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Enhancing Management Effectiveness in the Biosphere Reserve Mananara-Nord

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Abstract

Managing a protected area is a challenge in itself. Various pressures and influences from outside the protected area are impacting on natural and cultural values of ecosystems and their services inside. Without an effective and efficient management, protected areas potentially fail to preserve what is left. Especially in the context of protected area management in developing countries, the actors responsible often perceive it a dilemma to safeguard natural resources without negatively influencing the basic needs of local people.

Against this background, ANGAP (l'Association Nationale pour la Gestion des Aires Protégées) – Madagascar's protected area management body – has a special mission to accomplish in the Biosphere Reserve Mananara-Nord: the integration of both the conservation of natural resources in the core zone and the provision of developmental support in the transition zone.

As part of an interdisciplinary project on success and failure factors of protected area management, the GoBi Project (Governance of Biodiversity) affiliated with Berlin's Humboldt University, a case study was conducted in the Biosphere Reserve Mananara-Nord (BRMN) in Madagascar. The goal was (1) to investigate site-specific conditions in order to understand the present context in the BRMN; and (2) to devolve the different aspects of the site's context into a management tool in order to improve management effectiveness.

This paper presents an innovative approach to improvement of the management effectiveness of the BRMN by applying a widely used measurement and monitoring tool for managers, the so-called Balanced Scorecard, to the non-profit sector of protected areas. The Balanced Scorecard management tool, an evaluation system that allows a well-balanced assessment of management structures and processes while fostering the effectiveness of adaptive management, has not previously been utilised in the context of protected area management. This paper represents an initial attempt to deploy this tool for the special case of BRMN.

Key Words

Balanced Scorecard, biosphere reserve, management effectiveness, Madagascar, adaptive protected area management

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1 Introduction

Natural resources are under increasing pressure, and global biodiversity is declining dramatically. With international conventions and agreements such as the Convention on Biological Diversity (CBD) and the Millennium Development Goals, nations worldwide try to jointly pinpoint and tackle both the phenomenon of biodiversity loss and the improvement of human well-being on a global scale.

Protected areas represent a widely recommended means for in-situ biodiversity conservation (see e.g. CBD's Programme of Work on Protected Areas (UNEP & CBD 2006)). The World Conservation Union (IUCN) defines a protected area as "an area of land and/or sea especially dedicated to the protection and maintenance of biological diversity, and of natural and associated cultural resources, and managed through legal or other effective means." (Dudley *et al.* 2003; IUCN 1994) Nowadays understanding implies that at best protected areas are to produce conservation benefits to local communities while minimising biodiversity threats and pressures at the same time. It is thus aimed at pro-actively reconciling nature conservation and sustainable development of local communities for poverty alleviation (Adams *et al.* 2004; Mulongoy & Chape 2004).

Achieving effective management of protected areas has become an issue of global attention that increasingly occupies centre stage in the conservation of biodiversity. In practice, however, management processes frequently lack effectiveness since they neither respond adequately to conditions on site, clearly defined needs and opportunities, nor do they create stakeholders' understanding, only to mention some potential problems (Stoll-Kleemann and Welp 2006). Selecting the most compatible management practices and adapting them to both the present situation and to anticipated changes is essential for meeting conservation goals Conservation Measures Partnership (2004). Monitoring the effectiveness of management structures and processes is thus a critical element of any plan to manage natural resources for conservation and sustainable use (Kremen *et al.* 1998).

This paper presents the findings of a case study that aims at the improvement of protected area management effectiveness by applying the Balanced Scorecard approach. The case study was conducted in the Biosphere Reserve Mananara-Nord in Madagascar. The study sought to identify factors that influence the success of this protected area in order to integrate them into the management processes. The Balanced Scorecard approach (see 1.2) was seen as the ideal instrument to align these factors to management structure and processes.

1.1 Protected Area Management Effectiveness Evaluation

When considering the definite need to conserve natural and cultural values, humanity encounters a variety of challenges. People are getting more and more conscious about the imperative to take action in preserving our natural treasure. The establishment of protected areas takes an essential part of this action. Since protected areas (PAs) are seen as both a promising and effective response strategy against biodiversity loss (MA 2005), PA managers are expected to contribute to the achievement globally formulated conservation targets through

successful PA implementation at the local level. However, with the establishment of institutions such as protected areas, management obligation and demands for capacity arise. The basic requirement to comply with these challenges is a sound and dynamic alignment of management actions with national policies as they relate to prevailing local conditions, i.e. the variety of biological and social characteristics, pressures and natural resource uses (Hockings *et al.* 2006). There are various good reasons why a management should be open-minded towards a periodic monitoring and evaluation of management effectiveness. If appropriately implemented

- the management improves transparency and demonstrates accountability of its structures and processes;
- manager's decision-making and resulting activities are better understood and thus promote stakeholders' commitment and support;
- the management reduces dependence on resource constraints through raising efficiency; and
- assumed that management evaluation is applied on a regular basis, the circular learning process facilitates an adaptive management (Hockings *et al.* 2006).

In 1996 the World Commission on Protected Areas (WCPA) appointed a management effectiveness task force emphasizing the need to elaborate a framework for (1) the evaluation of the achievement of PA management objectives, (2) its alignment to governance systems, (3) a corresponding resourcing, and (4) the implementation of proper strategies and processes (Hockings *et al.* 2000). Oftentimes manager and other parties working in the field of protected areas still refuse assessments of their performance. However, it should be emphasised that monitoring and evaluation also promote positive effects in terms of the provision of incentives, e.g. by creating economic imperatives (Dudley *et al.* 2004).

According to Hockings (2003) various concepts in the field of management monitoring and evaluation have been elaborated and practiced; all of them seeking to improve management effectiveness of protected areas. The approaches vary from simple systems for monitoring biodiversity in particular protected areas (Cifuentes A. *et al.* 2000), across a rapid site-level assessment system (Ervin 2003) and a scorecard system formulated by The Nature Conservancy (TNC 2002), to detailed monitoring and evaluation systems customised to particular Pas and their conditions. The important message for the evaluation of management effectiveness is "…(to) ideally look at all aspects of the management cycle, including the context within which management takes place" (Dudley *et al.* 2004).

1.2 The Balanced Scorecard - Description

The Balanced Scorecard (BSC) approach was first described and introduced by Robert Kaplan and David Norton in the early 1990s as a performance management framework (Fernandes *et al.* 2006). The primary function of the BSC concept is to be a control tool for managers (Kaplan & Norton 1992). Over the past twenty years, it has emerged as the basis for a "strategic management system" representing a medium to translate a vision into a set of clear objectives

assigned to strategies and actions (Cobbold & Lawrie 2002). Performance measurement indicators allow for precise evaluation of implemented management activities. This is very much in demand since performance measurement is apt to improve the examination and evaluation of the management processes under consideration and thus the quality of strategic management (Tuomela 2005).

The BSC approach was designed to incorporate performance measures of drivers that indicate future performance into the classical financial measures of past performance; hence, to provide a mix of outcome measures and performance drivers. An important asset is the opportunity it creates for managers to focus on decision-making rather than on analytical processes. (Fernandes *et al.* 2006)

Management success depends on the consistency of measures and strategies with the corporate policy goals and vision. Therefore, the BSC consists of four different perspectives: *financial*, *customer*, *internal processes*, and *learning and growth.* These characterise the current status and future potential of organisations. Performance measures classified vis-à-vis these four perspectives express outcome measures and performance drivers of those outcomes that are linked together in cause-and-effect relationships (Kaplan & Norton 2001).

Monitoring and evaluation provide the basis for the management to adapt dynamically to the current state of biodiversity and to all threats and pressures affecting the protected area. The BSC concept, if implemented and adapted wisely, might function as a navigation tool for the management of the BRMN to enable it to both maximise conservation success and satisfy minimum basic human needs.

1.3 Madagascar – An Overview

Photo 1 **Chameleon**
by Christiane Röttger

Madagascar is considered to be a global biodiversity hotspot and conservation priority (Hannah *et al.* 1998) because of its rich biota and exceptionally high levels of endemism (Nicoll & Langrand 1989) and deforestation (Green & Sussman 1990). The country has already lost eighty percent of its natural areas and continues to lose an estimated 200,000 hectares to deforestation annually (Rakotonindrina 1999).

At the same time, Madagascar is one of the few nations globally recognised as a unique eco-region in its own right. Because of Madagascar's early geological separation from the African continent during the Jurassic Period, the country became isolated and its unique biodiversity evolved (Rakotonindrina 1999).

Five bioclimatic zones provide possibilities for agricultural systems adapted to both temperate and tropical countries. Madagascar has great potential for sustainable economic use since it has vast spaces not yet earmarked for development. The human population is just over fourteen million, with a high demographic growth rate of 2.9 per cent; occupation is focussed on about 37 per cent of the land surface. With an increasing population dependent on the use of natural resources, there is an urgent need for sustainable management to safeguard what remains in order to maintain both the biodiversity value as well as ecosystem services (WWF Madagascar 2003).

Nevertheless, Madagascar lives with many constraints, mostly of economic and socio-cultural character. According to a World Bank ranking, Madagascar is the world's ninth-poorest country, where some 70 percent of the population struggles to survive on less than one dollar a day; the annual per capita Gross National Product (GNP) is 230 dollar. About 80 percent still live in the countryside, although urbanisation is increasing (IFAD 2007; Kistler & Spack 2003). The Malagasy economy is dominated by the primary sector, with agriculture accounting for 38 per cent of national product production, more than 50 per cent of raw materials, and 70 per cent of the employment (Wikipedia 2006).

Madagascar's government has striven to preserve its natural diversity by establishing a protected area network that supports nature conservation and is integrated into development-oriented and other community-based programmes (World Bank *et al.* 1988). At the World Parks Congress in Durban in 2003, Madagascar's President, Mr. Marc Ravalomanana, announced the expansion of the country's protected area surface from 4.2 million to fifteen million hectares, which is about 26 per cent of Madagascar's total terrestrial surface (U.N. Wire 2003). This target is not only very ambitious; it also poses serious challenges to the capacity of the administrative body, the ANGAP (Association Nationale pour la Gestion des Aires Protégées), which is responsible for the management of the protected area network at various institutional levels.

1.4 Research Approach

The present study was initiated by the research group "Governance of Biodiversity" (GoBi)[1], affiliated with the Humboldt University of Berlin. The group investigates and assesses the effectiveness of protected areas, with emphasis on biosphere reserves (BRs) (Stoll-Kleemann *et al.* 2006). The study in Madagascar is seen as a source of valuable information, especially due to the comprehensive investigation of influencing success and failure factors, which were subsequently deployed to draft a Balanced Scorecard (BSC) for a biosphere reserve.

Furthermore, the Malagasy protected area management body – the ANGAP – signalled its interest in the study and proposed Mananara-Nord as an investigation site, it being the only biosphere reserve in the country that has kept environmental records and data on management processes since its nomination (in 1989) and, as such, has gathered unique experience.

The applied method follows a qualitative research approach (Denzin & Lincoln 1994; Kohler Riessman 1993), seeking to demonstrate the current situation on site through empirical evidence. Management and governance of the biosphere reserve, social and cultural phenomena, including stakeholder roles, are focused. Techniques of the case study include observation (field visits), interviews and questionnaires as well as a fundamental review of existing literature.

In particular during a four-month onsite investigation (December 2005 until April 2006), basic success and failure factors of the BRMN were elicited from literature and through interviews with various stakeholder groups and were consequently carefully defined.

[1] See www.biodiversitygovernance.de

The study:

1. determined and defined critical factors that have important influence on the BR's situation.
2. matched results of a SWOT (strengths, weaknesses, opportunities and threats) and stakeholder analysis to reflect the current situation of the BR vis-à-vis the list of factors in order to elaborate a set of key factors specific to the BRMN.
3. provided thematic categorisation and integration of these factors into the four perspectives of the Balanced Scorecard (BSC).
4. allowed for the integration of particular BRMN management objectives, strategies, and measures into each perspective.

2 Biosphere Reserve Mananara-Nord

2.1 Biosphere Reserve Concept

As stated at the conference of the parties to the Convention on Biological Diversity (CBD) at its fifth meeting, "the ecosystem approach is a strategy for the integrated management of land, water, and living resources that promotes conservation and sustainable use in an equitable way. Thus, the application of the ecosystem approach helps to reach a balance of the Convention's three objectives: conservation, sustainable use, and the fair and equitable sharing of the benefits arising out of the utilization of genetic resources." (UNEP & CBD 2000) In principle, the ecosystem approach needs ongoing adaptation to changing conditions since ecosystems - with their complexity and dynamic nature - seem unpredictable. Above this, there is still a significant lack of knowledge for complete understanding of their functioning. The implementation of the CBD supposes the involvement of all sectors of society in the conservation of biological diversity and sustainable resource use. (UNESCO 2000)

One approach that seeks to achieve the involvement of people is the biosphere reserve concept established by UNESCO's Man and the Biosphere (MAB) Programme. The aim is to reconcile the conservation of biodiversity with sustainable economic development. Biosphere reserves are under sovereign national jurisdiction, yet they share their experience and ideas regionally, nationally, and internationally within the World Network of Biosphere Reserves (Bridgewater 2002). There are about 531 sites worldwide in 105 countries (UNESCO 2008). The BR concept combines participatory management requirements and a zoning scheme with a research-oriented world network (Batisse 1997; Chape *et al.* 2003). It constitutes a set of trans-sectional natural landscapes and ecosystems, many closely intertwined with human settlements and forms of use. BRs are "experimental places and vanguards for sustainable development", as declared in the Seville Strategy (UNESCO 1995), one of the key documents of the concept that frames the role of and vision for BRs in the 21st century. BRs have three inter-connected functions:

- Conservation: landscapes, ecosystems, species, and genetic variation
- Development: economic, human, and culturally adapted

- Logistic support: research, monitoring, environmental education and training

Theoretically, by combining these three functions BRs can be considered as model regions for the implementation of the CBD's ecosystem approach (Bridgewater 2001, 2002; UNESCO 2000).

In order to implement the three-fold functions, BRs ideally consist of three interrelated zones: the core, buffer, and transition zone. The conservation efforts inside the core zone (CZ) together with developmental activities in the buffer and transition zones are supposed to build up the necessary acceptance and consequently the aspired-to support of local populations living adjacent to the CZ of the BR. In addition, the formal existence of the World Network of Biosphere Reserves (WNBR), constituted by active regional sub-networks and national networks, helps countries to exchange information about conservation, developmental activities, and experiences within a neutral, culturally adapted setting (Bridgewater 2001).

2.2 Characteristics of the Biosphere Reserve Mananara-Nord

Photo 2 **Nosy Atafana in the BRMN** by Nadine Fritz-Vietta

The Biosphere Reserve Mananara-Nord (BRMN) is composed of one strict conservation area, comparable to the core zone of the MAB concept, which includes the remaining parts of the rain forest and coral reefs. This zone is officially categorised as a National Park: a protected zone, where only conservation activities such as ecological monitoring and research, but also traditional socio-cultural ceremonies, are allowed, hence an officially assigned IUCN category II National Park (WDPA 2006). It comprises the massive forest blocks of Ivontaka South and Ivontaka as well as the forests of Verezanatsoro. Another part of the core zone embraces the marine park Mananara-Nord, which covers three islands situated in the coastal waters near the village of 'Sahasoa', known as Nosy Atafana, Nosy Rangotsy, and Nosy Hely. The zone corresponds to the National Park of the Malagasy conservation system ('Zone Tampon' and 'Noyau Dur'). This core area is surrounded by the peripheral or development zone – 'Zone de Potection' and 'Zone Périphérique' – in the Malagasy system, in which sustainable use of the natural resources by the local population is permitted. The MAB approach earmarks a so-called buffer zone in between the core and the development zone, which, in the BRMN, has never been proclaimed (ANGAP 2005a; UNESCO *et al.* 2001) see figure 1.

The Reserve, designated by Presidential Decree 89/216 on July 25, 1989, is located on the northeast coast of Madagascar. It forms part of the commune of Toamasina and is situated 280 km north of the commune's capital city, Toamasina. The total area encompasses 144,000 hectares, including the core area(s) with 24,000 ha (of which 1,000 ha are marine), buffer zones, and about 15,000 ha transition area. The ecosystems in the biosphere reserve are very diverse and include tropical humid forest, sandy coastal plains with littoral, and wetland vegetation, mangrove formations, marshlands, and coral reefs. Approximately 60,000 inhabitants live in the area (1995), distributed in about 186 villages.

The reserve was managed and financed by UNESCO between the date of its nomination in 1989 and 2002. The management of the BRMN was assigned to the Malagasy Protected Areas Association ANGAP in 2002, and it is now funded by the European Union (EU). Participatory research has been carried out in order to identify the needs of local people. In addition, sustainable development operations in sectors such as agriculture, rural infrastructure, health, education, fishing, animal husbandry, women's organisations, research, conservation, and adventure tourism have been established.

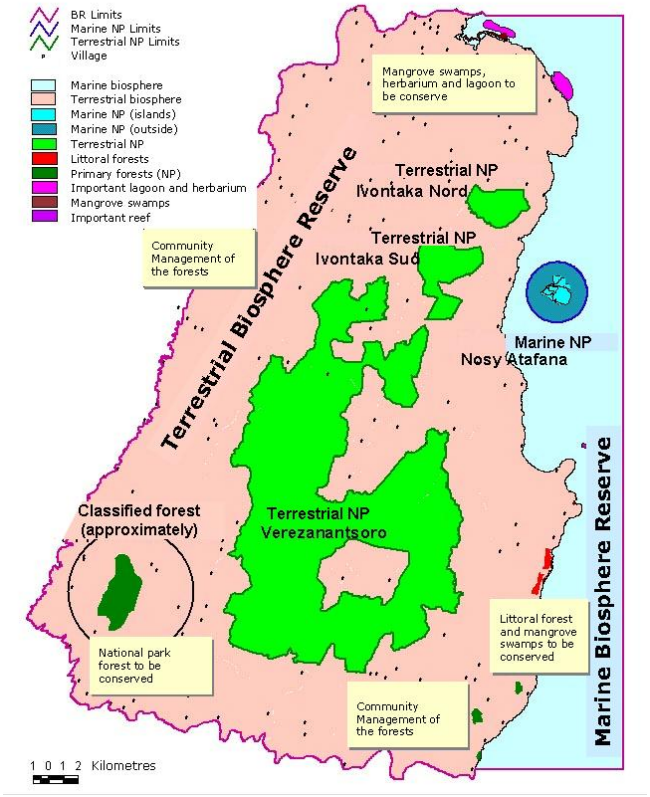

Figure 1: Map of the Biosphere Reserve Mananara-Nord2

2.3 Ecological Situation and Biodiversity Status

The lowland coastal rainforests of the BRMN are one of Madagascar's richest areas in terms of biodiversity and are quite unique. Most of the flora in the east coast region (170 out of the estimated 250 floral species) is endemic. The fauna is also very important biologically: nine of the eleven lemur species of the eastern region are concentrated there (Raondry 1995), as are sixty avian species (Nicoll & Langrand 1989). The three forests of the terrestrial National Park (Ivontaka Nord, Ivontaka Sud and Verezanantsoro) are part of Mananara-Nord's heritage of true ancient forests (ANGAP 2005a).

[2] Source: UNESCO *et al.* 2001; slightly changed

Terrestrial Habitat

The terrestrial biodiversity of the reserve can be divided into four principal habitats: dense humid forest, littoral forest that is partially degraded, vegetation of the wetlands, swamps, and secondary vegetation, which grows after slash and burn agriculture. The dense humid forest is the climax vegetation of the region. It comprises the lowland humid forests (9-800 m) and is the regional biodiversity sanctuary. The biosphere reserve currently contains 48,000 ha of dense, humid forests. A total of 20,800 ha (43%) of the reserve's forest is found inside the core zone, of which 85% is covered with dense forest (ANGAP 2005a; WildMadagascar.org 2006).

Photo 3 **Littoral and Mangrove Forest in the BRMN** by Christiane Röttger

The littoral forest covers a surface of about 740 ha but is not part of the core zone. Eight inventories have estimated a floral diversity of 23-116 plants per site, depending on the degree of degradation and soil quality (ANGAP 2005a). The littoral forests on the isolated granites of the islands of the marine park manifest the most vulnerable floral biodiversity. The coastal plains consist of rice fields, marshes, and mangrove vegetation. The secondary vegetation *savoka*[3] is the dominant vegetation here (ANGAP 2005a; c; UNESCO *et al.* 2001).

Marine Habitat

The marine ecosystems of Mananara-Nord, the barrier reef and coral island, are highly productive in terms of fish and crustaceans, with about 31 to 138 species having been observed per site. Mangroves and sea grass are important habitat for the regeneration of fish and the marine ecosystem in general. Seven different mangrove species and nine species of phanerogames have been identified. The Dugong Dugong, an especially rare and endangered marine mammal species, uses the sea grass fields as a feeding ground. A total of 169 different coral species have been identified and the reefs are home to a huge variety of molluscs, echinoderms, algae, and phanerogames (UNESCO *et al.* 2001).

2.4 Local Socio-Economic Situation

Currently, about 54,000 people reside at the biosphere reserve Mananara-Nord, with an average density of 39 inhabitants per km². Population growth is approximately 3% (as of 2006) – about the same as the national average - and the population is characterised by adolescence: 46% of the population are under eighteen years of age, 47% are between eighteen and sixty, and only 7% are older than sixty (UNESCO *et al.* 2001). Typically, families in the Mananara region have about five children; in Malagasy society, children are considered as security for the future. The region is negatively affected by poverty and a relatively low level of education.

[3] A type of permaculture

Resource Use

Photo 4 **A Farmer Cultivating Rice**
by Christiane Röttger

Since the whole eastern part of Madagascar is typically humid and extraordinarily rich in biodiversity, the local population generally does not suffer natural resource scarcity. As is the case everywhere, though, this natural prosperity is not infinite. Negative consequences are perceptible and require a sound and elaborated response to the prevalent consumptive use of natural resources for subsistence. Modern cultivation methods are increasingly being applied, making resource use sustainable and leading to increased crop efficiency, but this is only true for a small part of the local land-use system. Traditional, non-sustainable forms of resource use are still common practices in the Mananara region. (ANGAP 2005b)

Due to its fertility, the Mananara region is diverse in resource utilisation. Basic subsistence products – besides fruits – include breadfruit, manioc, sweet corn, litchi, sugar beets, rice, vanilla, clove, and coffee. Slash-and-burn agriculture is the dominant method employed in the area. Mananara is the leading site for the cultivation of cloves in Madagascar and the foremost area in the Toamasina province for vanilla. Coffee production is also at a high level (UNESCO *et al.* 2001). Other essential exploitation activities encompass livestock breeding, fishing, mining, and logging (table 1). The proportion of terrestrial fauna exploitation is at a relatively low level.

Since Madagascar is a developing country; most Malagasy generally do not possess more than a small cottage, a small piece of agricultural terrain, and – if they are relatively well off – a small amount of livestock. The livestock serve predominantly as security for times of scarcity. People are particularly dependent on natural resources in their region because transportation is limited and certain enclaves are not even accessible. Cottages are built of wood and leaves from the surrounding forests.

Table 1 Agricultural Products in the Mananara Region

Vanilla and clove	These are the most important products in the biosphere reserve. The majority of the inhabitants cultivate them either exclusively or primarily. Their commercial exploitation is relatively elaborated, with development projects supporting modern sustainable cultivation techniques. Nonetheless, cultivators still have to face considerable price fluctuations, meaning that a stable, functioning sales and distribution network has yet to be established.
Coffee	Coffee is primarily cultivated for local markets and utilised as exchange for subsistence goods. It is of high quality, but export is rather difficult because of inadequate transportation.
Rice	This grain is primarily cultivated by the slash-and-burn method, thus requiring a large amount of terrain and is not sustainable in the long run. New cultivation techniques are labour-intensive and consequently costly and thus have not been widely accepted. Essential cultivation inputs like irrigation, fertiliser, and mounting machinery are still lacking.
Timber	Logging provides an alternative to agriculture. It is strictly forbidden inside the national park, and without a special permit is also illicit outside the core zone. It is nonetheless done by commercial exploiters, who trade the wood in Toamasina (export/import centre);
Mining	Quartz is mainly exploited for commercial means. Chinese immigrants in particular are involved in these commercial operations.
Fishing	Gathering mussels, calamari, and sea cucumber is the most common activity. Fishing techniques are still mainly traditional. The exploitation of marine resources is not yet very elaborate, yet fishing serves as a vital source of food and money.

Land Tenure Situation and Property Rights

Madagascar's rural areas land tenure is still largely affected by traditional informal land tenure systems slowly shifting towards a modern registration and titling scheme (Worldbank 2006).

The majority of the biosphere's population are farmers who cultivate their own land. Throughout the interviews with local residents, it became evident that they acquired these sites by inheritance, purchase, or land-reclamation ('défrichement'). Since the biosphere is classified in different zones, the core zone is not reclaimable at all. Peasants whose land was inside the park's boundaries had to relocate outside the borders. On the periphery, land has become scarce due to the prohibition of land-reclamation activities. 'Défrichement', or *tavy* in the vernacular terminology, traditionally defines to whom a site belongs; in Madagascar's history land-reclamation was recognised as legal form to claim tenure of publicly owned land, provided that the land had not been cultivated by someone else previously (Jacoby & Minten 2005). Thus, property rights are neither especially clarified nor codified, and since the population is steadily growing, pressure on non-declared land is intense. Today the process of land-

reclamation had become discredited and alternate ways to establish a common land register were required. Therefore, the Malagasy government, in collaboration with the ANGAP, developed national protected areas legislation: the "Codes des Aires Protégées" (COAP). This policy defines specific zones – a buffer zone ("Zone d'Occupation Controlée (ZOC)" and a "Zone d'Utilisation Controlée (ZUC)") surrounding the core zone – in which controlled resource use is permitted to reduce human- induced pressures on protected ecosystems. (Repoblikan'i Madagasikara – Présidence de la République 2003)

Developmental Programmes

Next to the ANGAP, in the BR Mananara, nine other local NGOs are actively working in the field of developmental activities. Important local non-governmental organisations are «le Fonds d'Intervention pour le Développement (FID)» and «le Projet de Soutien au Développement Rural (PSDR)», which are in charge of rural infrastructures and development (FID 2003). To boost the local economic situation, these organisations have jointly developed programmes in order to promote small-scale projects. They offer support to newly established associations and income generating activities.

2.5 Threats to Biodiversity

Deforestation

The pressure of deforestation is the major cause for the degradation of natural habitats in Madagascar and is mainly the result of three activities:

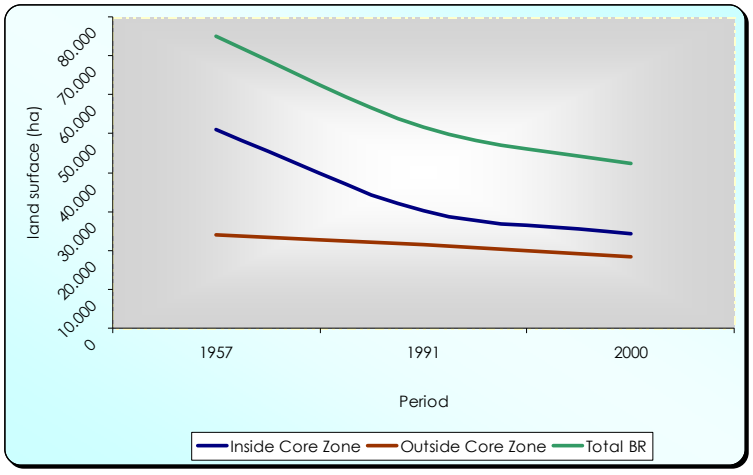

Figure 2: Forest Coverage in the BRMN

(1) *Tavy* or slash-and-burn agriculture is of major traditional importance for Malagasy culture and the Malagasy economy. *Tavy* is mostly used for converting tropical rainforests into rice fields (Kistler & Spack 2003). Typically, an acre or two of forest is cut, burned, and then planted with rice. After one or two years of production, the field is left fallow for four to six years before the process is repeated. Running through two or three such cycles, the soil is exhausted of nutrients, and the land is likely colonised by scrub vegetation or alien grasses. On slopes, the new vegetation is often insufficient to anchor soils, making erosion

and landslides a problem (Huttel *et al.* 2002). The development of forestland coverage next to the evolution of *tavy* in the Mananara region before and after the implementation of the biosphere reserve is illustrated in figures 2 and 3.

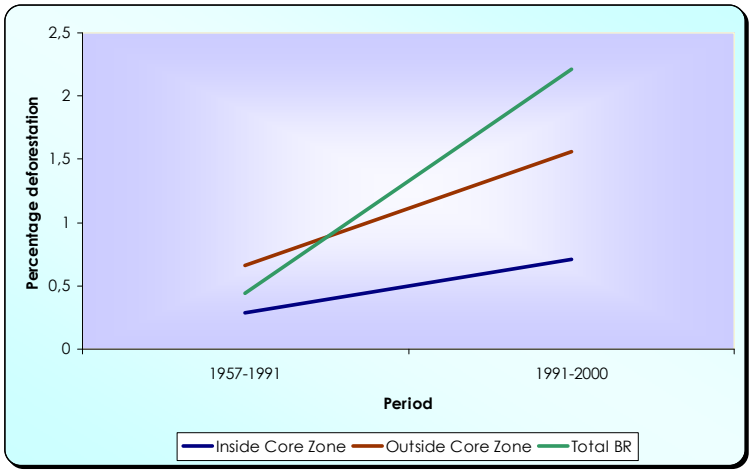

Figure 3: Annual Percentage of Deforestation

It should be noted that the population of Mananara-Nord practised shifting slash-and-burn agriculture, *tavy,* as a traditional farming technique during past centuries without having an overly negative effect on biodiversity (WildMadagascar.org 2006). In fact, this method was considered sustainable until the early seventies, when the country adopted a more liberal policy on slash-and-burn-agriculture, which was rapidly extended (2003).

The population increase also constitutes an essential driving force that contributes to the devastating effect of *tavy*; the pressure on land has increased, and people are not able to wait for already-cultivated land to rehabilitate, but rather have to move to new areas of cultivation. *Tavy* may have evolved as the most efficient agricultural strategy for given environments in Madagascar, but as currently practiced—with fallow periods too brief to allow sufficient regeneration of vegetation—it is no longer a viable cultivation technique (Kremen *et al.* 1998).

(2) Human Occupation. In Mananara-Nord, human settlement is the pressure that is most difficult to manage. Occupation is characterised by new settlements and expansion of villages, frequent temporary settlements during crop harvest, or by the cultivation of new areas through *tavy*. In 2000, 44 newly settled sites were registered, of which sixteen are permanent. In 2004, there were fifteen new parcels temporarily occupied from January until September. The pressure of human occupation is increasing rapidly due to explosive population growth, immigration, and poverty.

(3) Logging is a big problem for forest conservation in Madagascar. Traders and businessmen over-exploit areas by selective cutting or clear-cutting without any thought given to long-term biodiversity persistence. Studies related to the impact of wood fuel usage on the environment show that it accounts for up to 53,300,000 m³ of timber (ANGAP 1998). In Mananara, the timber company "Grande Moulin de Dakar" had a devastating effect on the humid forest in the 1960s. No commercial timber company currently threatens the forest in the BR, but there are local delinquents who exploit mainly rosewood and hardwoods.

Species of *Sapotaceae* and *Fabaceae* in particular are harvested and thus endangered.

Altogether, the biodiversity status of the BR remains relatively stable, and there has not been any logging of rainforest in the core zone during the last few years. (ANGAP 2005a; Brandt *et al.* 2000; UNESCO *et al.* 2001; and WildMadagascar.org 2006)

Poaching

Poaching exists in Mananara in the core zone as well as in the peripheral zone but does not pose an ostensible threat. It has been illegal to kill or keep lemurs as pets since 1964, and many species are protected by local taboos (*fady*). Nevertheless, several cases of lemur hunts have been recorded. Another small mammal, the *tenrec,* is often hunted as a source of protein. Lemurs, other small mammals, and birds are frequently hunted and are at the highest risk of being poached. Additionally, reptiles and amphibians are enthusiastically collected for the international pet trade. Chameleons, geckos, snakes, and tortoises are the most targeted.

Fishing

The waters around Madagascar provide a rich fishing ground and are an important source of income for villagers. Unfortunately, fishing is poorly regulated. Foreign fishing boats encroach on fishing areas to the detriment of locals and the marine fauna. Sharks, sea cucumbers, and lobster are being harvested at increasingly unsustainable rates. Although fishing is considered a less important pressure in Mananara, it does have some negative impact on the marine ecosystem.

Soil Erosion

Partly due to indiscriminate logging, Madagascar loses about eleven tonnes/ha of arable soil annually, but in some areas, this loss can be as high as 300 tonnes/ha. Bush fires, deforestation, indiscriminate logging, and cultivation techniques all remove vegetation cover from the land. Watersheds, often stripped absolutely bare of vegetation, are subject to serious erosion. Erosion also progressively silts up the larger rice fields, and the silting up of riverbeds can lead to disastrous floods (for instance the Ikopa River, which crosses Antananarivo). The marine ecosystem and coral barrier reefs in particular are seriously threatened by accumulated soil in mangrove forests and reefs.

Exotic Alien Species

The deliberate introduction of some species for agriculture and fisheries has not always been successful. The best example of damage wrought by introduced species can be found in the island's rivers and lakes. Adaptable and aggressive *tilapia*, introduced as a food fish, have displaced the native *cichlids*. In the BRMN, the abundance of rats (*Rattus rattus*) on Nosy Atafana, one of the islands of the marine national park, poses major danger to endemic species.

Other Threats

Other threats to biodiversity are the collection of secondary forest products and the exploitation of quartz, which were determined by the staff members of the BRMN to be the 'Threat of the Year 2006'. Another pressure might evolve due to local and national policy and politicians. During the time of the elections, experience shows that local policy makers stop supporting conservation initiatives, which means the national political situation might return to unstable conditions and thus negatively affect the conservation success of the BR. (ANGAP 2005a; Brandt *et al.* 2000; UNESCO *et al.* 2001; and WildMadagascar.org 2006)

2.6 Culture

Cultural Values

The biosphere reserve's population consists of various ethnic groups, deriving mainly from the nearby continents Africa and Asia. The influence of the mixture of the various cultures on attitudes and behaviours is recognisable in the region of Mananara-Nord. Values are oriented according to traditional structures that play an important role in the society's cohabitation. Mutual aid is implicit and cultivated in the family, between families, and help is even offered to strangers. Zebu culling for particular celebratory reasons as well as for traditional meals is a vital custom that is still practiced. Taboos and customs are affected by the belief in ancestors and 'joro' (ritual invocation) (Rakotonindrina 1999).

Norms are built on a strong mesh of specific taboos and traditional patterns of behaviour. One significant range of taboos is grouped under the term *fady*. *Fady* describes a group of proscriptions applied individually within family boundaries or are of general significance. The taboos most frequently invoked are the prohibition against the consumption of Indri, pork, and goat meat, the work of *tavy* on Tuesdays, Thursdays, and Sundays, and the working of certain lands utilising metallic tools (Brandt *et al.* 2000). To deny hospitality to a stranger is *fady* as well.

Another legal framework collectively known as the *Dina,* is a system of rules and regulations used to guide and control resource use and community behaviour. In rural areas the *Dina* provides an important basis for norms, since it is commonly respected as binding, conflict solving mechanism. It organises the handling of virtually all forest products, among other things. Only proprietors or people nominated for utilisation are allowed to use the resources, unless the village elders authorise exploitation. Therefore, valley residents have a common vision for the use of the forest, thus it assures sustainability by respecting key functions of land management. "Instead of being simply viewed as a source of raw material to 'use before the others', the forest is now regarded as a heritage to be managed for immediate and future sustainable use" (Equator Initiative 2003). However, although the *Dina* is largely respected, the younger generation no longer maintains traditional norms absolutely. Due to an individualisation process that has become evident in recent years, especially in the context of economic activities such as land-reclamation and agriculture, traditions are being increasingly ignored (Raondry *et al.* 2002). A number of crucial aspects of local culture are illustrated in figure 4.

Community organisation is characterised by several small institutions. Principally, groups declare individual institutions to represent a certain social fraction of their society. The most influential groupings in Mananara-Nord are « les associations des parents d'élèves (FRAM) », « les groupements de gestion de forêts », « les groupements féminins », and « les groupements d'épargne et de crédit (OTIV) ». (ANGAP 2005b)

During the interview survey with residents, it became obvious that people do not strive for personal wealth, but for the fulfilment of basic needs; if these are satisfied they work for the community's well-being.

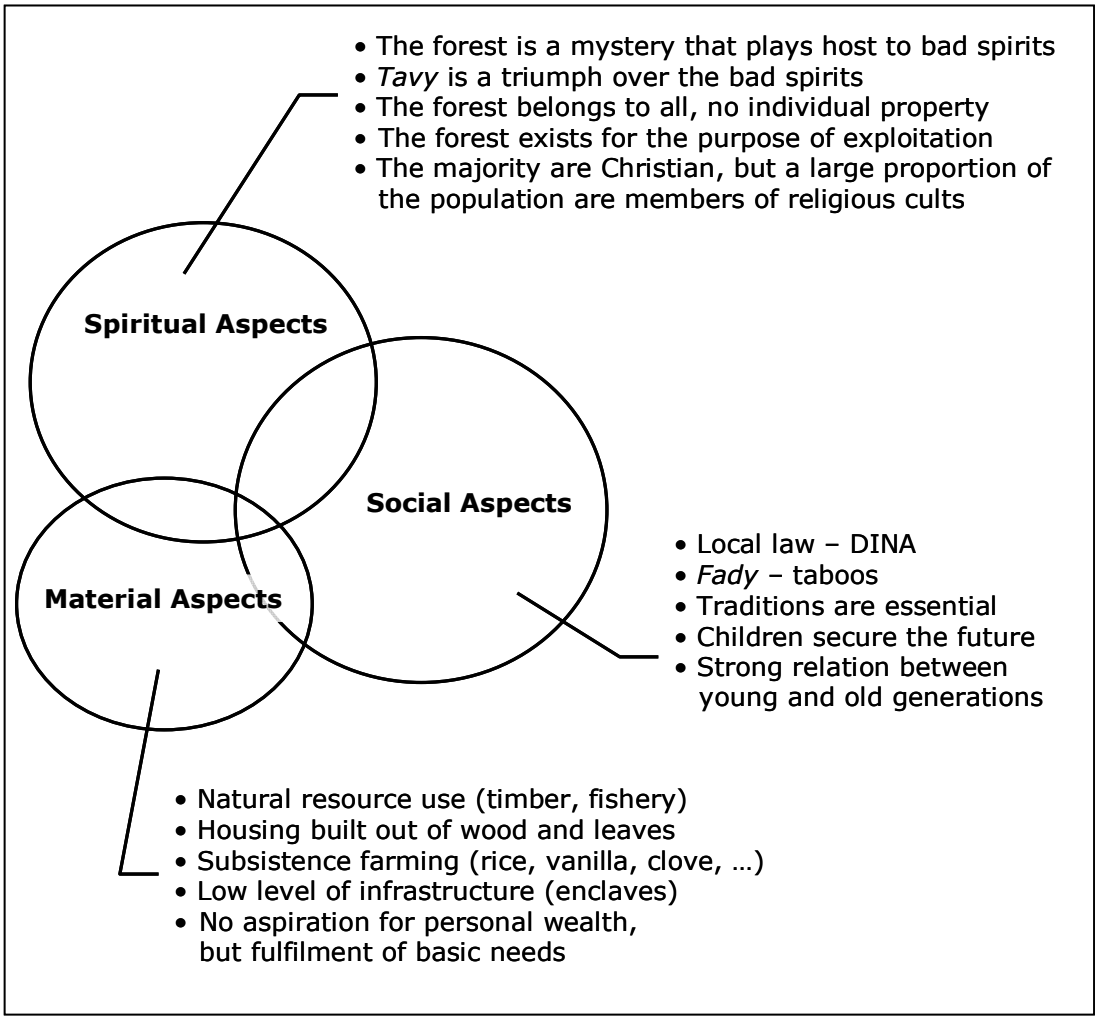

Figure 4: Cultural Aspects in the Biosphere Reserve Mananara-Nord

Acceptance of the Biosphere Reserve

The population is apparently divided into two factions as regards their attitude towards the BRMN. One group of local residents maintains a traditional cultural antipathy towards the forest and thus rejects the project's activities aiming at primary forest conservation. A second group that is hostile to the project are Christian sects (e.g. Adventists). They are convinced that God has provided the forest to human beings for proper use through, for example, land-reclamation. A third group, representing the majority, recognises the forest's value, with its ecosystem functions as well as the benefits the BRMN management contributes to conservation and developmental efforts. Income-generating activities are of

major interest in the short-term perspective and environmental sustainability in the long run. Though convinced of the projects' advantages and the importance of conserving the forest, these people are constrained to satisfying daily basic needs through making use of the forest. The only solution is to find and implement alternatives for this unsustainable use of natural resources. (Brandt *et al.* 2000)

2.7 BRMN Management

This section aims at answering the following questions: Where does the management of the BRMN face major problems, and what needs to be done to solve them? And, most important, how can the BSC add value and contribute to the existent management (surplus)?

Vision and Policy Goal

The principle task of the management is "to conserve the natural habitat and the initial ecosystem, including its unique biodiversity values". As the BRMN is part of Madagascar's national system of protected areas, it should represent and preserve its exceptional biodiversity and perform its function, which is of national and international interest. The BRMN is classified as a first-priority conservation area due to its unique biodiversity and the major pressures it has to withstand. The reserve is a natural and cultural heritage for the country and considered a world heritage by the United Nations. (ANGAP 2005a)

The BRMN Management has formulated a fourfold policy goal:

(1) The forest surface has to be maintained to ensure the hydrological equilibrium in the area, to prevent soil erosion, and to reduce sedimentation of rivers.

(2) The fauna and flora of the region have to be protected to maintain a genetic pool and a potential for regeneration that is important for sustainable utilisation. The healthy functioning of the parks coral reefs has to be ensured. Eco-tourism, environmental education, and monitoring have to be enhanced.

(3) The local cultural identity has to be maintained in order to facilitate the interaction of people and their environment, which forms an important part of the locale tradition and culture. The development of economic and sustainable agricultural methods for the population is likewise part of the vision. Development and integration of the population are therefore regarded as crucial factors in achieving these goals. (Brandt *et al* 2000)

(4) The BRMN management's contract with the EU states a triple objective: conservation and extension of the sustainable management of the primary forests, reduction of rural poverty, and strategic and political enforcement of a sustainable valorisation of the forests, leading to the transfer of the forest management.

Management Structure

The project of the BRMN is part of the ANGAP and is therefore under the authority of the direction in Antananarivo and the interregional division in Toamasina. It consists of six departments: 1. conservation, 2. development, 3.

environmental education, 4. transfer of the forest management, 5. socio-organisational assistance, and 6. communication/information (Fritz-Vietta 2008).

Management Plan(s)

With the full assumption of management responsibility by the ANGAP, the management plans (each individual division was requested to formulate its own management activities) were revised and adapted to changed conditions. In this process, the BRMN management was assisted by an external technical consultant of the international NGO *InterCoopération Suisse* (IC).

Due to the autonomous examination of each division, every department elaborated its own plan, while the elaboration of one general "Plan d'Aménagement" has not yet been completed. The lack of coherence in the management plans has become apparent; the project does not dispose of one specific plan that applies to the whole BR and its zones. However, each of the various departments of the project has developed a plan for its specific subject, i.e., a conservation management plan (ANGAP, 2005a), a rural developmental management plan (ANGAP, 2005b), a plan for environmental education (ANGAP, 2006), and also a "Plan Synthétique" (ANGAP, 2005c). Additionally, the technical advisor of the project from IC has elaborated one management plan for the peripheral zone, one for the core zone, and one plan called "Plan Final" that encompasses the whole BR. These plans are available as draft versions, and all were examined in order to extract the necessary information concerning management objectives, strategies, and actions.

With regard to the application of the BSC to the BRMN, it is essential to obtain an unambiguous picture of the project's management processes. Therefore, it was decided to split the objectives, strategies, and actions according to their subject and responsible department.

Next to the management plans, there is the contract of subvention with the European commission entitled "Sustainable management of the primary forests for poverty reduction in North-East Madagascar". It also comprises objectives and descriptions of activities to achieve these objectives.

3 Methodological Approach

It can generally be stated that conservation success has been achieved when the management practice fits the current situation in the area, and when the predetermined conservation targets have been met, monitored by the means of significant data of the biosphere reserve (Bertzky and Stoll-Kleemann). According to the European Environment Agency, sustainability in natural resource use is achieved when "…consumption of resources and their associated impacts do not exceed the carrying capacity of the environment…" (EEA 2005). Based on the analysis of BRMN's current situation, a stakeholder and SWOT analysis were undertaken and are described below in order to elucidate the area's condition and to allow for a further systematic assignment of management processes to the former one.

3.8 SWOT and Stakeholder Analysis

The current situation of the BRMN was analysed with help of an analysis of Strengths, Weaknesses, Opportunities, and Threats (SWOT) and of all relevant stakeholder groups, including their power and their presumed interest in the BRMN. The following section presents a discussion of the SWOT analysis and links the findings to the relevant stakeholders.

SWOT analysis

In the following, only the internal perspectives, i.e., the strengths and weaknesses of the BRMN, are presented, as they can be manipulated and influenced by management activities. The analysis is based on a literature review and on interviews conducted with BR residents. Together with the results of the interview survey, they form the basis for the identification of important strategic intervention areas of the management, elaborated in the form of the BSC. Table 2 lists the most important strengths and weaknesses that emerged from the SWOT analysis.

Table 2 Essential Strengths and Weaknesses of the BRMN

Strengths	Weaknesses
▪ Alternative, modern agricultural techniques; amelioration and variation of the crop quality and quantity. ▪ Support for the creation and establishment of associations; participation in BRMN activities, transfer of the forest management to the community level. ▪ Environmental education; advanced understanding of the importance of conservation. ▪ Establishment of information centres and libraries; establishment of ecotourism.	▪ Conservation does not play an important role in the everyday life of the residents (development has priority). ▪ Threats to biodiversity caused by human activity. ▪ Not enough schools and the absence of sound education (low educational level). ▪ Ongoing utilisation of traditional techniques that are not sustainable (*tavy*) – deforestation.

The results of the analysis clearly show that the strengths of the BRMN lie in the development of modern, rather sustainable agricultural techniques and an amelioration and variation of the crop quality and quantity. Providing developmental support for the population is a major factor in increasing their acceptance of the BR and where applied, it generates a definite strength. However, these modern techniques are not well distributed or utilised yet, which is the reason for the continued presence of conventional, unsustainable techniques, which constitute a weakness. The involvement of the local population in activities undertaken by the BRMN management, especially in communal forest management, is high on the agenda. The transfer of forest management has taken place in eight communities of the BR, and the further devolution of responsibility is in process. In particular, the creation and establishment of local

associations and the participation of these groups in activities and projects of the BRMN are seen as having a potentially strong positive impact. The same is true of environmental education and awareness-raising activities, such as establishing information centres, libraries, and ecotourism.

A high level of acceptance and understanding of the reserve's existence is vital for its success. This, in turn, depends on the degree of assistance and support it provides for the population, as well as the presence of developmental activities. At the moment, the population does not appear to esteem the importance of the conservation activities, the reason perhaps being that their relation to development activities is not always obvious. This is clearly a weakness. The absence of schools and sound education is another weakness, as better education raises awareness and improves income opportunities for locals. These are weaknesses that need to be tackled by management efforts. Another equally important challenge is the threats to biodiversity caused by human influence: eliminating these threats plays an essential role for the success of the BRMN, and the ongoing failure to do so still poses a great problem.

Stakeholder Analysis

Initially, it is important to classify all actors playing a role in the PAM system and processes (Mayers 2005). Therefore, the individual framework of relevant stakeholders has to be identified and their potential impact on strengths and weaknesses investigated. The stakeholder analysis was conducted at the local level, and the entity scrutinised was the management of the BRMN. The analysis of the various stakeholders identified their individual power and interest in nature conservation. The most important stakeholders need to be considered and consequently taken into account in the decision-making processes.

An important actor with a powerful impact is the national government, which actively supports nature-conservation efforts, and might correctly be considered the BRMN's major partner and supporter. The coming into force of the national legislation on protected areas (COAP) constitutes a vital improvement and a basis for all management options of the BRMN. The ANGAP is the initiator of conservation activities on the local level and works for the achievement of the reserve's overall objectives of biodiversity conservation and pressure reduction. The local population is another essential stakeholder group that has great influence on the success of the BRMN. This is especially true for people who live adjacent to the core zone because they potentially pose direct threats to the natural resources. The local communities and authorities are additional actors. Representing the local population, they have both significant power and interest in all activities that occur in the region.

The SWOT analysis clearly depicts participation and involvement of locals together with awareness-raising activities and education as key factors. This viewpoint is supported by the stakeholder analysis, which mentions local people, communities, and authorities as being among the key stakeholder groups. Management activities should seek to demonstrate ways in which local people, communities, and authorities can contribute actively to the conservation of their environment and thus to improve the quality of their own lives.

Other stakeholders - such as firms, tour operators, and tourists - often exert pressure on natural resources, but are seen as having little interest in nature

conservation. It is therefore important to consider these groups in management activities and provide them with incentives for sustainable resource use. National and international NGOs are important partners to the RBMN management and thus also require adequate consideration. The project should aim at intense collaboration with these institutions to establish a joint effort to reduce threats to biodiversity and the passivity of the population.

3.9 Interview Analysis

In total, 47 interviews were conducted on site during the survey in the BRMN, of which fifteen were with the staff of the ANGAP who work in the biosphere project in Mananara and 32 with residents living in the biosphere reserve. Additionally, sixteen interviews were carried out with general conservation experts working in Madagascar, such as from the head office of the ANGAP in Antananarivo, the World Wildlife Fund for Nature (WWF), the Wildlife Conservation Society (WCS), Conservation International (CI), and UNESCO. Altogether, 63 interviews were conducted in Madagascar. All interviews with staff of the ANGAP and other PA experts in Madagascar were analysed by collecting the answers to the following two questions: *What are success and failure factors of a protected area? How do you define a successful protected area?*

The resulting synthesis of factors constitutes, together with the findings of the SWOT and stakeholder analysis, a framework of success factors of the BRMN that should be integrated to its management efforts.

4 Results

In the following, the modification of the Balanced Scorecard for the setting of protected areas - and its specific application in the Madagascar reserve - will be demonstrated. The main question is "How must a Balanced Scorecard look like, when applied in a protected area context?". By showing its application in the BRMN, a draft of a BSC is deployed.

4.10 The Balanced Scorecard applied to PAM

As described in the introduction, the Balanced Scorecard approach arose from the business sector. Generally speaking, business organisations seek to maximise profit, whereas protected areas have a totally different focus, their vision being success in the conservation of nature. Nevertheless, like businesses, protected area managers are involved in decision-making processes and have to coordinate immediate measures as well as consider long-term prospects. Also like in business, good performance in conservation is the result of achieving targets, a process that requires periodic evaluation. Like any other management, those responsible for protected areas need to orient their thinking and actions toward sustainability, which demands strategic decision-making.

The Balanced Scorecard aims at adaptive management while integrating tangible and intangible performance measurement indicators in order to depict the management's achievement of objectives. Though theoretically being beneficial to PAM's effectiveness, the BSC concept requires a revision in its structure as well as its content, hence an adaptation to the setting of the non-profit area. When applied in the non-profit area, the perspectives interact differently. Financial gain

is no priority anymore, but rather the vision of Protected Areas (see figure 5). Therefore, there is a shift from tangible aims to an intangible vision and the need to adjust the perspectives accordingly.

Performance indicators are categorised in four perspectives that have been renamed to indicate their scope more adequately. In table 3, the original versus the adapted and renamed perspectives are presented for comparison.

Table 3 Perspective Adaptation

Original Perspectives	**PAM Perspectives**
1. Finances	1. Funding
2. Customers	2. External Impacts and Stakeholders
3. Internal Processes	3. PAM Internal Processes
4. Learning and Growth	4. Management Capacity

Since PAM usually depends on external financial backing, the *finances perspective* becomes the *funding perspective* considering the project's financial efficiency. What was originally the *customer perspective* is now in the context of PAM called the *external impacts and stakeholder* perspective; it puts special emphasis on the PA's external environment in order to reflect comprehensively the PA's external framing conditions.

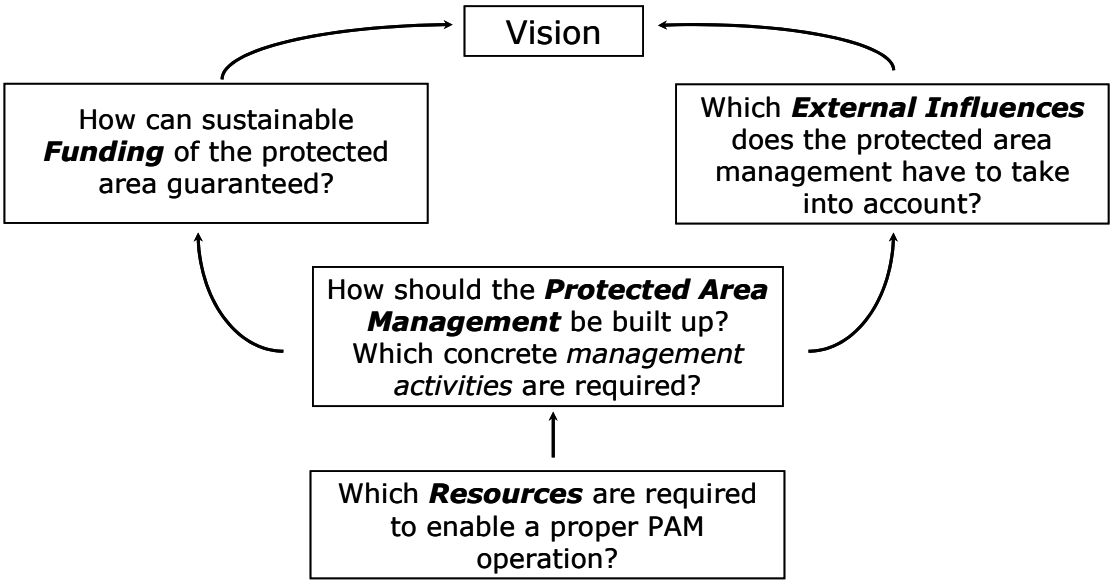

Figure 5: BSC approach adapted to PAM

Since the two remaining perspectives are almost identically applicable to both business units and PAM, they do not require any basic adjustments.

Generally, conservation success is the main focus and vision of PAM. With the nomination and establishment of a PA, a clear vision needs to be defined. For this reason, every management effort should be directed toward fulfilling this vision.

Based on given resources and facilities of the PAM, concrete management activities are chosen and implemented. These activities strive to accommodate

the interests of all the various actors concerned with the PA, i.e. the internal stakeholders (management staff), and the external stakeholders (communities, authorities etc., and investors), whose support and collaboration is essential for the realisation of the vision. The whole BSC concept, including the four perspectives, is displayed in figure 5. It is important to keep in mind that all perspectives interact complementarily.

4.11 Success and Failure Factors of the BRMN

In order to identify the most important success factors of the BRMN, the whole set of factors resulting from the interview analysis were compared with the main findings from SWOT and stakeholder analyses. In this process, all factors that did not fit the findings of the SWOT were considered less relevant for the BRMN and thus sorted out. This comparison resulted in a set of factors that are of particular importance for the BRMN. For the implementation of the BSC, these factors need to be assigned to the corresponding perspective. These four perspectives later constitute part of the Balanced Scorecard. Table 3 gives an overview of the selected factors already categorised into one of the four BSC perspectives.

Table 4 Selected Factors Resulting from a Comparison of Interviews, SWOT and Stakeholder Analysis, Divided into the Four Categories of the BSC

Selected factors from interviews, SWOT, and stakeholder analysis	
1. Funding - Budget realisation (project efficiency) - Working plan realisation - Management plan realisation	**3. Management Processes** - Activities to raise LP's acceptance - Rural development - Collaboration with local communities - Participation of involved actors - Conservation efforts - Law enforcement
2. External Stakeholders and Impacts - Sustainable commercial exploitation - Natural resource exploitation (illegal) - Property rights (land-tenure situation) - Poverty - Inadequate infrastructure - Legislation	**4. Management Capacity** - Available budget - Project infrastructure - Management structure - Quality personnel

From the analysis, it became obvious that the most important factors all aim at greater and more positive involvement of the local population including acceptance, development, and participation. Only the aspect funding, which got a similarly high score, is of a different focus. In particular, the activities to raise the population's acceptance were regarded as the most important and were mentioned by a third of all interviewees. The ranking of the factors indicates that integration of the population is regarded as crucial in achieving conservation

success. Funding plays a major role as well, as it is recognised as being essential in all conservation and management efforts.

As has already pointed out from the SWOT analysis, the human-caused threats to biodiversity are considered to have major influence. Then, in conjunction with the success factor of development, the poverty of the population and the absence of alternative income opportunities that could replace the destructive *tavy* are regarded as important failure factors.

These factors constitute the basis for the establishment of the BSC. In the following, the various categories including the factors are described in detail.

4.12 The Balanced Scorecard Adapted to the BRMN

In each of the four perspectives, the appropriate factors are integrated and contrasted with strategic objectives, strategies, and measures of the BRMN management, as well as the defined key indicators assigned to them; target-actual comparisons (TAC) are applied to allow for an evaluation of the objective realisation level. Key indicators play an important role in the later practical application of the BSC since they constitute a means of measuring and reflecting relations between strategic objectives and their accumulation to BRMN's vision. These indicators are subsequently compared to target values (TAC), which need to be defined in a corporate decision-making process by experts like project managers or technical consultants. Target values require accurate definition and, in addition, should be assessed realistically.

In the present case, the emphasis is set on the allocation of the management to factors identified as being essential to the success of the BRMN. Key-indicators are partly recommended or (where possible) concrete examples stated.

Funding Perspective

By setting one focus on the funding perspective, it is sought to render the BR's financial basis. Generating a durable budget, which facilitates the achievement of set objectives and the overall vision, generally hedges the project's financial sustainability in the future. No biosphere reserve can effectuate nature conservation alongside sustainable rural development without security of financial durability. The management has to handle its funds effectively, efficiently, and in a concerted manner. Basically, finances describe the determining condition by which the implementation of the management plan is bounded. In principle, management seldom has input into the limit of external funds. Since the majority of BRMN finances come from the European Union, the former is generally required to meet predefined targets. Durable funding has still not been guaranteed and constitutes one of the project's principal objectives. Table 5 shows how this objective is integrated into the *Funding perspective* of the BSC.

Table 5 Funding Perspective

Influencing Factor	Strategic Objective	Strategy	Measures	Key indicator	TAC

Budget realisation (project's efficiency)	Effective application of available funds	Setting up a budget combined with a controlling tool to monitor the transfer of money into activities	Monitoring effectiveness through project assessment and regular reviews	e.g. the difference between budget level and actual expenditures
Working plan realisation	Precisely defined objectives are achieved within the set timeframe	Establish working plans on a regular basis for each entity of the BR	Coordination, communication, and arrangement at all levels of the BR management	e.g. number of employees who realized their working plan at the end of the period
Management plan realisation	Precisely defined objectives achieved within the set timeframe	Each division is supposed to develop its own strategy plan (concerted with each other)	Coordination, communication and arrangement at all levels of the BR management	should be indicated through various indicators measuring objective achievement

External Stakeholders and Impacts Perspective

The second perspective constitutes the external framework of the biosphere reserve including both external stakeholders and general impacts of the PAM. Generally, this perspective gives an overview of how the management deals with these two components. The management of the BRMN formulated specifically elaborated management plans to react to and focus their management processes on these impacts. This perspective is an accumulation of results from the stakeholder analysis and provides an overview of the general situation on site, and how the management responds to it. See table 6 for details of the perspective's composition and content.

Table 6 External Stakeholder and Impacts Perspective

Influencing Factor	Strategic Objective	Strategy	Measures	Key-indicator	TAC
Sustainable commercial exploitation -success factor	Diversification of products and cultivation activities	Participative diagnosis of the villagers' priorities	Onsite communication with LP and training programmes; encouraging LP to account for their natural resources	e.g. rational commercial exploitation realised in a sustainable[4] manner	

[4] Sustainable manner has to be defined precisely.

Influencing Factor	Strategic Objective	Strategy	Measures	Key-indicator	TAC
Natural resource exploitation (illegal) **-failure factor**	Significantly lower level of pressures (illegal logging) on the core zone compared to current situation	Establishment of a sound information system for conservation management	Patrols in combination with awareness-raising activities and environmental education	e.g. number of violations per month in the core zone	
Property rights (Land Tenure Situation) **-failure factor**	Securing protection of natural resources	Feasibility studies on the implementation of GCF in selected sites	Collective elaboration of BRMN-specific rules and implementation through local communities (COGE)	e.g. number "défrichement " – land reclamation	
Poverty **-failure factor**	Living conditions at higher level compared to current situation	Technical advice for micro-projects and financing	Support and training for income generating activities & strengthening socio-organisational capacity	e.g. number of successful (yielding a return) micro-projects	
Bad infra-structure **-failure factor**	A dynamic rural sector interconnected through roads and efficient infrastructure	Development of multi-stakeholder[5] collaboration	Discussing priority setting of rural development and establishment of a tangible implementation plan	e.g. number of enclaves (→ reduction to a low level)	
Legislation **-indifferent factor**	Realisation of national conservation policy	Establishment of local managing committees (COGE) who are acquainted with legal framework	Comparing and matching COAP with local legislation framework DINA	e.g. Conformity between COAP and DINA	

Management Processes Perspective

The third element of the Balanced Scorecard encompasses virtually all factors related to the biosphere reserve's management processes. Logically,

[5] Multi-stakeholder approach = collaboration with both local authorities and developmental NGOs

management processes are brought together to enable effective and efficient implementation of all management activities. Thereby, in the viewpoint of this perspective, quality is one main issue of consideration, as it means both process effectiveness ('to do the right things') and process efficiency ('to do things right'). Another focus is set on the particular coordination of all activities among the various divisions of the project to prevent counter-productivity or actions that are not target oriented (see table 7).

Table 7 Management Processes Perspective

Influencing Factor	Strategic Objective	Strategy	Measures	Key-indicator	TAC
Activities to raise local population's acceptance	Local population accepts the presence of the BR	Comprehension building and change of local population's attitude towards nature conservation	Strengthening of the educational infrastructure – improvement of schools and material	e.g. ratio of inhabitants having a positive attitude toward the BR	
Rural development	Utilisation of new cultivation techniques in degraded zones	Establishment of a systematic training and literacy programme	Scheduling the training and literacy programme specifically adapted to local conditions	e.g. number people implementing new techniques	
Collaboration with local communities	Frequent information exchange on crucial topics; clear assignment of responsibility	Establishment of direct communication channels between BRMN management and communities	roundtables on a regular basis	e.g. frequency of meetings or results of meetings	
Participation of involved actors	Provision for traditional knowledge in planning processes	Participative diagnosis, inventories, zoning, and laws of utilisation	Frequent visits to villages adjacent to the core zone seeking to communicate with inhabitants	e.g. number of local people willing to participate in BR activities	

Influencing Factor	Strategic Objective	Strategy	Measures	Key-indicator	TAC
Conservation efforts	Constant presence of "bio-indicators" to monitor functioning and status of the ecosystem	Elaboration of an ecological monitoring system	Monitoring activities on a regular basis	e.g. ecological indicators ("bio-indicators")	
Law enforcement	Significantly lower level of pressures (human occupation) on the core zone compared to current situation	Development of close collaboration between field agents and the police (who have the authority to enforce sanctions)	Maintenance of a close information exchange with local authorities	e.g. frequency with which sanctions are enforced in an adequate manner	

Management Capacity Perspective

To round off, the management capacity perspective draws a clear picture about internal stakeholders and resources of the BRMN. A functioning infrastructure provided with sufficient resources is a fundamental requirement and of high value for every organisation. Unfortunately, the majority of biosphere reserves do not attain this capacity. Most lack the financial means to remunerate staff and purchase the necessary equipment. Fortunately, the Biosphere Reserve Mananara-Nord has been endowed with a budget adequate to accomplish its tasks at the moment, but this funding runs out in 2007, and there is no long-term replacement source in sight. It is, therefore, necessary to invest in sustainable income generation and self-financing activities. The management structure and employees build the foundation for successful operations. See table 8 regarding the management capacity perspective of the BSC.

Table 8 Management Capacity Perspective

Influencing Factor	Strategic Objective	Strategy	Measures	Key-indicator	TAC
Available budget	Presence of a reliable basis to be able to fulfil the required tasks	Quality-oriented distribution of funds to generate new, durable income	Set up initiatives for income-generating activities	e.g. generated revenues	
Project infrastructure	To possess adequate equipment to be able to fulfil the required tasks	Wise handling of available means to guarantee a long-term existence	Supervision of project settings on a regular basis to ensure capacity to act	e.g. ?	
Management structure	Clear distribution of responsibility among all project divisions	Communication and information exchange on a regular basis	Arrange frequent internal meetings	e.g. quality teamwork	
Quality personnel	Skilled employees at all levels of operation	Increasing employee potentials and specific skills	Regular training that includes monitoring of employees' accomplished work	e.g. quality of accomplished tasks (degree of fulfilment of set objectives)	

By drafting the perspectives of the BSC, the inter-linkages among influencing factors, the objectives, strategies, and measures of the management become obvious. These factors actually define what is important and thereby determine objectives and measures that need to be taken to improve the situation.

After having matched the determined success and failure factors with the management of the BRMN for each perspective, particular interconnections among strategic objectives, strategies, and measures were drawn and aligned. Although specific indicators have not yet been determined and allocated, examples are offered to give an impression of which indicators might be adequate; furthermore, target-actual comparison is not yet included. In order to do so, the concerned management is asked to develop its own set of target values that precisely characterise the targets' achievement.

In this state, the Balanced Scorecard can be integrated into the local management and supports effective management structure and processes. Hence, management effectiveness might be promoted and better attainable.

5 Discussion

What is achieved?

The determination of critical success and failure factors was one major goal of this study and has been achieved adequately. The integration of the BSC, together with management factors has also been successful. However, the elaboration of cause-and-effect relationships between factors has not yet been realised. Also, the identification and fixing of definite key indicators to actually measure the achievement of the management goals have only partly been realised. Further research on this issue would add important value to the BSC.

The perspectives presented above include recommendations on how to improve the management effectiveness of the BRMN. However, when it comes to the actual practical implementation and application of the BSC to the management schemes of the BRMN, further practical recommendations are needed. The actual integration of the BSC into the working reality of the project needs to go along with education activities, such as workshops, training, and capacity building of the staff. Difficulties in implementation and utilisation of the propositions may evolve from the project's management capacity in regard to equipment and human resources, as well as from the daily reality in one of the world's poorest countries. The region of Mananara is quite isolated, lacking tar roads and other basic facilities and infrastructure. The underdeveloped communication infrastructure likewise causes problems to coordinate and collaborate effectively, not only with villagers but also with project staff members who are situated in the different sectors. These shortcomings need to be taken into account. The challenge for further research is thus to close this implementation gap and to facilitate necessary improvements and capacity-building measures to ensure the actual application of the BSC in practice.

What is new?

According to the "Open Standards for the Practice of Conservation" (Conservation Measures Partnership 2004) devised by The Conservation Measures Partnership during the conventionalisation phase the issue needs to be specified, the context in which the management takes place needs to be clearly articulated, and cause-and-effect-relationships of objectives and activities need to be considered. All these requirements play a significant role in the BSC concept. Through the accomplishment of interviews with all different stakeholder groups success and failure factors were identified and analysed by a SWOT and stakeholder analysis. Thus the context was better understood and the BSC concept could be applied correspondingly. Next to these basic considerations realised in this study cause-and-effect relationships document interrelations between strategic objectives and their subsequent implementation through strategies, measures and particular activities. In a strategy map defined strategic objectives are represented and correlated to each other. They are pictured at their different points of influence, i.e. *funding perspective*, *external impacts and stakeholder perspective*, *management processes perspective*, and *management capacity perspective*. Through this direct alignment a result-based planning is achieved, measurable through indicators and their accumulated target values. Once implemented the Balanced Scorecard easily functions as evaluation and monitoring tool facilitating an adaptive management cycle. Transparency and accountability, a crucial claim

to management effectiveness, plays an essential part of the concept's philosophy and is promoted through a clear and concise responsibility distribution and a fixed obligation to report. A results-oriented evaluation acts inspiring, when good results are honoured.

Many practical tools largely based on the framework for the assessing the management effectiveness of protected areas[6], such as The Consolidation Scorecard[7] devised by The Nature Conservancy (TNC), the Rapid Assessment and Prioritization of Protected Areas Management (RAPPAM)[8] concept and the management effectiveness tracking tool[9] developed by inter alia the World Wide Fund for Nature (WWF), and further well-known approaches already contribute considerably to the enhancement of management effectiveness. Corresponding to a results-oriented management approach the Balanced Scorecard introduces performance indicators, classifies them and pinpoints their interrelation. The management thus becomes inherent and clearly coordinated and stands a real chance to persist in the long-run. It is regularly checked whether actions have produced the envisaged results / outcomes in other words correspond to the protected area's overall vision. The Balanced Scorecard is a concept assisting the management to coordinate and synchronise individual perspectives which need to be considered. Thus the approach holds an added value to other monitoring and evaluation tools present in the field of protected area management effectiveness assessment.

6 Conclusion

The study has achieved its major objective and answered its main research question, '*How can the concept of the Balanced Scorecard be adapted to protected area management to achieve conservation success in the BRMN?'*.

Using a wide set of various analytical tools (SWOT, stakeholder, and interview analyses) that encompassed qualitative social as well as quantitative research methods ensured a refinement and proper determination of influencing factors. Also, the BSC was modified and adapted to the context of protected area management. The results of this study are thus twofold: firstly, the identification of critical success and failure factors and secondly, the deployment of the BSC in the Biosphere Reserve Mananara-Nord. Therefore, on the one hand the following recommendations relate to the actual implementation of the BSC. And, on the other hand, based on the detailed literature review, the interviews with various stakeholder (particularly with the residents), the SWOT and stakeholder analysis, and the definition of influencing factors, it is possible to include further recommendations directed at the BRMN project. These can be used to improve management activities in the short term, even if the BSC is not applied immediately.

[6] Drafted and announced by the World Commission on Protected Areas (WCPA) see e.g. (Hockings *et al.* 2000; Hockings *et al.* 2006)

[7] For further information see e.g. (TNC 2002)

[8] For further information see e.g. (Ervin 2003)

[9] For further information see e.g. (Stolton *et al.* 2003)

Recommendations / Outlook

In the following, the most important success and failure factors as well as strengths and weaknesses of the BRMN are highlighted, including recommendations to address them.

As a result of the study, it became obvious that the first priority, especially for the residents of the BRMN, is the availability of development activities. The acceptance of the BR directly depends on the presence of this assistance. Almost all residents interviewed expressed their support for the BR and agreed with the importance of conserving the natural resources. However, they also made very clear that their acceptance was mainly contingent on the project's activities concerning development. Without activities directed at the local population, it would be very difficult to involve them and increase awareness and understanding of conservation. It is thus most important to let development go hand in hand with conservation. Strategies and activities integrating both are essential. The 'Slowfood'[10] project is a good example, and the BRMN management should seek to broaden this approach and to develop similar income-generating projects.

It is of fundamental importance, not only to provide aid, but also to facilitate active participation of the local population, who are often too passive, expecting the project or other organisations to tackle their problems and improve their situation. To increase the residents' proactive involvement and ability and willingness to act, the establishment of local associations must be supported. The BRMN already undertakes such activities and should focus further on these and similar efforts. The transfer of the forest management to the local level is already a very promising approach to increasing the residents' sense of responsibility.

The involvement and education of the rural population is no doubt a crucial element for the success of the BRMN. Efforts concerning the monitoring of the biodiversity status and threats, however, should not be neglected. Ecological research on status and trends of the natural resources and the impact of human activities needs to play a stronger role. The establishment of an Environmental Impact Assessment System is a good approach for monitoring the conservation status and could also be included in the BSC concept.

The lack of coherence in management plans and activities is another important issue. The collaboration and coordination between the different departments must be designed more coherently and efficiently. The implementation of the Balanced Scorecard holds out the opportunity to better coordinate activities, to create more transparent management processes, and to clarify responsibilities.

The theoretic transformation of the BSC into a proper performance measurement and monitoring tool for managers of the BRMN is an important step, but putting this tool into practice requires another effort, and the following recommendations are only provisional. According to Papalexandris *et al.* (2005), the implementation of the BSC in an organisation needs sound and well-prepared planning. Gaining commitment is crucial, as is assessing employee acceptance of changing conditions and their willingness to change their own behaviour. These changes have to be communicated to the staff, and it has to be ensured that all

[10] Slowfood is a label for bio-products, in this case vanilla production; if organic farming is practised, products are labelled and brought to market for higher prices, to state one of many benefits.

have the same understanding of the project's vision, mission, and strategies. Priorities and objectives have to be identified and appropriate performance measures need to be selected.

The management needs to specify precise objectives that are achievable in a certain timeframe and that are measurable through unambiguous indicators. Target values need to indicate the achievement level of the envisaged objectives. The ANGAP has already developed an evaluation system to measure the efficiency of the national protected area network (ANGAP 2005d), which might pose a reasonable basis for the implementation of the BSC. Although the BRMN might not yet possess the capacity and resources to adapt such a tool, the follow-up efforts should not lose the track.

Of course, the BSC has been developed for transferral into practice, and this aim has indeed proven possible. The ANGAP has already developed a methodology to evaluate management effectiveness and is making efforts to enhance its management system. By involving the BSC in these efforts, the managers of the BRMN could reap the benefits of implementing this tool, which ensures improved and more effective management in the long run. This will contribute to the realisation of the overall vision and will benefits both nature and people.

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