and on the economy. This assessment plays a major role in decision making and can be done through several tools described in the following section. At this stage, the decision makers can make a final choice or if the process was not satisfactory or the selected choice does not convince them than they can decide to postpone the decision in order to wait for new information. In this case the stages are cycled through again.



Generalized decision making process (Source: Hajkowicz, S. 2000.)

Tools for decision making

There is a whole range of tools available that can support the decision-making process by estimating the impact of potential alternatives or scenarios (Proctor & Drechsler 2003, Zografos & Oglethorpe 2004). These tools are not substitutable and each of them has its strengths and weaknesses. Depending on the problem being addressed, on the aim of the projects, etc. the most suitable tool should be selected. It follows a brief description of some tools for decision making.

Cost Benefit Analysis (CBA)

This widely used decision support tool provides a format for enumerating the range of benefits and costs surrounding a decision, aggregating the affects over time using an approach called discounting, and arriving at a monetary "present value" that, in concept, is comparable with other governmental uses for scarce resources. CBA tends to have a comprehensive approach. CBA requires monetary values for all benefits and cost to be included, which can be considered as a weak point. In addition, the outcome depends strongly on the level of the discount rate.

Environmental Impact Assessment (EIA)

Environmental Impact Assessment (EIA) EIA is a systematic procedure for collecting information about the environmental impacts of a project or policy, and for measuring those impacts. It ignores non-environmental impacts and it ignores costs. It provides a partial evaluation but forms an essential part of any evaluative procedure. As such it is an essential input to any decision-making procedure. Impacts may be scored and weighted, or they become inputs into a CBA. EIA would generally look for ways to minimise environmental impacts without changing the benefits or costs of the project or policy.

Strategic Environmental Assessment (SEA).

SEA is similar to EIA but tends to operate at a "higher" level of decision-making. Instead of single projects or policies, SEA would consider entire programmes of investments or policies. The goal is to look for the synergies between individual policies and projects and to evaluate alternatives in a more comprehensive manner. An SEA is more likely than an EIA to consider issues like: is the policy or project needed at all; and, if it is, what are the alternative options available? Issues of time, cost and non-environmental costs and benefits do not figure prominently.

Life Cycle Analysis (LCA).

LCA is similar to EIA in that it identifies the environmental impacts of a policy or project and tries to measure them. It may or may not measure the impacts in the same units, any more than EIA tries to do this. Typically, when attempts are made to adopt the same units they do not include money, although some LCAs have done this. The chief difference between EIA and LCA is that LCA looks not just at the impacts directly arising from a project or policy, but at the whole "life cycle" of impacts. establishing an inventory of impacts and then the impacts are subjected to an assessment to establish the extent of impact and the weight to be attached to it.

Risk Assessments (RA).

Risk assessment involves assessing either the health or environmental risks (or both) attached to a product, process, policy or project. Risk assessments may be expressed in

various ways: as the probability of some defined effect occurring, as a number of incidences across a defined population, as a defined incidence per unit of exposure, etc.

Risk assessments may not translate into decision rules very easily. One way they may do this is if the actual or estimated risk level is compared to an “acceptable” level which in turn may be the result of some expert judgement or the result of a public survey.

A Comparative Risk assessment (CRA) involves analysing risks but for several alternative projects or policies. The issue is then which option should be chosen and the answer offered by CRA is that the option with the lowest risk should be chosen. A Risk-Risk Analysis (RRA) tends to focus on health risks and asks what would happen to health risks if some policy was adopted and what would happen if it was not adopted. Finally, a Health-Health Analysis (HHA) is similar to RRA but instead of comparing the risks with and without the behavioural reaction to a policy, it compares the change in risks from a policy with the risks associated with the expenditure on the policy.

Cost-Effectiveness Analysis (CEA).

The easiest way to think about CEA is to assume that there is a single indicator of effectiveness, E, and this is to be compared to a cost of C.

Multi-Criteria Analysis (MCA).

MCA involves multiple indicators of effectiveness. The steps in an MCA are as follows:

(1) The goals or objectives of the policy or investment are stated. (2) “Criteria” or, sometimes, “attributes” which help achieve the objectives are then selected. (3) Such criteria may or may not be measured in monetary terms. (4) Each option (alternative means of securing the objective) is then given a score and a weight. (5) □ In the simplest of MCAs, the final outcome is a weighted average of the scores, with the option providing the highest weighted score being the one that is “best”. More sophisticated techniques might be used for more complex decisions. Problems associated with MCA are the sensitivity of the outcome to selection of criteria and weights; choices which reflect experts preferences. Moreover it does not deal with time discounting. A strong point of MCA is transparency.

CBA and MCA are both comprehensive tools, allowing for the inclusion of effects on the environment, on socio-cultural aspects and on the economy. The other tools narrow their focus on benefits and ignore costs, or focus on risk or health aspects. There are significant differences between CBA and MCA. In spite of these differences (or perhaps on account of these differences) they are increasingly combined in evaluations, using CBA outcomes as an input for an MCA.

Appendix 3 Monetary Valuation Methods, Constraints and Examples

Source: De Groot *et al.*, 2006 (Compiled after Barbier *et al.* 1997, King & Mazotta 2001, Wilson & Carpenter 1999, Stuij *et al.* 2002).

METHOD		DESCRIPTION	CONSTRAINTS	EXAMPLES
1. Direct Market Valuation	Market Price	The exchange value (based on marginal productivity cost) that ecosystem services have in trade	Market imperfections and policy failures distort market prices.	Mainly applicable to the “goods” (e.g. fish) but also some cultural (e.g. recreation) and regulating services (e.g. pollination).
	Factor Income or Prod. Factor method	Measures effect of ecosystem services on loss (or gains) in earnings and/or productivity)	Care needs to be taken not to double count values	Natural water quality improvements which increase commercial fisheries catch and thereby incomes of fishermen.
	Public pricing *	Public investments, e.g. land purchase, or monetary incentives (taxes/subsidies) for ecosystem service use or conservation	Property rights sometimes difficult to establish; care must be taken to avoid perverse incentives	Investments in watershed-protection to provide drinking water, or conservation measures
2. Indirect Market Valuation	Avoided (Damage) Cost Method	Services that allow society to avoid costs that would have been incurred in the absence of those services	It is assumed that the costs of avoided damage or substitutes match the original benefit. However, this match may not be accurate, which can lead to underestimates as well as overestimates.	The value of the flood control service can be derived from the estimated damage if flooding would occur
	Replacement Cost & Substitution Cost	Some services could be replaced with human-made systems		The value of groundwater recharge can be estimated from the costs of obtaining water from another source (substitute costs)
	Mitigation or restoration cost	Cost of moderating effects of lost functions (or of their restoration)		E.g. cost of preventive expenditures in absence of wetland service (e.g. flood barriers) or relocation
	Travel Cost Method	Use of ecosystem services may require travel and the associated costs can be seen as a reflection of the implied value	Over-estimates are easily made. The technique is data intensive.	E.g. part of the recreational value of a site is reflected in the amount of time and money that people spend while travelling to the site.
	Hedonic Pricing Method	Reflection of service demand in the prices people pay for associated marketed goods	The method only captures people’s willingness to pay for perceived benefits. Very data intensive.	For example: clean air, presence of water and aesthetic views will increase the price of surrounding real estate.

METHOD		DESCRIPTION	CONSTRAINTS	EXAMPLES
3. Surveys	Contingent Valuation Method (CVM)	This method asks people how much they would be willing to pay (or accept as compensation) for specific services through questionnaires or interviews	There are various sources of bias in the interview techniques. Also there is controversy over whether people would actually pay the amounts they state in the interviews	It is often the only way to estimate non-use values. For example, a survey questionnaire might ask respondents to express their willingness to increase the level of water quality in a stream, lake or river so that they might enjoy activities like swimming, boating, or fishing
	Group valuation	Same as Contingent Valuation (CV) but then as an interactive group process	The bias in a group CV is supposed to be less than in individual CV	
4. Benefit Transfer		Uses results from other, similar areas, to estimate the value of a given service in the study site	Values are site and context dependent and therefore in principle not transferable	When time to carry out original research is scarce and/or data is unavailable, Benefit Transfers can be use (but with caution)

* strictly speaking, public pricing is not “market based” but is real money involved in transactions related to ecosystem services reflecting the public WTP for their use or conservation.

Appendix 4 Stakeholder analysis and participatory methods

Stakeholder analysis and participatory processes play a major role in the application of the DST.

Stakeholder Analysis can be defined as a holistic procedure and approach to understand a system or natural resource and assess the impact of changes to the system or natural resource by means of identifying the main actors or stakeholders and assessing their respective interest in the issue. Stakeholders can be identified as any group of society organized or not who has declared or conceivable stake or share a common interest in a particular system or natural resource (Grimble & Wellard 1997, Schmeer 1999). Stakeholders can be distinguished according to their institutional set up meaning that they can be global, national, regional and local (Grimble and Wellard 1997). The exact identification of specific stakeholders and break down of these categories cannot be pre – determined and it is always relevant and dependent on the decision problem at hand. There is no ‘standard set’ of stakeholders relevant to natural resource and environmental decision making. Stakeholders identified for one decision situation are not necessarily important for another project. In addition, stakeholders change over time, so stakeholders previously identified must be reconsidered rather than immediately assumed to still be relevant to the process (Brown *et al.* 2001).

A broadly used stakeholder classification is according to the way they have a vested interest in a decision problem or alternatively from the degree that they affect and / or are affected by the decision process (Grimble & Wellard 1997, Banville 1998, De Groot *et al.* 2006). Basically, three groups are distinguished: (1) One category of stakeholders concerns the degree that they can influence the decision making (the way the decision problem is formulated or solved). (2) A second category concerns the degree that stakeholders would be affected by the outcome of the decision making process. (3) Finally, there is the last category of stakeholders that can influence the decision making process but are also affected by the outcome.

Stakeholders can be categorized also according to their level of influence and their importance. *Importance* refers to the degree to which the stakeholder is considered a focus of a decision to be made. *Influence* refers to the level of power a stakeholder has to control the outcome of a decision. Influence is dictated by stakeholders’ control of, or access to, power and resources. Influential stakeholders, (e.g. lobbying groups) often are already engaged in the process or have access to it.

Once the stakeholders are identified it is necessary to facilitate communication among them, through participatory processes, in order to discuss the different interests at stake. Participatory processes create a social and political space – ‘forums for exchange that are organised for the purposes of facilitating communication between government, citizens, stakeholders/interest groups, and businesses regarding a specific decision problem’ (Renn *et al.* 1993). There are a wide variety of participatory processes that have been used in various ways to support environmental decision making:

- **Public hearings.** Public hearings are regulated, formal arrangements of which stakeholders can give evidence or question public authorities about

decisions under consideration. Public hearings are open to who chooses to attend, which in practical situations are limited to organised interests with significant economies at stake. It is the most common form of face-to-face public involvement (Beierle 1998).

- **Focus groups.** The general goal of a focus group is to uncover diverse values and preferences pertaining to a defined topic by observing the discussions in an interacting group. In other words, the aim is to achieve an in-depth understanding of a particular issue as it is understood by the group. A focus group setting enables viewpoints that might not have been discovered in individual interviews. It allows analysing how shifts in opinions occur and what the influencing factors are in these processes. Depending on the research topic, the participants can be stakeholders or citizens. The focus groups may involve discussions for one day only (1-3 hours), or cover a period of several days (van Asselt & Rijkens-Klomp 2002).
- **Citizens' juries.** The main aim of a citizens' jury is to obtain informed citizens input on policy decisions. It is based on the rationale that, given adequate information and opportunity to discuss, such a jury can be trusted to take decisions regarded as legitimate and fair on behalf of the community. A jury of 12-24 citizens is selected randomly but with respect to characteristics as age, gender, education, geographic location and attitude to the issue at hand. During 4-5 days the participants formulate judgements through learning, interaction and deliberation to contribute to decision making. Experts, often called witnesses, are involved to provide information related to the issue. A moderator facilitates the discussion and encourages mutual respect. The questions to be addressed by the jury are defined by a steering group before the meeting. The steering group also set the agenda and invites the experts (van Asselt & Rijkens-Klomp 2002).
- **Participatory Modelling:** This process focuses on stakeholders and organises the information management in a systematic way with the active involvement of model users. Costanza & Ruth (1998) argue that participatory modelling can involve experts, policy makers and stakeholders helping them for mutual understanding, in depth dialogue and solicit input from broad range of participants.
- **Consensus conferences:** This approach includes more experts' knowledge into the deliberation process but incorporates stakeholders' (10 – 16 members of public) knowledge in a less thoroughly way. Allows citizens – stakeholders to set questions to a panel of experts, then to assess experts' answers and finally to negotiate between themselves and to reach a consensus outcome. In most cases consensus conferences' outcome is published and reported to parliament and policy makers which makes its accountability and legitimacy very strong (Rowe & Frewer 2000).
- **Workshops:** This is a traditional, common participation method to resolve issues and can be used to obtain and understand public's views, discuss issues and reach consensus (see below) . An experienced facilitator who keeps neutral position is usually required to structure the meetings and to help all participants to get engaged to the discussions (Keeney et al., 1990).

Appendix 5 Applications of Multi Criteria Analysis for Valuation purposes

MCA for valuation purposes has been tested in different applications demonstrating a new promising direction of participatory valuation (see table below). The main innovative aspect of this developed framework and decision support system is the incorporation of landscape function analysis into the whole process of evaluation and its flexibility to integrate different type of data and provide different types of decision support.

Applications of Multi Criteria Analysis (similar to the analysis done in this study) for Valuation purposes

Field	Purpose of (E)valuation and decision context	Mean preferences' elicitation	Weighting Method applied	Author
Energy	Evaluation of environmental impacts	Workshop – individual interviews	Swing	McDaniels (1996)
Energy	Evaluation of alternative energy options	Workshops	Swing and Trade off	Hobbs and Horn (1997)
Biodiversity – land use	Valuation of Benefits of wilderness preservation area	Workshops	Swing	McDaniels and Roessler (1998)
Land use	Evaluation of alternative land use options	Workshops	Swing and Trade off	McDaniels (1999)
Land use - management	Evaluation of alternative policy options to protect and restore tidal wetlands for salmon habitat	Group deliberation		Gregory and Wellman (2001)
Air pollution	Evaluation of different air pollution levels	Individual interviews	Combination of Swing and WTP	Kwak <i>et al.</i> (2001)
Marine protected area management	Evaluation of different development scenarios	Workshops	Direct point allocation	(Brown <i>et al.</i> 2001)
Energy planning	Evaluation of alternative energy scenarios	Individual Interviews	Swing and Trade off	Diakoulaki and Grafakos (2004)
Land use	Valuation of non market losses (compensation)	Workshop	Swing	McDaniels and Trousdale (2005)

Appendix 6 Usefull websites

Organisation	URL	Sustainable (eco-) tourism	Decision making	Valuation	Stakeholders
Conservation Finance Guide	http://guide.conservationfinance.org/	✓		✓	
Conservation International (CI)	http://www.ecotour.org/xp/ecotour/	✓			
Ecological Tourism in Europe (ETE)	http://www.oete.de/eng/		✓		✓
Ecosystem Services Projects	http://www.ecosystems-servicesproject.org/			✓	
Environment Agency	http://www.environment-agency.gov.uk/		✓	✓	
Environmental Valuation and Cost-Benefit News	http://envirovaluation.org/		✓	✓	
European Network for Sustainable Tourism Development (ECOTRANS)	http://www.eco-tip.org/	✓	✓		✓
Global Development Research Centre (GDRC)	http://www.gdrc.org/uem/eco-tour/eco-tour.html	✓	✓	✓	
International Institute of Ecological Economics	http://www.ecoeco.org/			✓	
International Centre for Ecotourism Research (ICER), Griffith University, Australia	http://www.gu.edu.au/centre/icer/	✓			
International Centre for Responsible Tourism (ICRT), University of Greenwich, UK	http://www.icrtourism.org/ or http://www.crctourism.com.au/	✓			
International Institute for Sustainable Development (IISD)	http://www.iisd.org/		✓	✓	
International Ecotourism Society	http://www.ecotourism.org/	✓			✓
International Institute for Environment and Development (IIED)	http://www.iied.org/	✓			
International Centre for Responsible Tourism (ICRT); International Institute for Environment and Development (IIED); Overseas Development Institute (ODI).	http://www.propoortourism.org.uk/	✓			✓
IUCN Biodiversity Economics	http://www.biodiversityeconomics.org/			✓	✓
IUCN – World Commission on Protected Areas (WCPA)	http://www.iucn.org/themes/wcpa/theme/tourism/tourism.html	✓			
Nature Conservancy	http://www.nature.org/	✓			
Nature Valuation and Financing Network	http://naturevaluation.org/		✓	✓	
United Nations Environment Programme (UNEP)	http://www.uneptie.org/pc/tourism/	✓			
University of Maryland, Ecosystem Valuation	http://ecosystemvaluation.org/			✓	
World Bank, Environmental Economics	http://www.worldbank.org/environmentaleconomics		✓	✓	
World Tourism Organization (WTO)	http://www.world-tourism.org/	✓			✓

Appendix 7 Questionnaire interviews South-Africa

Background of the project

Pretoria University and the Wageningen University and Research Centre (Netherlands) aim to develop a decision support tool (DST) which assesses the costs and benefits of tourism development scenarios. Not only regarding the economic environment but also taking into account the natural and socio-cultural environment. The area of Greater Giyani, bordering the Kruger National Park, serves as a case study site. We will develop a number of tourism scenarios for the Giyani area, with the year 2020 as a point of reference. Each scenario will explore the impact of a specific tourism strategy.

Purpose of the interviews

The purpose of the interviews is

- to get a better understanding of possible future developments and the opportunities for tourism development in the greater Giyani area;
- to get an idea of the ecological, social and economic impacts of various tourism options.

This will help us to develop a number of relevant scenarios. It will also help us to get a better idea of the data requirements for the scenario analysis, helping us to focus our data search.

Clusters of interviews

Between 23-25 November 5 clusters of interviews will be taken:

- Cluster 1: UP - three profs in tourism and rural development (one meeting)
- Cluster 2: Sanparks - three people in tourism development, resource use and community development (one meeting)
- Cluster 3: Dept Env. Affairs and Tourism (national gov.) - three people in tourism development and resource use (one meeting)
- Cluster 4: Limpopo prov. government (provincial gov.) - two people in tourism and the provincial gov. project manager of ARISE (one meeting)
- Cluster 5: A range of different tour operators (separate meetings)

Besides, interviews will be held with Nicholus (ARISE project manager) and Trevar Xivuri (the local ARISE site manager), probably on 28-29th of November.

List of questions:

Short introduction of ourselves, our project as well as the Arise project in Greater Giyani. A map of Greater Giyani will be available.

Introduction

1. What position/responsibilities do you have within your organization?
2. In which kind of activities/projects are you involved?
3. Are you somehow familiar with the area of Greater Giyani and/or the Arise project?

Tourism feasibility of Greater Giyani

4. What (natural, cultural, scenic etc.) characteristics of Greater Giyani do you consider as the main attractions for tourism development at the moment?
5. Same question for the potential characteristics after finalizing the restoration of the area (initiated by the Arise-project) say next 10-15 years?
6. How does this relate to the nearby Kruger NP? Do you consider the integration of the Kruger NP tourism product(s) as crucial for tourism development in Greater Giyani?
7. Do you consider the (potential) characteristics and attractions of Greater Giyani as relatively unique or can these be observed as well in areas closer to Pretoria? In other words, how competitive do you reckon Greater Giyani is?
8. For which types of tourists/visitors (domestic/foreign) do you consider Greater Giyani to be an interesting destination?
9. What kind of tourism products you think could be developed for next 10 to 15 years, considering activities, facilities and type of accommodations? Does this include short-term and or long-term stays?
10. What do you consider as the main barriers for developing Greater Giyani as a tourism destination?
11. What do you consider as the main conditions for success?
12. What other land-use or economic developments do you think could evolve in Greater Giyani the next 10 to 15 years, and what is the relation to tourism development?

Stakeholders

13. Who do you consider as the main stakeholders for tourism development in Greater Giyani?
14. What role do you see for each stakeholder? (Initiative, ownership, investment, organization).
15. How would you like to involve the local inhabitants of the Greater Giyani in tourism development next 10 to 15 years?

Carrying capacities

For these questions we will ask for their opinion on positive and negative ecological, socio-cultural and economic impacts. We will hand out a list of general positive and negative impacts. For ourselves we keep the extended list (including examples) as shown below. We will ask about the relevance of these (and other?) impacts and also for the weight (1 to 5) assigned to it.

16. What do you consider as major potential (positive and negative) economic impacts; and how important do you think these impacts are (weight 1-5)?
17. What do you consider as major potential (positive and negative) socio-cultural impacts; and how important do you think these impacts are (weight 1-5)?
18. What do you consider as major potential (positive and negative) ecological impacts of tourism development in Greater Giyani; and how important do you think these impacts are (weight 1-5)?