

Towards a decision support tool to assess costs and benefits of tourism development scenarios.

Application of the tool at Greater Giyani, South Africa

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ABSTRACT

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Preface

Summary

The tourism industry represents a thriving business nearly all around the world and for years to come. The world tourism organisation (WTO) expects the international tourism arrivals to double until 1.6 billion between now and 2020. Although tourism development offers many opportunities, facts have shown that unsustainable development will lead to negative impacts on the natural, socio-cultural and economic environment.

In order to assist policy makers in taking the right decisions, Pretoria University and the Wageningen University and Research Centre (WUR) of the Netherlands have joint forces. A cooperation has started to develop a decision support tool (DST) which assesses all costs and benefits associated with tourism development scenarios. This not only refers to the economical environment but also to the natural and socio-cultural environment, which costs and benefits are usually more difficult to express.

In order not to stay stuck within theoretical frameworks a case study site has been selected to apply, evaluate and improve the DST. The selected site is known as 'Greater Giyani' bordering the Kruger park. The area is also focal area of the ARISE project (an acronym for **A**frica's **R**ural **I**nitiatives for **S**ustainable **E**nvironments; www.arise.za.net). Tourism development would be a logical step within this initiative.

The theoretical framework has been developed through a literature research among others using information gathered from the field by organisations like UNEP and WWF. For detailed information on the area two students from Wageningen University have carried out their practical thesis at location. Their results are to be expected early 2007.

In order to set up some feasible tourism development scenario's it was chosen to interview a broad range of stakeholders ranging from local community members to tour operators, land-use managers (South Africa National Parks) and local and national decision makers. The results of the interviews have been presented at a workshop attended by representatives of the local communities.

The results at this stage are promising. Analysis are ongoing and needed to fine-tune the DST.

Besides that there are good opportunities to set up a rural development scenario which is broadly accepted by the local population in Greater Giyani. A scenario, which will focus on restoration of the area and sustainable use of the natural resources, including agriculture and tourism-use.

1 Introduction

1.1 Problem statement

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 had its (small) share in this but its impact may increase as international tourist arrivals are expected to double from now until 1.6 billion in 2020 (World Tourism Organisation 2006). A substantial part will consist of nature based tourism. 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. Today 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.

In order 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 focussing on the rural area of Greater Giyani, Limpopo province South-Africa, bordering the Kruger National Park.
3. built a partnership between the Wageningen University and Research Centre and the Pretoria University on:
 - the application and further development of the decision support tool at the Greater Giyani study area; as well as,

- the sustainable rural development of the Greater Giyani area, considering its potential for tourism, agriculture and natural development.

1.3 Operating procedure

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.

Division of tasks

Alterra had the lead in the project coordination and editing of the report. ESA was main responsible for the student research, thereby supported by SRA. WI through its expertise supported the research during project group meetings throughout the project.

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).

Activities

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 economical, 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 scenario's and to create a common understanding on the potential (tourism)development of the area and willingness to co-operate hereto.

2 Tourism impacts or costs

2.1 Sustainable tourism

Massive growth is predicted for tourism in the forthcoming years, providing excellent opportunities for spreading prosperity but presenting considerable challenges and potential threats to the environment and local communities if not well managed.

Sustainable tourism development guidelines and management practices are applicable to all forms of tourism in all types of destinations. Sustainability principles refer to the environmental, economic and socio-cultural aspects of tourism development, and a suitable balance must be established between these three dimensions to guarantee its long-term sustainability.

In general sustainable tourism should:

- 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.
- 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.
- 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.

Sustainable tourism development requires the informed participation of all relevant stakeholders, as well as strong political leadership to ensure wide participation and consensus building. Achieving sustainable tourism is a continuous process and it requires constant monitoring of impacts, introducing the necessary preventive and/or corrective measures whenever necessary.

Sustainable tourism should also maintain a high level of tourist satisfaction and ensure a meaningful experience to the tourists, raising their awareness about sustainability issues and promoting sustainable tourism practices amongst them (WTO, 2004).

2.2 Negative economic impacts of tourism

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

The direct income for an area is the amount of tourist expenditure that remains locally 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 travellers expenditures go to the airlines, hotels and other international companies (who often have their headquarters in the travellers home countries), and not to local businesses or workers. 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.

There are two main ways that leakage occurs:

Import leakage:

This commonly occurs when tourists demand standards of equipment, food, and other products that the host country cannot supply. Especially in less-developed countries, food and drinks must often be imported, since local products are not up to the hotel's (i.e. tourist's) standards or the country simply doesn't have a supplying industry. 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.

Export leakage

Multinational corporations and large foreign businesses have a substantial share in the import leakage. Often, especially in poor developing destinations, they are the only ones that possess the necessary capital to invest in the construction of tourism infrastructure and facilities. As a consequence of this, an export leakage arises when overseas investors who finance the resorts and hotels take their profits back to their country of origin.

2.2.2 Enclave tourism

Local businesses often see their chances to earn income from tourists severely reduced by the creation of "all-inclusive" vacation packages. When tourists remain for their entire stay at the same cruise ship or resort, which provides everything they need and where they will make all their expenditures, not much opportunity is left for local people to profit from tourism.

2.2.3 Infrastructure cost

Tourism development can cost the local government and local taxpayers a great deal of money. Developers may want the government to improve the airport, roads and other infrastructure, and possibly to provide tax breaks and other financial advantages, which are costly activities for the government. Public resources spent on subsidized infrastructure or

tax breaks may reduce government investment in other critical areas such as education and health.

2.2.4 Increase in prices

Increasing demand for basic services and goods from tourists will often cause price hikes that negatively affect local residents whose income does not increase proportionately. Tourism development and the related rise in real estate demand may dramatically increase building costs and land values. Not only does this make it more difficult for local people, especially in developing countries, to meet their basic daily needs, it can also result in a dominance by outsiders in land markets and in-migration that erodes economic opportunities for the locals, eventually disempowering residents.

2.2.5 Economic dependence of the local community on tourism

Diversification in an economy is a sign of health, however if a country or region becomes dependent for its economic survival upon one industry, it can put major stress upon this industry as well as the people involved to perform well. Many countries, especially developing countries with little ability to explore other resources, have embraced tourism as a way to boost the economy.

Over-reliance on tourism, 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.

2.2.6 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.

2.2.7 Other industry impacts affecting tourism

Economic crises, like the Asian crisis that hit Thailand, Malaysia and Indonesia a few years ago, can be devastating to inbound tourism flows. The financial turmoil triggered a sharp fall in tourism flows to affected countries during 1997 and 1998.

2.3 Socio-cultural impacts of tourism

The socio-cultural 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 judgments 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 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:

- *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 customers' 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.

2.3.2 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 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 behavior, 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 peoples 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.

Even in cases where tourism "works", in the sense that it improves local economies and the earning power of local individuals, it cannot solve all local social or economic problems. Sometimes it substitutes new problems for old ones.

2.3.3 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. Socio-cultural disadvantages evolve from:

- *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 artifacts 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.

2.3.4 Ethical issues

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

- *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 jewelry, 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.

2.4 Environmental impacts of tourism

The quality of the environment, both natural and man-made, 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.

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.

Negative impacts from tourism occur when the level of visitor use is greater than the environment's ability to cope with this use within the acceptable limits of change. 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 (UNEP, 2006).

2.4.1 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 liters a day) almost double the amount of what inhabitants of an average Spanish city use (...). 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.

2.4.2 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.

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.

2.4.3 Physical impacts

Attractive landscape sites, such as sandy beaches, lakes, riversides, and mountain tops and slopes, are often transitional zones, characterized by species-rich ecosystems. Typical physical impacts include the degradation of such ecosystems.

An ecosystem is a geographic area including all the living organisms (people, plants, animals, and microorganisms), their physical surroundings (such as soil, water, and air), and the natural cycles that sustain them. 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.

Physical impacts of tourism development

Some examples:

- 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. In the Philippines and the Maldives, dynamiting and mining of coral for resort building materials has damaged fragile coral reefs and depleted the fisheries that sustain local people and attract tourists. 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. Evidence suggests a variety of impacts to coral result from shoreline development, increased sediments in the water, trampling by tourists and divers, ship groundings, pollution from sewage, overfishing, and fishing with poisons and explosives that destroy coral habitat.

Physical impacts from tourist activities

Some examples:

- *Trampling:*
Tourists using the same trail over and over again trample the vegetation and soil, eventually causing damage that can lead to loss of biodiversity and other impacts.

Such damage can be even more extensive when visitors frequently stray off established trails.

- *Anchoring and other marine activities:*

In marine areas (around coastal waters, reefs, beach and shoreline, offshore waters, uplands and lagoons) many tourist activities occur in or around fragile ecosystems. Anchoring, snorkeling, sport fishing and scuba diving, yachting, and cruising are some of the activities that can cause direct degradation of marine ecosystems such as coral reefs, and subsequent impacts on coastal protection and fisheries.

- *Alteration of ecosystems by tourist activities:*

Habitat can be degraded by tourism leisure activities. For example, wildlife viewing can bring about stress for the animals and alter their natural behavior when tourists come too close. Safaris and wildlife watching activities have a degrading effect on habitat as they often are accompanied by the noise and commotion created by tourists as they chase wild animals in their trucks and aircraft. This puts high pressure on animal habits and behaviors and tends to bring about behavioral changes.

3 Tourism Benefits

3.1 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.

3.1.1 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. Some countries seek to accelerate this growth by requiring visitors to bring in a certain amount of foreign currency for each day of their stay and do not allow them to take it out of the country again at the end of the trip.

3.1.2 Contribution to government revenues

Government revenues from the tourism sector can be categorized 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.

3.1.3 Employment generation

The rapid expansion of international tourism has led to significant employment creation. For example, the hotel accommodation sector alone provided around 11.3 million jobs worldwide in 1995. 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.

3.1.4 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.

3.1.5 Contribution to local economies

Tourism can be a significant, even essential, part of the local economy. 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

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 is community development, which is a process and a capacity to make decisions that consider the long-term economy, ecology and equity of all communities.

3.2.1 Poverty alleviation

Tourism can contribute to positive developments, not just negative impacts. It has the potential to promote social development through employment creation, income redistribution and poverty alleviation.

3.2.2 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.

3.2.3 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.

3.2.4 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.

3.2.5 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.

3.2.6 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.

3.3 Environmental benefits from tourism

3.3.1 Financial contributions

Direct financial contributions

Tourism can contribute directly to the conservation of sensitive areas and habitat. Revenue from park-entrance fees and similar sources can be allocated specifically to pay for the protection and management of environmentally sensitive areas. Special fees for park operations or conservation activities can be collected from tourists or tour operators.

Contributions to government revenues

Some governments collect money in more far-reaching and indirect ways that are not linked to specific parks or conservation areas. User fees, income taxes, taxes on sales or

rental of recreation equipment, and license fees for activities such as hunting and fishing can provide governments with the funds needed to manage natural resources. Such funds can be used for overall conservation programs and activities, such as park ranger salaries and park maintenance.

3.3.2 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.

Cleaner production techniques can be important tools for planning and operating tourism facilities in a way that minimizes their environmental impacts. For example, green building (using energy-efficient and non-polluting construction materials, sewage systems and energy sources) is an increasingly important way for the tourism industry to decrease its impact on the environment. And because waste treatment and disposal are often major, long-term environmental problems in the tourism industry, pollution prevention and waste minimization techniques are especially important for the tourism industry.

3.3.3 Environmental awareness raising

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 behavior and activities to preserve the environment. If it is to be sustainable in the long run, tourism must incorporate the principles and practices of sustainable consumption. Sustainable consumption includes building consumer demand for products that have been made using cleaner production techniques, and for services - including tourism services - that are provided in a way that minimizes environmental impacts. The tourism industry can play a key role in providing environmental information and raising awareness among tourists of the environmental consequences of their actions. Tourists and tourism-related businesses consume an enormous quantity of goods and services; moving them toward using those that are produced and provided in an environmentally sustainable way, from cradle to grave, could have an enormous positive impact on the planet's environment.

3.3.4 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.

Tourism has had a positive effect on wildlife preservation and protection efforts, notably in Africa but also in South America, Asia, Australia, and the South Pacific. Numerous animal

and plant species have already become extinct or may become extinct soon. Many countries have therefore established wildlife reserves and enacted strict laws protecting the animals that draw nature-loving tourists. As a result of these measures, several endangered species have begun to thrive again.

3.3.5 Alternative employment

Tourism can provide an alternative to development scenarios that may have greater environmental impacts. The Eco-escuela de Español, a Spanish language school created in 1996 as part of a Conservation International project in the Guatemalan village of San Andres, is an example. The community-owned school, located in the Maya Biosphere Reserve, combines individual language courses with home stay opportunities and community-led eco-tours. It receives around 1,800 tourists yearly, mostly from the US and Europe, and employs almost 100 residents, of whom around 60% were previously engaged in mostly illegal timber extraction, hunting and *milpas*, or slash-and-burn agriculture. Careful monitoring in 2000 has shown that, among the families benefiting from the business, the majority has significantly reduced hunting practices, and the number and extension of "slash-and-burn" agricultural plots. Furthermore, as most families in the village benefit directly or indirectly from the school, community-managed private reserves have been established, and social pressure against hunting has increased.

3.3.6 Regulatory measures

Regulatory measures help offset negative impacts; for instance, controls on the number of tourist activities and movement of visitors within protected areas can limit impacts on the ecosystem and help maintain the integrity and vitality of the site. Such limits can also reduce the negative impacts on resources.

Limits should be established after an in-depth analysis of the maximum sustainable visitor capacity. This strategy is being used in the Galapagos Islands, where the number of ships allowed to cruise this remote archipelago is limited, and only designated islands can be visited, ensuring visitors have little impact on the sensitive environment and animal habitats.

4 The tourism development Decision Support Tool (DST)

4.1 Integrated Assessment Framework

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: chapters 2 and 3 provide a broad overview of potential negative and positive impacts;
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 4.3);
3. Function Valuation: in this step, the benefits of ecosystem services identified in step 2 are analysed. These benefits should be quantified in both the appropriate value-units (economic, socio-cultural and ecological indicators) as well as monetary values (see 4.4);
4. Cost-benefit Analysis: these analysis will determine the monetary costs and benefits of different development scenarios (see 4.5);
5. Multi-criteria Analysis / Trade-off analysis: these analysis will determine all trade-offs involved in development scenarios (see 4.6);
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.

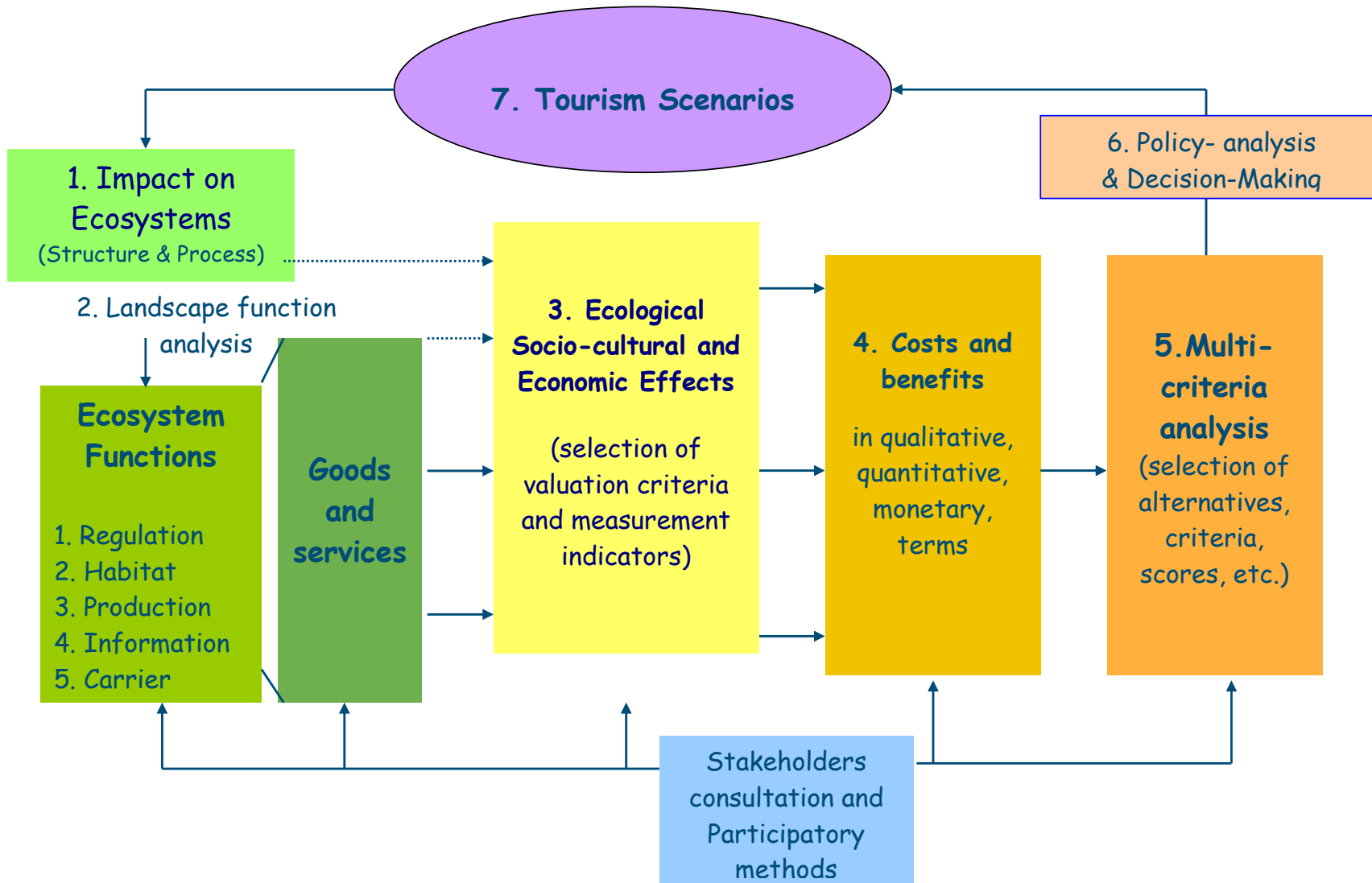


Figure 1: Integrated assessment framework

4.3 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 (eg. 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) (i.e. ecosystem properties providing the good or service)	Goods and Services (examples)
1	<i>Production Functions</i>	Resources from un-manipulated ecosystems	-Biomass (production and stock) -Biochemical properties -etc	-Freshwater (*) -Food (eg fish, bushmeat) -Raw materials (wood, fodder, etc) -Etc.
	<i>Carrier functions</i>	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 (eg, agriculture, plantations, aquaculture) -Energy conversion (eg wind, solar) -Mining (ore, fossil fuels, etc.) -Transportation (esp. on waterways) -etc
2	Regulation Functions	Direct benefits from ecosystem processes	Role of ecosystems in bio-geo chemical cycles (e.g. CO ₂ / O ₂ balance, hydrological cycle)	-Climate regulation -Maintenance of soil fertility -etc
			Role of vegetation & biota in removal or breakdown of nutrients and toxic compounds	-Waste treatment (e.g. water purification) -Maintenance of air quality
			Physical properties of land cover	-Water regulation (eg buffering runoff) -erosion prevention -storm protection & flood prevention
			Population control through tropic-dynamic relations Etc.	- Biological control (of pests and diseases); - Pollination Etc.
3	Habitat Functions	Maintenance of biodiversity and evolutionary processes	Presence of rare/endemic species; species diversity, etc	Refugium for wildlife
			Reproduction habitat for migratory species	Nursery function (for commercial species)
4	Cultural & Amenity Functions	Non-material benefits	Landscape (or ecosystem) properties with aesthetic, recreational, historic, spiritual, inspirational, scientific or educational value	-Enjoyment of scenery (eg 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 (eg. cleaning of rainwater by vegetation or microbial activity in water) and often takes place in different compartments of the landscape.

- (1) **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 (eg. 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.

- (2) **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) **Habitat functions** comprise the importance of ecosystems and landscapes to maintain natural processes and biodiversity, including the refugium and the nursery functions. The refugium 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.

- (4) **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 (Aldred, 1994). These services have also been named ‘information functions’ (as in de Groot, 1992).

4.4 Function Valuation

The impact of each Scenario should be evaluated according to a number of *ecological, social and economic 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-specialist, in this way they can facilitate communication between different stakeholders (The 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 (eg. 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 see De Groot and Hein, 2005). The distinction among the different types of indicators go beyond the scope of this report and therefore for this analysis only a set of general indicators for each valuation criteria will be considered (see table 2). Next to selecting measurement indicators it is necessary to identify the existing relation between measurement indicator and goods and services (see table 3 A,B,C). 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.

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

Valuation Criteria	Description	Measurement Indicator	Method
Economic valuation criteria (TEV)			
<i>Stock Value</i>	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
<i>Direct (consumptive) use Value</i>	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
<i>Direct (non consumptive) use Value</i>	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
<i>Indirect use Value</i>	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.
<i>Non use value</i>	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.
Socio-cultural valuation criteria			
	(use of) Ecosystem	- Average n. people	- Statistical bureau

Employment	services provide opportunity for employment	employed within local community/yr - Average n. people employed other than local community/yr	
Heritage value	Importance of nature as reference to personal or collective history and cultural identity.	- surface historic sites, features and artefacts/ area - N.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
Spirituality value	Importance of nature in symbols and elements with sacred, religious and spiritual significance.	- Surface sacred sites or features/area - N.of people “using” ecosystems for their spiritual value/area/yr - N. sacred sites/area	- interviews
Wellbeing	Effect of nature on peoples’ well being	- health (esp. mental) - safety - gen. sense of well being	- interviews +
Ecological valuation criteria			
Naturalness/Integrity	Degree of human presence in terms of physical, chemical or biological disturbance.	- 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.
Diversity	Variety of life in all its forms, including ecosystems, species & genetic diversity.	- number of ecosystems/ area - number of species/ area	- satellite photos - field work or data from environmental institutes, universities , etc.
Uniqueness/rarity	Local, national or global rarity of ecosystems and species	- number of endemic species/ area	- field work or data from environmental institutes, universities , etc.
Resilience	Sensitivity of ecosystems to human disturbance and capacity for renewability	- energy budget (GPP/NPP) - complexity in food chain levels	- expert judgement base on studies done in the area

See Appendix ... for further details on link between Ecosystem Functions, goods and services and Evaluation Criteria

Economic Value (importance) 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, 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 ecological, socio-cultural, and economic 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) (Figure 6 – to be included) 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 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 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).

Stock values.....There are several methods used to value stocks. They attempt to give an estimate of the fair value, by using fundamental economic criteria. This theoretical valuation has to be perfected with market criteria, as the final purpose is to determine potential market prices.....

Monetary Valuation of ecosystem services

The (relative) importance people attach to many of the values listed in the sections above, and their associated wetland 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 ... for an example of monetary values calculated for Bushbuckridge Communal Area.

TableTotal (Economic) value of Bushbuckrich Communal Area: comparison of actual and – restored situation (source: adapted from Blignaut & Moolman, 2006).

		Area in Ha (or % of study area) ¹	Actual Total value (US\$ million)	# people employed	Restored 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
	- Vegetation	idem	546,96	n/a	2.967,98
	TEV (flow values)				
1	Direct Use Value				
1a	Direct (Cons.) Use value³	idem	112,6	????	611,35 ++
	-Fuelwood		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		18,09		98,25
	- tourism ⁶	idem	18,09	????	98,25
2	Indirect Use Value		13,16		71,43
	- honey production		0,85		4,56
	- carbon sequestration		12,31		66,87
3	Non-use Value⁷		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);

³Based 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

4.5 Cost-benefit Analysis

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.

4.6 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, artifacts/ 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			

Multi-criteria analysis is a tool to compare a mix of environmental, socio-cultural and economic effects of development scenarios (see Appendix V for details). In addition to TEV (see Table ...) also other factors should be taken into account such as: employment, cultural and other wellbeing factors and ecological aspects.

Scenarios are evaluated by scoring indicators (see table ...). For each scenario and for each indicator the scores will be assessed in monetary, quantitative and 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. When for example information already exists, there is no reason for actually investing money for carrying out expensive data collection.....

5 Case-study Greater Giyani, South-Africa

5.1 Description of the study area

Data from student thesis are needed to finalise this chapter.

The decision support tool needs to be applied, tested and adjusted towards the needs of users and stakeholders in a practical setting. For this purpose the area of Greater Giyani has been selected in South-Africa.

The study area lies in the North Eastern part of the Greater Giyani local municipality, which is located in the Limpopo province in the North Eastern part of South Africa (see picture). The area is situated on the North of the Klein Letaba River and lies adjacent to the Kruger National Park.

The analysis focused on 12 villages: Hlomela, Ndindani, Mahlati, Gawula, Khakhala, Thomo, Mhlava, Muyexe, Homu A, Homu B, Homu C, Mapayeni, Nwankuwani and Vuhehli. There are no data available about the exact extension of the study area but we roughly estimate that the area under analysis is about 450 Km².

5.1.1 Economic aspects

The following information is mainly taken from the Greater Giyani Local Municipality Integrated Development Plan (GGM 2005/2006). The study area is only a part of the municipality.

Employment

In 1996 about 51% of people in the Greater Letaba municipality were unemployed; in 2001 this had increase to approx. 60%. The unemployment rate in the study is estimated to be higher then this, since the majority of the jobs are in Giyani (the main city in the Greater Letaba municipality) which is not part of the study area. According to the estimation made in 2001 78.04% of people in Greater Giyani have no individual monthly income.

Unemployment has a negative impact on society in terms of decreasing level of education and disease, increased degradation of land and exploitation of resources, increased dependency on grants. Crime and drugs are however not really an issue in the area.

Infrastructure

- Road and Transportation: most of roads need rehabilitation and maintenance and bridges need to be repaired;
- Water: the current water infrastructure is inadequate to supply water to all villages of Greater Giyani Municipality;
- Sanitation: sanitation is a major problem which contributes to health hazards and underground water pollution. In 2001 54.9% of the population of the Greater Giyani municipality had no sanitation facilities;
- Electricity: in 2001 about 33.8% households still needed electricity;

- Solid waste disposal: littering and illegal dumping is a major problem. Greater Giyani municipality has only one solid waste disposal site that does not adhere to the requirements of the Department of Environmental Affairs and Tourism.

Health services

Some of the villages have no health facilities and community members need to travel long distances to access health facilities. HIV/AIDS is a major problem in the area mainly caused by lack of ignorance.

5.1.2 Socio-cultural aspects

Social cohesion

The cooperation between the villages is limited. The social structure at the municipal level is therefore quite instable. Within villages however the social cohesion among families is very strong.

Education

According to an analysis done in 2001 in the Greater Letaba municipality the majority of the people (77.4%) in the age group of 5 to 24 years has received education.(74.4% attended school, 2.1% preschool, 0.5% college, 0.1% professional education, 0.1% University and other types of education 0.2%.

It is notable that 22.6% of the population in this age bracket did not attend any education institution. Possible factors contributing to this may be the low accessibility of schools and poverty hampering people's ability to afford an educational institution.

Ceremonies

Female initiation ceremony. This ceremony is considered the starting point of the female majority. The ceremony is legally not compulsory but is socially considered very important by the households. The costs of the ceremony are paid by the family of the girl, people are invited to eat and make party all night. Each ceremony is done for one girl.

Male initiation ceremony: Yong men go in the bushes for several weeks in groups and they learn practical things like making fires, use natural resources in a functional way, gather and prepare their own food, under the guidance of one or more teachers.

Rain prayer: people go in the bushes about 100 m outside the village. The church leaders lead the ceremony and common people attend the ceremony. The ceremony occurs when needed and after very dry period. It is a social event.

5.1.3 Environmental aspects

The area is a degraded dry savanna (see picture). To date no baseline information (GIS-based) is available with regard to the landscape, topography, climate, flora and fauna of the area. There are many obstacles to the economic growth of the area such as geographical location (distance to markets), shortage of skills, poor infrastructure, climatic conditions and disease (HIV and malaria). However, the municipality has been assessed to have potential for tourism and conservation development (G.G.M. 2005/2006).

Environmental impacts:

- Water pollution: this is a major problem caused by littering and overflow of sewage;
- Field and forest fires: this is a serious problem in the area due to poaching, firewood collection, uncontrolled burning of forests;
- Soil erosion: it is a problem in the study area due to forest fires, deforestation, overgrazing and poor land use planning and management;
- Overgrazing: overgrazing is another environmental problem in the area;
- Deforestation: people use wood for several purposes increasing degradation;
- Air pollution: the concentration of vehicles and small industries causes an increase in air pollution in the town of Giyani, but our study area is not affected by air pollution.

Ecosystem goods

- Grass: Mat: People use a special type of grass for making mats that they can sell where they sit during special ceremonies such as funerals, traditional gatherings. They collect the grass along the Letaba river (or they grow it themselves only in dump area);
- Marula fruit: Provides drink during social gathering and is a mean to invoke the presence of God for protection. During the unveiling of the grave, branches of the Marula tree are cut, brought home and planted in one corner of the house to symbolize the spirit of the person that remains with the people that are alive and protect them from evil. (Thomo village).

5.2 Stakeholder interviews and workshop

5.2.1 Interviews

A series of interviews with stakeholders were held between November 23 and 25. The questionnaires (appendix 8) were sent in advance to enable people to prepare for the interview. The stakeholders could be 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 provincial gov. project manager of ARISE
- Cluster 5: A range of different tour operators.

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

5.2.2 Stakeholder workshop wit local community

On November 28th a stakeholder workshop was held in the village of Gawula. The workshop was attended by 41 participants: representatives from a.o. the district, the

municipality, Environmental Offset Investment (EOI), representatives from HOMU Travel Authority, Villagers from Hlomela, Mahlathi, Gawula, Mapayini, representatives from ANC, Headman Kakhala, traditional healers from Thomo, Thomo traditional council, representatives from SANCO, Tirghuinzi, Arts project and the disability community.

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

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

Etc.....

5.3 Tourism development scenarios

The interviews and workshop have lead to the set up of three potential development scenarios. 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 process are the willingness of the local villages to co-operate in the (tourism)development of their area, the support from policy makers and landuse-managers (SAN-Parks); and the ability to find sufficient funding.

5.3.1 Scenario 1: No tourism development

This scenario is true when local stakeholders have no interest in tourism development or they cannot create a common understanding after all, on the development plan for Greater Giyani. A common tourism development plan is essential as only the variety of attractions in and around the villages makes tourism development feasible. Solitary development of tourism within the villages is most probably not feasible.

Without tourism development the area should focus on other development options like sustainable ways of agriculture, basically through a continuation of the ARISE project. New initiatives might be implemented like biogass from livestock (and human) excrements. This might diminish or even exclude the need for firewood, an issue which currently has a degrading impact on the area.

5.3.2 Scenario 2: Tourism development but no direct connection to Kruger NP

In this scenario the focus could be on developing products for tourists, recreation and/or leisure (during the weekends) as this might be interesting for residents (> 1.000.000) living in the cities and villages (a.o. Polokwane) relatively nearby.

These products should be different from the Kruger National Park (wildlife viewing), meaning products which add to the Kruger experience. As Kruger NP management does not allow visitors to leave the car one could think in Greater Giyani of hiking- and cycling-routes (between the villages), kayaking on the Letaba-river, donkey-car's etc. like suggested during the interviews. Focus should as well be on culture based tourism including the Ivory-route, archeology, but also upgrading the cultural experiences of the villages. Besides

lodges one could think of home-stays, where visitors are treated and taken care of at the homes of the locals.

By introducing non-dangerous wildlife like antelope species, the area would become much more interesting for wildlife experiences.

5.3.3 Scenario 3: Tourism, with link to KNP

Part of the study area, approx. 8000 ha, borders the Kruger NP and is only extensively used by the communities (hardly any livestock grazing or firewood collection). This area borders the Kruger NP and the habitat looks similar. This part might be included within the Kruger NP, in change of turning the ranger gate nearby into a tourism gate. As Kruger receives between 1 and 2 million visitors each year, this would create a fair market for the Greater Giyani area. Among others to built tourism lodges in a different market segment compared to Kruger NP (many 5-star).

From the interviews it became clear that SAN Parks was not against the idea. They still aim to enlarge their protected area, among others to meet the goal to have 10% of South-Africa's nature officially protected (Millennium goal). Locals may preserve the right to use the land for subsistence values. It is part of negotiations between representatives of the communities and SAN-Parks to find out what is feasible and what not.

Table 5 :Short description of Scenarios in the study area

Scenarios	Description	Additional comments
Scenario A (baseline scenario)		
Scenario B (.....)		
Scenario C (.....)		

6 Discussion and recommendations

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Appendix 1. 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.ecosystemservicesproject.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/environmентаleconomics		√	√	
World Tourism Organization (WTO)	http://www.world-tourism.org/	√			√

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 fig.....) 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.

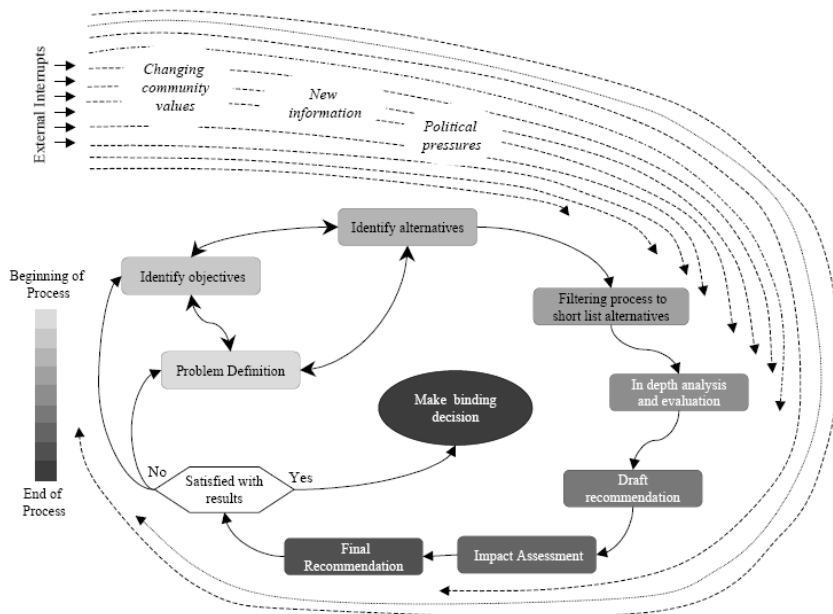


Fig.... Generalized decision making process (Source: Hajkowicz, S. 2000.)

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 nonenvironmental 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 nonenvironmental 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. Link between Ecosystem Functions and evaluation criteria.

Table II.A: Economic valuation: relation between measurement indicators and goods and services

		Economic valuation criteria								
	Valuation criteria	Stock value	Direct (consumptive) use value		Direct (non consumptive) use value		Indirect use value	Non use value	Employment	
Functions:	Measurement indicators Goods and services	Available stock in Euro/yr	Average income local community in Euro/yr	Average income others than local community in Euro/yr	Average income local community in Euro/yr	Average income others than local community in Euro/yr	Benefits to society in Euro/yr	Benefits in Euro/yr	Average n. people employed within local community/yr	Average n. people employed others/yr
Production function	Food	X	X	X				X	X	X
	Raw materials	X	X	X				X	X	X
	Genetic resources	X	X	X				X	X	X
	Medicinal resources	X	X	X				X	X	X
	Ornamental resources	X	X	X				X	X	X
Information function	Aesthetic information							X		
	Recreation				X	X		X	X	X
	Cultural & artistic information							X		
	Spiritual and historic information							X		
	Science & Education				X	X		X	X	X
Regulation Function	Gas regulation						X	X		
	Climate regulation						X	X		
	Disturbance prevention						X	X		
	Water regulation						X	X		
	Water supply						X	X		
	Soil retention						X	X		
	Soil formation						X	X		
	Nutrient regulation						X	X		
	Waste treatment						X	X		
Pollination						X	X			

Habitat function	Refugium function							X		
	Nursery function							X		

Table II B: Socio-cultural valuation: relation between measurement indicators and goods and services

		Socio-cultural valuation					
Valuation criteria		Heritage value		Spirituality value		Mental health	
Function s:	Measurement indicators	Surface historic sites, features and artefacts/area	N.of people “using” ecosystems for cultural heritage and identity/area/yr	Surface sacred sites or features/area	N. people who attach religious significance to ecosystems/area/yr	Sense of well being
	Goods and services						
Production function	Food						
	Raw materials						
	Genetic resources						
	Medicinal resources						
	Ornamental resources						
Information function	Aesthetic information					X	
	Recreation					X	
	Cultural & artistic information		X				
	Spiritual and historic information	X		X	X		
	Science & Education						
Regulation Function	Gas regulation						
	Climate regulation						
	Disturbance prevention						
	Water regulation						
	Water supply						
	Soil retention						
	Soil formation						
	Nutrient regulation						
	Waste treatment						
Pollination							
Habitat function	Refugium function						
	Nursery function						

Table IIC: Ecological Valuation: relation between measurement indicators and goods and services

		Ecological valuation							
		Naturalness		Diversity		Uniqueness		Resilience	
Function s:	Valuation criteria	N. of key species present/s urface area	Quality of air, water, and soil	N. ecosyste ms/surfa ce area	N. of species/s urface area	N. endemic species/s urface area	Compl exity in food chain levels
	Measurement indicators								
Producti on function	Food								
	Raw materials								
	Genetic resources								
	Medicinal resources								
	Ornamental resources								
Informat ion function	Aesthetic information								
	Recreation								
	Cultural & artistic information								
	Spiritual and historic information								
	Science & Education								
Regulati on Function	Gas regulation		X						
	Climate regulation		X						
	Disturbance prevention								
	Water regulation		X						
	Water supply		X						
	Soil retention		X						
	Soil formation		X						
	Nutrient regulation		X						
	Waste treatment		X						
Pollination									
Habitat function	Refugium function	X		X	X	X		X	
	Nursery function	X		X	X	X		X	

Appendix 4. Monetary Valuation Methods, Constraints and Examples.

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

	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.
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		<i>Uses results from other, similar areas, to estimate the value of a given service in the study site</i>	<i>Values are site and context dependent and therefore in principle not transferable</i>	<i>When time to carry out original research is scarce and/or data is unavailable, Benefit Transfers can be use (but with caution)</i>

* 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 5. Multi-Criteria Analysis (MCA)

Objectives of a MCA

Multiple Criteria Analysis (MCA) aims at providing a formal approach helping decision makers and stakeholders to effectively handle complex policy decision situations in which the level of conflict between criteria is such that intuitive solutions can not be satisfactory.

In general an MCA seeks to identify the alternatives or options that are to be assessed in coming to a decision situation, a range of criteria that are going to rank these alternatives, the preferences and weights that stakeholders assign to different criteria and an aggregation model that calculates the overall utility of alternatives according to criteria weights resulting on the final rank of alternatives.

MCA is particularly suited if, in addition to the conflict between criteria, there is significant uncertainty in measuring performances and/or in constructing preferences. Finally, MCA can help in resolving disagreement if stakeholders have different views on the relative importance of the considered criteria. It should be stressed, that MCA is not a tool providing the right solution in a decision problem, simply because no such solution exists. Instead, it is an aid to decision making process that helps decision makers and stakeholders organize the available information, think on the consequences, explore their own preferences and values system and resulting to a more defensible, acceptable and legitimate decision (Belton and Stewart, 2002).

The strength of MCA is better reflected in problems of a strategic nature encountered in many different fields of economic activity. These problems refer to non-repeated decision situations with a medium-to long-term planning horizon and usually have more serious and often non-reversible consequences. Similar types of problems are technological choices, establishment of action plans and policies in different sectors, siting decisions, project evaluation and approval, etc. However, there are also routine decisions needing the consideration of multiple conflicting criteria, such as provider selection, evaluation of applicants, diagnosis and restoration of disturbances etc. The main difference between these two broad categories from the methodological point of view is that in the former uncertainties are much higher, while there is usually a greater involvement of stakeholders, thus more difficulties to arrive at a consensus.

Besides the above discrimination between strategic and routine problems, multiple criteria decision situations differ in their overall problematique according to the type of decision pursued. Roy (1996) distinguishes four major typologies of decision types:

- **Choice:** selecting only one action among several alternatives.
- **Ranking:** placing alternatives in a preference ordering for selecting those ranked at the higher places.
- **Sorting:** grouping alternatives into broad hierarchical categories, each one including a number of non-distinctive alternatives.

- **Description:** analyzing alternatives and their consequences in a formalized manner that helps decision makers and stakeholders gain a deeper understanding of the problem.

The fact that MCA has the ability to be used for projects with multiple and sometimes conflicting objectives – criteria is one of the reasons that it is widely used for natural resource management and environmental policy decisions. There are variant applications of MCA in environmental decision making among a broad spectrum of environmental fields (Balasubramaniam and Voulvoulis, 2005). Environmental decision making problems in all sectors have a number of requirements of decision aids that have been met by MCA in variant ways. Next to tourism decision-making the main types of environmental decision making problems that MCA techniques have been used are: environmental impact assessment; energy planning; Waste management; water resources management; land use; forest management.

Steps of MCA

The MCA methodology is being decomposed in the following main steps:

- 1) Identification and Structure the decision problem – context

This first step is to identify the issue under consideration, to agree on the focus and the scope of the analysis. In the presence of multiple stakeholders a common understanding of the problem should be achieved through the elicitation of ideas and the sharing of concerns and values. Other aspects of context concern the political, economic, social and technological environments in which the analysis is to be conducted. Additionally, in this step the decision problem is being structured by generating the alternative options and identifying the relevant evaluation criteria – objectives or effects. Usually the selection of criteria – objectives is based on the possible consequences that the alternatives have and should be clearly defined, directly relevant to the policy problem at hand and mutually exclusive (Bouyssou, 1990). Furthermore, it is important to select attributes or indicators to measure the impacts that the alternatives have to the selected criteria – objectives. The identification of decision makers and more particular of relevant stakeholders (mainly by stakeholder analysis) is an inherent and essential part of this step.

- 2) Assessment of impacts of different alternatives

In this step the impact of each alternative is being assessed against all criteria. When accurate data or reliable calculation models do not exist for the measurement of the impacts that each alternative has against the criteria then information is needed to determine possible consequences. In both cases such information must be based on the analysis of existing data, data from field work or experts' judgments (Keeney, 1982).

- 3) Preferences and Values elicitation

The objective of this step is to capture the stakeholders' preferences in front of the particular problem as defined in the specific decision context. The difficulty here is that preferences can not be considered as definite and existing within human mind, but they are constructed during the decision aid process by means of specific

techniques acting often as a learning procedure and enabling stakeholders to think and realise their preferences and values. In every decision situation not all criteria - objectives are equally important. The weights can be qualitative expressed, quantitative expressed, or a mixture of both (Proctor and Drechler, 2006). By assigning weights denoting relative importance, stakeholders implicitly express what portion of one criterion they are willing to give up (trade off) in order to improve the performance of another criterion by one unit. In policy analyses which involve many stakeholders, this step can be the most important and informative of the whole process. It allows stakeholders to express different views explicitly and guides to the identification of areas which are most important and warrant careful consideration. Weighting make explicit those areas that may require possible trade offs between the performances of the criteria and thus they provide a greater focus to complex decision making problems. At this point and in order to check the consistency of stakeholders' preferences, a consistency check is required to help stakeholders' understand and construct better their value system and to result to a more valid and reliable output of the decision making process (Belton and Stewart, 2002).

4) Aggregation and ranking of alternatives

This step combines the performances of alternatives with weights to arrive at a final solution taking into account all evaluation criteria. A variety of MCA methods have been developed each one based on different ways of eliciting weight information and on different aggregation rules. The information must be synthesized in a logical manner to assess the alternative options. The basis for this evaluation is the expected utility. The calculation of utility for each alternative implies the use of an aggregation formula together with the weighting factors provided by the stakeholder. Policy alternatives are ranked according to the expected utility from the highest to lowest value (Keeney, 1982).

5) Sensitivity analysis and search for group consensus

Sensitivity analysis is a well known and widely used technique for the consideration of the impact of the uncertainty and vairability on the outcome of the particular analysis. For example it might be explored how sensitive the rank of an alternative depends on its performance in a particular criterion or on one criterion weight.

Selection of criteria

In general, the criteria should be compete and exhaustive in that they cover all possible aspects of the decision makig problem. They should be mutually exclusive to avoid double counting. They should also be decomposable into smaller measurable units. Also their number should be restricted so that weighing them does not become unmanagable.

Standardization:

The different effects of Scenario's, and the different scores given to indicators or criterion within each Scenario's, can be compared only if the measurement units are the same. However often the scores are estimated using different measurement unites (i.e. monetary values, quantitative values and qualitative values). In this case through standardization methods it is possible to transform the different measurement units (e.g. numbers, euro, kg., km., etc.) into commensurable units.

Several techniques can be used (Hajkowicz et al., 2000):

Very often the effects or scores are standardized, through a linear function, according to their distance from a maximum and/or minimum value. For example to the best score is given the value of 1 and to the worst one is given the value of 0, thereby to all other intermediate scores it will be given a value between 0 and 1.

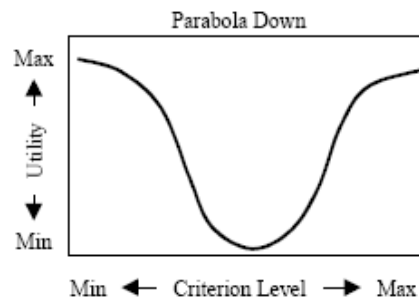
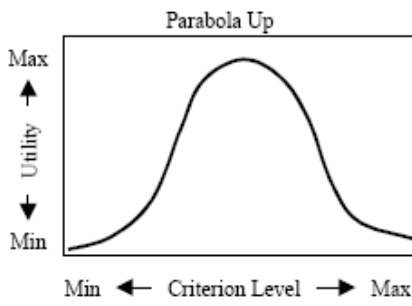
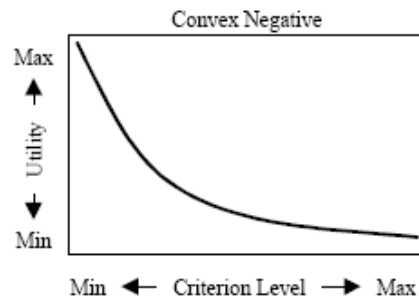
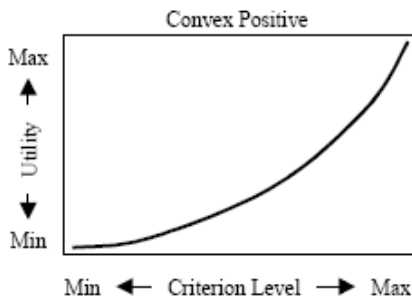
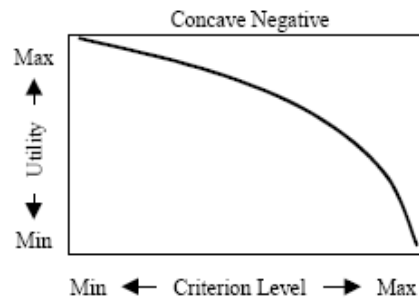
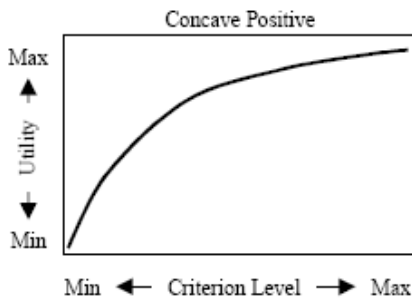
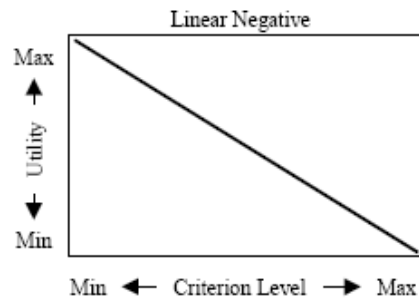
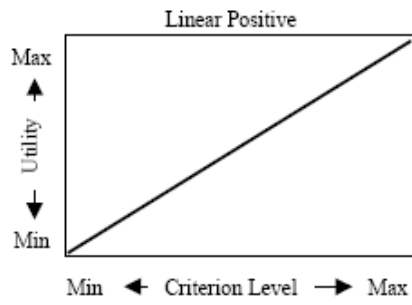
Another method is to standardize scores, through a linear function, by taking into account only the best score. For example if the value 1 is given to the best score then all other scores will receive a value between 0 and 1 (the highest score).

It is also possible to estimate the ideal value and the minimum value of the outcome for a selected indicator or criterion. The ideal value represents the most desired outcome for the selected indicator or criterion, whereas the minimum value represents the less desired outcome. All scores will be standardized, through a linear function, between the end points of the range (the ideal and minimum value considered).

As showed in fig., next to a linear functions, other types of functions can be used. In general a utility function represents the way in which a decision maker derives utility from a given indicator. Often a linear function is used since this is the easiest method. When the utility function has a linear form this means that if the performance of the indicator (or criterion) increases then the utility derived from it also increases at a linear rate. For example for some people the cleaner are the streets of their city or the more beautiful is the landscape in the area where they live, than the higher is the utility they derive in terms of well being. If an increase in the performance of indicators at the lower end of the range will give higher utility than an increase in the performance of indicators at the higher end of the range then the function will have a concave form. For example some people may give a higher utility to an increase in salary from 600 Euro to 700 Euro per month than an increase from 2 000 Euro to 2 100 per month. A parabolic function may occur in some specific cases for example when measuring soil pH. As a matter of fact the yields of some crops diminishes when the Ph moves away from his ideal position.

The choice of the standardization method select depends very much from the preferences of the decision makers. Particular care should be taken when selecting the standardization method as this will very likely impact the result of the Multi criteria analysis.

A more accurate overview about standardization methods can be found in Hajkowicz et al., 2000;



TableGeneric utility function forms.
Source: Hajkowicz et al, 2000.

Attribution of weights and ranking

In MCA, the preferences of the decision-maker are accounted for by the weighting places on each of the criteria and subcriteria. The weightings may range from equal importance to a ranking of most to least important to a relative weighting of all criteria. The weights may be qualitatively or quantitatively expressed, or a mixture of both. One more than one decision maker is involved the process of placing weights becomes complex, since preferences may not be unique.

Sensitivity analysis

Sensitivity analysis is a widely-used tool fo the investigation of the impact of uncertainty and variability on the outcome of a particular analysis. For example, one may explore how sensitively the rank of an option depends on its performance in a particular criterion.

Appendix 6. 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 and 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 and 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 and 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 and 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 and 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, and 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 7. Blueprint stakeholder workshops

Communication among stakeholders is facilitated through several participatory methods (see Appenix ??) In this study in order to facilitate communication and stimulate discussion one preparatory meeting and one workshop will be held in South Africa.

A key methodological aspect of the workshop is that it allows for deliberate processes through which stakeholders can come to a common understanding of complex values, including values for amenity aspects which are very relevant especially when dealing with tourism issues. The following phases are considered: preparation, implementation and evaluation.

Preparation Phase

During this phase the focus is given to organizational matters and a number of contents aspects. In terms of organization, clearly, suitable space for the workshops needs to be reserved, participants have to be selected and invited, a date and time has to be set, length of the workshop has to be decided, catering has to be organised, and it should be decided how the interest of potential participants is ensured, and what level of compensation they should receive (for instance travel costs and a meal).

In terms of content and for the success of the workshop, it is crucial that the participants receive (i) a clear insight into the objectives and approach of the workshop; as well as (ii) the relevant background information to ensure efficiency of the workshop discussions. All this information can be condensed in a presentation to be held in the beginning of the workshop. It is important to focus and narrow down the objective of the discussions in view of the limited time that will be available during the workshop.

Implementation phase

A key issue during the workshops is that all participants get an equal opportunity to express their views and contribute to the deliberate process. This requires that modulators, facilitators are present at each session. These people should be experienced with facilitation in order to ensure that they are not influencing the contents of the discussions, but that they, instead, focus on the procedures. It is conceivable that widely varying views exist among stakeholders, e.g. with respect to the values of different functions. Where possible, a consensus view needs to be found, but provisions need to be made for reporting heterogeneous views.

Evaluation Phase

In the evaluation phase, both the process and the outcomes have to be evaluated. Main feedback and comments given by participants including suggestions for additional scenarios, additional valuation criteria and measurement indicators will be taken into account.

Workshop programme

Session 1 (Background information and discussion)

In the first part of this session background information are presented with power point. Here the structure of the workshop is presented (i.e. division in sessions, breaks, lunch). Then the general objectives of the project are highlighted (e.g. description of the project, partners, objectives). It follows a quick presentation of the integrated assessment framework used (fig.1). After this the students will present their findings (Jotte will discuss about the socio-economic characteristics of the study area; Chick will give an overview of livelihood dependence on ecosystems goods and services, possibilities for future development of the study area (land use/tourism scenarios), synergies and conflicts among stakeholders)

In the second part participants can ask questions or give some general comments about the project; moreover they can provide feedback on 1) the integrated assessment framework and on 2) the tourism scenarios (i.e. participants are asked to express their opinions about the applicability of the scenarios presented and to identify alternative scenarios and justify their choice).

Session 2 (Impact assessment and discussion)

In the first part of this session the ecological, social, economic valuation criteria and the measurement indicators, used in this project to assess the impacts of Scenarios, are briefly presented (power point). Then participants are invited to react by (i) giving general comments about the criteria selected (ii) identifying additional criteria or measurement indicators that can be relevant for the study area and/or the Scenarios considered and that were not yet taken into account.

After that participants will be randomly divided in few groups of about 4 people each. Each group will receive a printed copy of the “Impact assessment sheet” containing a list of criteria and indicators (see table below) already discussed in the first part of this Session. The facilitator will explain briefly how to use the sheets given to them. Then each group will be invited to fill-in the impact assessment sheet (one sheet per group) and assess according to their own judgment, their expertise and the discussion within their group the values of measurement indicators for each Scenario considered. The scale used for the assessment is an ordinal scale, which means that the indicators are valued through a score (see table below for explanation). At the end of this session “Impact Assessment sheets” are handed-in to the person chairing the meeting.

Table 7: Example of “Impact Assessment sheet” to be given to each group of participants

N.B. The impact of each Scenario is assessed according to valuation criteria and indicators selected. The scale chosen for this assessment is an **ordinal scale**. This means that a **score** is assigned to each indicator and therefore the impact of each Scenario will be **ranked**. For example let's assume we have 3 Scenarios and we are estimating (through a score) the indicator “sense of well being” (included the socio cultural valuation criteria under the criteria “mental health”). Participants are asked to give a score from 1 to 3 (or to 4, or to 5, etc. if there are 4 scenarios, or 5 scenarios, etc) to the indicator “sense of well being”. The score 1 will be given to the Scenario that according to expert judgment can have the higher therapeutic effects on people's mental well being. The scenario that will be the second best alternative in terms of “sense of well being ” will get the score 2- The score 3 will be

assigned to the Scenario that, according to expert judgment, will give the lower “sense of well being” effect.

Next to this table participants will receive a paper with some **short, simple and to the point explanation** of the meaning of each indicator.

The data provided by the experts in this “Impact Assessment sheets” will be than be quickly (we have very little time available) inserted in the computer model.

These data provided by experts are **provisional** and are meant only to give an orientation of the impacts of the different scenarios. Accurate data on monetary, qualitative, quantitative values will be collected by Evgenia and Peter (students from ESA) from Nov.–Dec.2006 to Jan-Feb 2007 and will be inserted into the final version of the report.

Here below I (Stelios/Valentina ?) use the same table described theoretically when presenting the model included all indicators suggested by Dolf.

Opmerking [g1]: Sugg Dolf: put economic First, then socio-cultural, then ecological)

Valuation criteria		Measurement indicator	Scenario A Baseline	Scenario B	Scenario C
Ecological valuation criteria					
Naturalness/integrity	Degree of human presence in terms of physical, chemical or biological disturbance.	n. key species/present/study area	<i>Insert score</i>	<i>Insert score</i>	<i>Insert score</i>
		Quality of air, water and soil	<i>Insert score</i>	<i>Insert score</i>	<i>Insert score</i>
Diversity	Variety of life in all its forms, including ecosystems, species & genetic diversity.	n. ecosystems/ study area	<i>Insert score</i>	<i>Insert score</i>	<i>Insert score</i>
		n. species/ study area	<i>Insert score</i>	<i>Insert score</i>	<i>Insert score</i>
Uniqueness	Local, national or global rarity of ecosystems and species	n. endemic species/ study area	<i>Insert score</i>	<i>Insert score</i>	<i>Insert score</i>
				
Resilience	Sensitivity of ecosystems to human disturbance and capacity for renewability	Complexity in food chain level	<i>Insert score</i>	<i>Insert score</i>	<i>Insert score</i>
				
.....					
Socio-cultural valuation criteria					
Heritage value	Importance of nature as reference to personal or collective history and cultural identity.	surface of historic sites, features, artifacts/ study area	<i>Insert score</i>	<i>Insert score</i>	<i>Insert score</i>
		n. of people using ecosystems for cultural heritage and identity/ study area /yr	<i>Insert score</i>	<i>Insert score</i>	<i>Insert score</i>

Spiritual value	Importance of nature in symbols and elements with sacred, religious and spiritual significance.	surface sacred sites or features/ study area	<i>Insert score</i>	<i>Insert score</i>	<i>Insert score</i>
		n. people who attach religious significance to ecosystems/ study area /yr	<i>Insert score</i>	<i>Insert score</i>	<i>Insert score</i>
Mental health	General therapeutic effects of nature on peoples' mental well being	Sense of well being	<i>Insert score</i>	<i>Insert score</i>	<i>Insert score</i>
.....					
Economic valuation criteria					
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	<i>Insert score</i>	<i>Insert score</i>	<i>Insert score</i>
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>Insert score</i>	<i>Insert score</i>	<i>Insert score</i>
		Average income others than local community in Euro/yr	<i>Insert score</i>	<i>Insert score</i>	<i>Insert score</i>
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>Insert score</i>	<i>Insert score</i>	<i>Insert score</i>
		Average income others than local community in Euro/yr	<i>Insert score</i>	<i>Insert score</i>	<i>Insert score</i>

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	<i>Insert score</i>	<i>Insert score</i>	<i>Insert score</i>
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 to society in Euro/yr	<i>Insert score</i>	<i>Insert score</i>	<i>Insert score</i>
Employment	(use of) Ecosystem services provide opportunity for employment	Average n. people employed within local community/yr	<i>Insert score</i>	<i>Insert score</i>	<i>Insert score</i>
		Average n. people employed others /yr	<i>Insert score</i>	<i>Insert score</i>	<i>Insert score</i>

Session 3 (Preferences elicitation and discussion)

Participants are divided in few (3 or 4) groups. Each group is represented by homogenous groups of stakeholders with similar interests (e.g. non-governmental organizations may represent one group, governmental organizations another group, tourism and private organizations another one, etc.).

Each group will receive a “Preference sheet” through which stakeholders, within each group, can express their preferences and interests among criteria and indicators. Preferences and interested are elicited trough “Direct Assessment”. Each group is invited to fill in the sheet and indicate its preferences by assigning a weight (weight= a score from 0 to 10) to each criteria and indicator (score). The weights assigned are the result of a discussion within the group.

The weights are expressed at three levels: they will be assigned to each group of criteria (e.g. ecological, socio-cultural and economic valuation criteria) (level 1), they will assigned to each criteria (e.g. naturalness, diversity, etc.) (level 2), and to each indicator (level 3).

For example at Level 1: groups composed by private organizations can consider the economic aspects more relevant than the ecological ones, whereas for the non-governmental organization group it can be the other way around. In this case private organizations may for example decide to give a score of 8 to economic valuation criteria, 1 to the ecological ones, and 1 to the socio-cultural ones (total=10). On the other hand non-governmental organizations may decide to give a score of 1 to economic valuation criteria, 4 to the ecological ones and 4 to the socio-cultural ones (total=10).

The same applies to the other levels.

Table 8A: “Preference elicitation sheet”.

Give a score to the group of valuation criteria

Group of Valuation criteria	Weights level 1
Ecological valuation criteria	<i>Insert score</i>
Socio-cultural valuation criteria	<i>Insert score</i>
Economic valuation criteria	<i>Insert score</i>
	<i>The sum of the above scores is equal to 10</i>

Table 8B: “Preference elicitation sheet”.

Give a score to the valuation criteria

(I (= Stelios ?) would recommend to reduce the n. of valuation criteria ideally to 2 or max to 3 for each group)

	Valuation criteria	Weights level 2
Ecological valuation criteria	Naturalness/integrity	<i>Insert score</i>
	Diversity	<i>Insert score</i>
	Uniqueness	<i>Insert score</i>
	Resilience	<i>Insert score</i>
		<i>The sum of the above scores is equal to 10</i>
Socio-cultural valuation criteria	Heritage value	<i>Insert score</i>
	Spiritual value	<i>Insert score</i>
	Mental health	<i>Insert score</i>
		<i>The sum of the above scores is equal to 10</i>
Economic valuation Criteria	Stock value	<i>Insert score</i>
	Direct (consumptive) use value	<i>Insert score</i>
	Direct (non consumptive) use value	<i>Insert score</i>
	Non use value	<i>Insert score</i>
	Employment	<i>Insert score</i>
		<i>The sum of the above scores is equal to 10</i>

Table 8C: “Preference elicitation sheet”.

Give a score to the measurement indicators

(I would suggest to reduce the n. of measurement indicators to few ones)

Valuation criteria	Measurement indicator	Weights level 3
ecological valuation criteria		
Naturalness/integrity	n. key species/present/study area	<i>Insert score</i>
	Quality of air, water and soil	<i>Insert score</i>
Diversity	n. ecosystems/ study area	<i>Insert score</i>
	n. species/ study area	<i>Insert score</i>
Uniqueness	n. endemic species/ study area	<i>Insert score</i>
	
Resilience	Complexity in food chain level	<i>Insert score</i>
		<i>The sum of the above scores is equal to 10</i>
Socio-cultural valuation criteria		
Heritage value	surface of historic sites, features, artifacts/ study area	<i>Insert score</i>
	n. of people using ecosystems for cultural heritage and identity/ study area /yr	<i>Insert score</i>
Spiritual value	surface sacred sites or features/ study area	<i>Insert score</i>
	n. people who attach religious significance to ecosystems/ study area /yr	<i>Insert score</i>
Mental health	Sense of well being	<i>Insert score</i>
		<i>The sum of the above scores is equal to 10</i>
Economic valuation criteria		

Stock value	Available stock in Euro/yr	<i>Insert score</i>
Direct (consumptive) use value	Average income local community in Euro/yr	<i>Insert score</i>
	Average income others than local community in Euro/yr	<i>Insert score</i>
Direct (non	Average income local community in Euro/yr	<i>Insert score</i>

consumptive) use value	Average income others than local community in Euro/yr	<i>Insert score</i>
Indirect use value	Benefits to society in Euro/yr	<i>Insert score</i>
Non use value	Benefits to society in Euro/yr	<i>Insert score</i>
Employment	Average n. people employed within local community/yr	<i>Insert score</i>
	Average n. people employed others /yr	<i>Insert score</i>
		<i>The sum of the above scores is equal to 10</i>

Session 4 (Results and discussion)

The data provided in the “Impact Assessment sheet”(Session 2) and in the “Preference elicitation sheet” (Session 3) are the inputs for the multi-criteria model which will quickly be run during the break. This data are just provisional and will allow a first rough estimation of the results. This data will be later expanded with the results of the second stakeholder workshop (local community workshop) and with the findings from students (2006-2007) and literature study. The provisional results and ranking of alternatives will be presented with power point to participants. Discussion will follow.

Appendix 8. 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 Geater 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 economical 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) economical 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)?

	Economical	Example	Weight (1-5)	Comments
Positive Impacts	Contribution to local economies	Direct and indirect tourism related jobs and businesses		
	Government stimulation of infrastructure investment	Water and sewage systems		
		Roads		
		Electricity		
		Telephone		
		Public transport network Other		
	Contribution to government revenues	Tourism taxes		
	Other			
Negative impacts	Leakages	Lodges from non-residential tourism entrepreneurs		
		Trained employees 'imported'		
		Food imported		
	Infrastructure costs	Increased local tax		
	Increase in prices			
	Economic dependence of local community on tourism			
	Seasonal character of jobs			
	Other			

	Socio-Cultural	Examples	Weight (1-5)	Comments
Positive Impacts	Poverty alleviation	Tourism related jobs		
	Tourism as a force for peace	Cultural exchange, mutual sympathy, reduce prejudices		
	Strengthening communities	Rejuvenation of local festivals		
		Tourism related professional training		
	Facilities for tourists and residents	Upgraded infrastructure, health and food facilities.		
Other?				
Negative impacts	Change or loss of identity and values	Loss of authenticity due to adaptation		
		Reconstructed ethnicity		
	Culture clashes	Economic inequality		
		Irritation due to tourist behavior		
		Job level friction		
	Physical influences causing social stress	Resource use conflicts		
		Cultural deterioration		
		Conflicts with traditional land-uses		
	Ethical issues	Crime generation		
		Child labour		
		Prostitution		
	Other?			

	Ecological	Examples	Weight (1-5)	Comments
Positive Impacts	Environmental awareness raising	Increased scope for nature restoration		
		Increased protection of wildlife (tourism attractions)		
	Tourism revenues to be spend on conservation	Entrance fees		
	Alternative employment	From poacher to tour guide		
	Other?			
Negative impacts	Depletion of natural and local resources	Water		
		Food		
		Energy		
		Land clearing		
		Deforestation (fuel wood, construction materials)		
		Other?		
	Pollution	Littering		
		Sewage		
		Aesthetic pollution		
		Other?		
	Physical impacts	Erosion		
		Trampling		
		Construction		

		Deforestation		
		Wildlife disturbance		
		Other?		